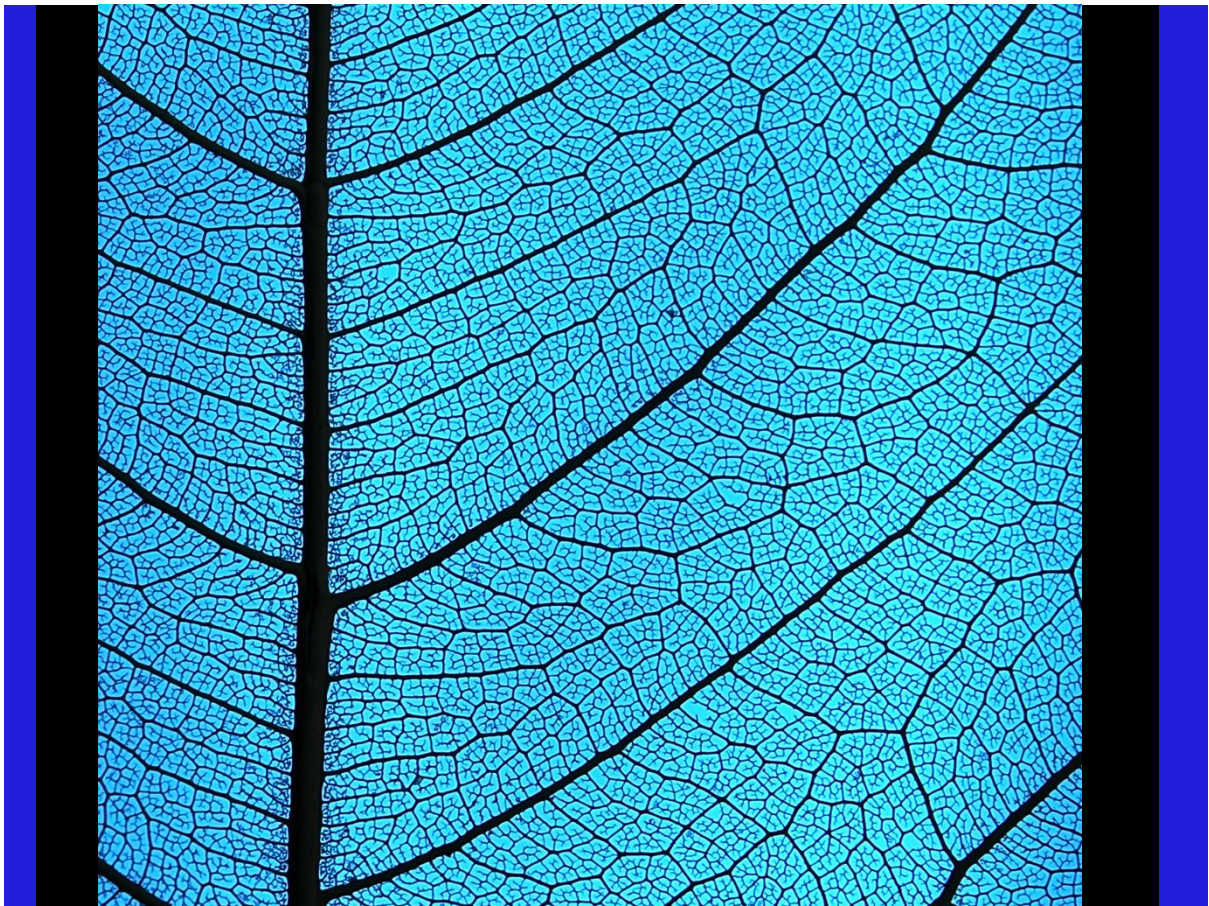


Overhead Line Works Environmental Report

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B2416603

Bodelwyddan Line Turn-Ins
18 June 2025



Overhead Line Works Environmental Report

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1. Introduction

1.1 Context and Overview

National Grid Electricity Transmission (NGET) ('the Applicant') operates the existing Bodelwyddan 400 kilovolt (kV) substation accessed from Glascoed Road, St. Asaph, in Denbighshire, north Wales. The Applicant is required to extend its existing substation to accommodate connection requests, which comprise three different elements:

- a. Construction of a new bay and installation of new equipment in the existing substation;
- b. Additional extension outside the current operational demise of the substation ('the substation extension') to accommodate connections from proposed new generation and an interconnector (the proposed MaresConnect project); and
- c. Construction of two overhead lines which will connect to the substation to the existing 4ZB overhead line to the south of the substation and proposed extension (hereafter referred to as the 'overhead line works').

The Applicant will use its permitted development rights to construct a new bay and install new equipment in its existing substation, but needs planning permission to extend its existing substation to accommodate connection requests.

The Applicant is making an application under the Town and Country Planning Act (TCPA) 1990 to Denbighshire County Council for an extension to the existing Bodelwyddan electricity substation and is making two applications to the Secretary of State for Energy Security and Net Zero (DESNZ) for consent to build and operate two overhead lines which will connect to the substation. The applications to DESNZ will include requests for deemed planning permission for the overhead line works via Section 37 of the Electricity Act 1989. This Environmental Report relates to the proposed overhead line works under the Electricity Act 1989.

The substation extension will allow the connection of new generation projects and an interconnector, each of which will be consented separately by their developers. The new overhead lines will replace the present double circuit 'turn-in' off the existing 4ZB Connah's Quay to Pentir overhead line. The new overhead lines comprising short double-circuit connections from the existing overhead line will create a Connah's Quay to Bodelwyddan overhead line and a Bodelwyddan to Pentir overhead line. The overhead line works and substation extension are required together for the new connections.

An Environmental Impact Assessment (EIA) Screening Opinion has not been provided by Denbighshire County Council but in discussion with the Council it has indicated to NGET that the substation extension, taking account of the overhead line works required, does not comprise EIA development.

The proposed overhead line works fall within the administrative boundary of Denbighshire County Council and are approximately 2 kilometres (km) west of St. Asaph and 1.3km south of Junction 26 of the North Wales A55 Expressway. The proposed locations of the overhead line works and works boundary are shown in Figure 1-1, Appendix A, Appendix B, and Appendix C.

The location of the proposed overhead line works is shown on Appendix A. The proposed overhead line works consist of:

- Existing overhead single circuit connection from the adjacent overhead line, which will be removed;
 - The existing cable sealing end compound and tower (pylon) to be removed, and the underground cables single circuit connection from the adjacent overhead line to be decommissioned;
 - Two new overhead line connections between the existing adjacent overhead line and the proposed extended substation;
 - Existing overhead line pylons to be removed; and

- Temporary compounds and car parking will utilise a combination of previously developed, operational land within the existing substation and undeveloped, non-operational land to the south and west of the substation extension for use in the overhead line works.

The overhead line works will include a temporary traffic diversion to allow works to take place. The existing pylon adjacent the sealing end compound will be removed along with the two low height pylons between it and the existing substation. Four new pylons will be constructed.

The existing overhead line proposed to be diverted is owned and operated by the Applicant.

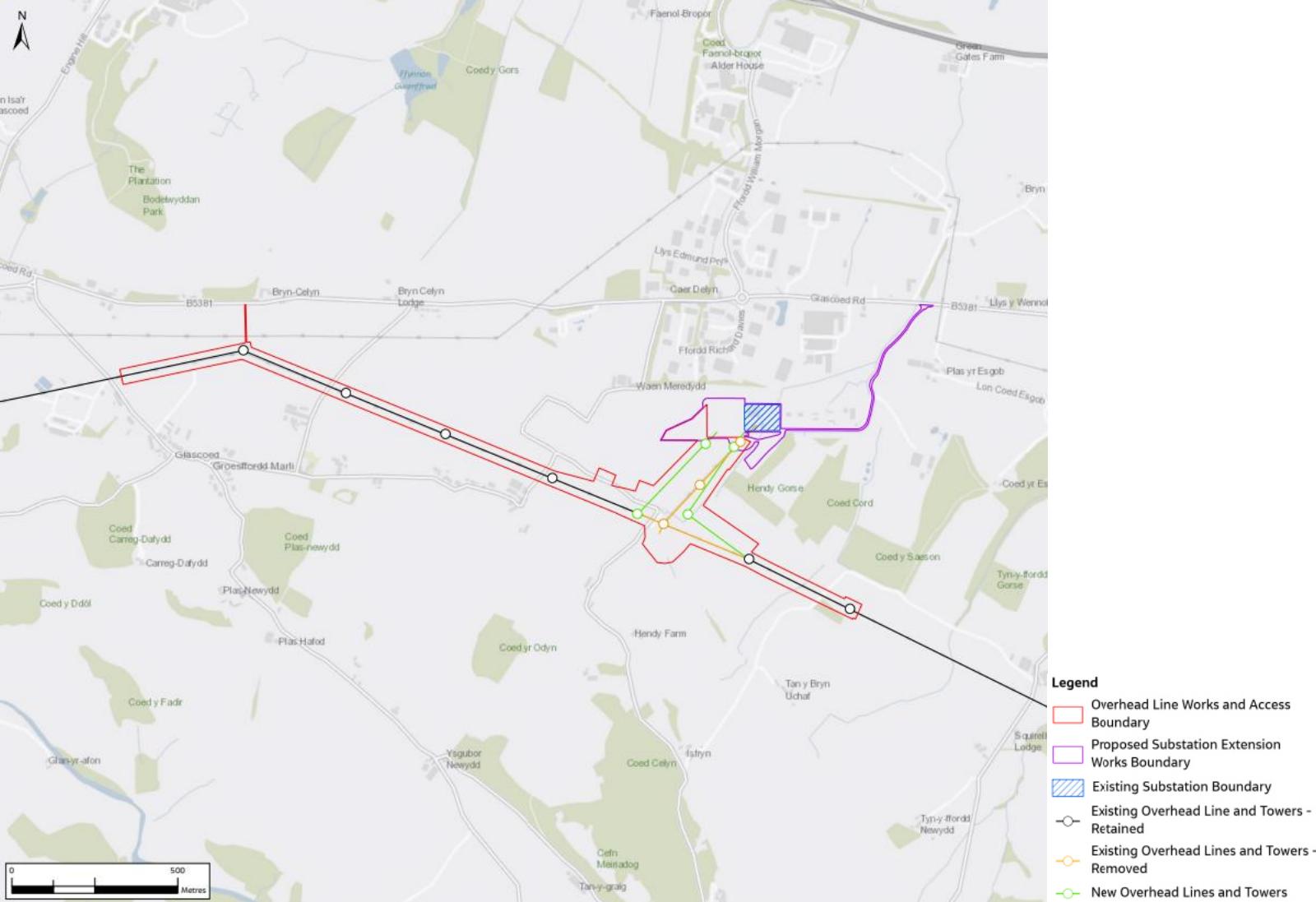


Figure 1-1: Works Site Plan

1.2 Consenting Approach

The overall consenting approach for the overhead line works, proposed substation extension and other accompanying works required to facilitate the wider project is set out in Table 1-1. The overhead line works pursuant to this application for Section 37 consent are reference number 2 in Table 1-1 and shown in Figure 1-1, Appendix A, Appendix B, and Appendix C. This Environmental Report was prepared as a technical report to examine the environmental aspects of the overhead line works and to support the Section 37 consent, and is not a statutory EIA report.

Table 1-1: Overall Consenting Approach

Ref:	Description of Works	Proposed Consenting Route
1.	Substation extension and replacement fencing around existing substation.	Planning application (pursuant to TCPA 1990).
2.	Overhead line works.	Section 37 consents.
3.	Other associated temporary enabling construction phase works including temporary access tracks and temporary compounds.	Planning application (pursuant to TCPA 1990 for substation works; deemed planning permission via Section 37 consents for overhead line works).

1.3 Report Structure and Supporting Documentation

The remaining sections of this Environmental Report comprise the following:

- Section 2 – Need for the Overhead Line Works: explains that the overhead line works are required together with the construction and operation of the proposed substation extension to accommodate additional load on the existing line which will arise from new connections;
- Section 3 - Description of the Overhead Line Works: including construction and operation;
- Section 4 - Consultation: explains the consultation undertaken to date;
- Section 5 - Environmental Appraisal: presents a summary of the assessment; and
- Section 6 - Conclusion: outlines the outcomes of the appraisal.

Reference is made to the following supporting Appendices:

- Appendix A: Works Site Plan;
- Appendix B: Section 37 Consent Drawing;
- Appendix C: Overhead Line Works Stage-by-Stage Drawings;
- Appendix D: Arboriculture Impact Assessment;
- Appendix E: Land Limitations Plan;
- Appendix F: Consultation;
- Appendix G: Planning, Design and Access Statement;
- Appendix H: Biodiversity Baseline;
- Appendix I: Habitats Regulations Assessment Screening;
- Appendix J: Landscape and Visual Methodology;
- Appendix K: Landscape Character and Constraints;
- Appendix L: Zone of Theoretical Visibility;

- Appendix M: Zone of Theoretical Visibility Methodology;
- Appendix N: Viewpoint Plan;
- Appendix O: Landscape & Visual Effects Table;
- Appendix P: Photomontages;
- Appendix Q: Photomontage Methodology;
- Appendix R: Representative Viewpoints;
- Appendix S: Environmental Masterplan;
- Appendix T: Heritage Appraisal;
- Appendix U: Construction Noise Statement; and
- Appendix V: Operation Noise Statement.

An assessment of the electric and magnetic fields associated with the proposed Bodelwyddan substation and overhead line modifications has been undertaken by the Applicant. The separate report comprises of a desktop analysis, undertaken in accordance with Government Policy and is based upon site-specific design information. The report concluded that the predominant source of exposure is the 400kV overhead lines connecting the substation to the electricity transmission system. The electric and magnetic fields from the overhead lines have been demonstrated as complying with the relevant exposure limits both individually and combined.

2. Need for the Overhead Line Works

2.1 Bodelwyddan Substation Extension

The Applicant owns, builds and maintains the electricity transmission network in England and Wales. Under the Electricity Act 1989, the Applicant holds a transmission licence, through which it is required to develop and maintain an efficient, coordinated and economical electricity transmission system. It is required to offer connections to organisations which make valid applications to connect to the transmission system and identified an extension to the existing Bodelwyddan 400kV substation as an appropriate response to connection requests made. These new connections include the proposed Awel-y-Môr Offshore Wind Farm (The Planning Inspectorate National Infrastructure Planning Ref: EN010112), the proposed Mona Offshore Wind Farm (The Planning Inspectorate National Infrastructure Planning Ref: EN010137), IGP Solar Farm and battery energy storage system (EIA scoping opinion requested January 2025), and the proposed MaresConnect interconnector (planning applications proposed to be submitted in 2025).

Renewable energy is required due to increasing energy demand and the need to mitigate the causes of climate change by achieving a carbon-neutral economy. The Welsh Government targets to generate 70% of electricity needs from renewable energy sources by 2030 and to reach net-zero by 2050. Awel-y-Môr Offshore Wind Farm Development Consent Order (DCO) was granted on 20 September 2023. A DCO application for Mona Offshore Wind Farm was submitted to the Planning Inspectorate in March 2024 and the Examination closed in January 2025. IGP Solar's proposals and separately MaresConnect interconnector are expected to be the subject of consent applications in 2025.

Figure 1-1 and Appendix A show the location of the proposed overhead line works and access routes, whilst also showing the existing Bodelwyddan substation and other existing substations to the east of the proposed substation extension. It also shows the following aspects of the proposed substation extension:

- The proposed substation extension works boundary;
- The access from the highway to the site of the works along the existing substation access road; and
- Working areas for the new substation extension around and to the west of the proposed substation extension.

Appendix B shows the location of the existing overhead lines and towers to be retained and removed, as well as new overhead lines and towers.

The overhead line works that are the subject of this report require consent via Section 37 of the Electricity Act 1989.

2.2 Construction Sequencing

It is important that the substation extension and connection of the proposed double circuit overhead lines are delivered as early as feasible to accommodate the additional load on the existing line arising from the proposed new connections.

Subject to planning permission, work is anticipated to commence on the Bodelwyddan substation extension during 2025 to deliver the wider project in time to accommodate the proposed new connections and additional load. The substation extension will take approximately 24 to 28 months to construct. The overhead line works will take longer due to required outages (period of time when at least one circuit or one 'side' of the overhead line is not live, allowing works to take place). The availability of outages can vary dependent on system conditions, but the current sequence of works is outlined in the stage-by-stage drawings presented in Appendix C, and as follows:

- Stage 1: Pre-outage assumes works commence 2026 with completion in April 2027;
- Stage 2: Pentir – Deeside – Bodelwyddan 2 circuit outage assumed 5 weeks;
- Stage 3: Pentir – Deeside – Bodelwyddan 1 circuit outage assumed 3 weeks;

- Stage 4. Pentir – Deeside – Bodelwyddan 2 circuit outage assumed 6 weeks subject to confirmation of remote end works;
- Stage 5. Pentir – Deeside – Bodelwyddan 1 circuit outage assumed 4 weeks subject to confirmation of remote end works; and
- Stage 6. Post outage and final arrangement.

The programme anticipates delivery of the overhead line works in late 2028 or early 2029, which would allow the new connections into the substation (subject to the connecting projects securing required consents) and accommodation of the additional load on the revised overhead lines arrangements following completion of the substation extension.

3. Description of the Overhead Line Works

3.1 Introduction

Figure 1-1 and Appendix A show the location of the overhead line works. The existing overhead single circuit connection from the adjacent overhead line is proposed to be removed between approximate Ordnance Survey (OS) Grid Reference SJ 01238 73284 and SJ 01585 73149, approximately 650 metres (m) south of Glascoed Road at the closest point. The existing sealing end compound (approximate OS Grid Reference SJ 01306 73220), and tower, also approximately 650m south of Glascoed Road, will be removed. The underground cables single circuit connection from the overhead line adjacent to the sealing end compound will be decommissioned. Two new overhead line connections between the existing adjacent overhead line and the proposed extended substation will be constructed, with new pylons at approximate OS Grid References SJ 01404 73280, SJ 01542 73483, SJ 01238 73284, and SJ 01465 73506. The existing overhead line pylons between the sealing end compound and the existing substation are to be removed, at approximate OS Grid References SJ 01435 73369 and SJ 01553 73487. Temporary working areas and access routes will be required to enable reconductoring or replacing conductors and wires, which will be between approximate OS Grid Reference SJ 01578 73153 and SJ 01885 73010, and SJ 00989 73380 and SH 99726 73686. Figure 1-1 and Appendix A also show the accompanying works and proposed substation extension outlined in Table 1-1.

Appendix C shows the stage-by-stage drawings including the sequencing of the overhead line works that are subject to Section 37 consent and which are considered in this report. A description of their construction, operation and decommissioning is set out below.

The substation extension and overhead line works are anticipated to require removal of trees, some pruning of overhanging branches, and hedgerows, as outlined in Appendix D. Temporary hedgerow loss will be reinstated following completion of the substation extension and overhead line works. Where there is permanent loss of trees and hedgerow, a commuted sum will be provided to fund works on Denbighshire County Council's Green Gates Farm Nature Reserve approximately 750m northwest of the overhead line works to compensate the loss and meet net benefit for biodiversity requirements. It is not possible to provide compensatory habitats on land adjacent to the substation or the proposed overhead line works due to other proposals emerging in the locale as shown in Appendix E. Awel-y-Môr Offshore Wind Farm's DCO rights have been granted to install cables through land around the substation and extension. Mona Offshore Wind Farm and MaresConnect interconnector have proposals in the public domain to build and to route infrastructure through land in the vicinity of the substation and extension.

3.2 Construction

3.2.1 Stage 1: Pre-outage

Stage 1 includes access and accommodation works at each work area, followed by installation of foundations at towers GM1, GMA1, 4ZB167A and 4ZB167B (see Appendix C, drawing PDD-32281-SBS-001 PO6 for locations and references). Towers 4ZB167A and 4ZB167B require foundation construction beneath or adjacent to live conductors and therefore may require an outage to complete this work.

Access to the overhead line works will be from two routes. The first route is via the existing substation access road which runs from Glascoed Road and then along the southern boundary of the substation. The access to the overhead line works would be off this road and along the existing cable route from the substation to the cable sealing end compound, tower 4ZB168 and tower 4ZB166. Working areas approximately 5m either side of existing easements for overhead line towers will be provided for access. The second overhead line works access route is via Glascoed Road to Tower 4ZB163 at OS Grid Reference SJ 00061 73765, where it connects to the existing easement 25m either side of the tower structures and lines.

The foundations of the new towers will not be piled (as per the existing towers). Foundation construction will involve the following plant and machinery: excavators, low loaders, 26 tonne (T) lorries, 6T dumper trucks, and concrete deliveries. The material storage areas will be within the working area around each tower, approximately 60m by 60m in extent, and within the temporary site cabins and storage areas shown in Figure 1-1 and Appendix A. Temporary material stockpiles would be in line with standard construction practice, with heights no greater than 4m. The contractor would comply with the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra, 2009). Daylight working is required for overhead line

works however lighting may be required in work-specific areas, compounds and for security. Working hours will typically be between 7.30am – 5.30pm, and weekend working may be required between 8.00am and 5.30pm subject to daylight.

This stage concludes with construction of tower GM1 (tower type L12 DT MK3 E6, height 55m, see drawing PDD-32281-OHL-013 P01 submitted with the application for elevations and plans of the tower). Construction of towers will require 28T vehicles for delivery, 20T telehandlers, 18T wagons, 42T low loaders, and cranes (assumed height approximately 75m and assumed weight 100T). The new towers will be painted steel to match the existing towers, and insulators may be glass or porcelain.

3.2.2 Stage 2: Pentir – Deeside – Bodelwyddan 2 circuit outage

Stage 2 includes construction of 4ZB167A tower body, short crossarms and temporary attachment (tower type L12 D90 STD, height 49m, base size 14.46m, see drawing PDD-32281-OHL-013 P01 submitted with the application for elevations and plans of the towers), and construction of two temporary masts (see Appendix C drawing PDD-32281-SBS-002 P06 for locations and references). The connection between towers 4ZB167 to GM002 will be removed. The circuit will be reinstated via temporary mast and teed arrangement at tower 4ZB167A.

3.2.3 Stage 3: Pentir – Deeside – Bodelwyddan 1 circuit outage

Stage 3 includes backstay conductors at tower 4ZB166 and termination of conductor on tower 4ZB167 (see Appendix C, drawing PDD-32281-SBS-003 P06 for locations and references). Conductor stringing will utilise the following plant and machinery: 20T telehandler, drum carrier, and 20T pullers and tensioners delivered on a low loader. Tower 4ZB167B will be constructed (tower type L12 D90 STD, height 49m, base size 14.46m, see drawing PDD-32281-OHL-013 P01 submitted with the application for elevations and plans of the towers), with temporary low duty span between towers 4ZB167B to 4ZB167. The phase will conclude with reinstatement of the circuit.

3.2.4 Stage 4: Pentir – Deeside – Bodelwyddan 2 circuit outage

Stage 4 includes dismantling of towers GM001, GM002 and spans (see Appendix C, drawing PDD-32281-SBS-004 P06 for locations and references). Removal of existing towers will utilise the following plant and machinery: low loaders, skip lorries, tipper lorries, and cranes (assumed height approximately 75m and assumed weight 100T). Tower GMA1 will be constructed (tower type L12 DT MK3 E6, height 55m, base size 17.380m, see drawing PDD-32281-OHL-013 P01 submitted with the application for elevations and plans of the towers), which may include foundations if they were not possible to construct in stage 1, therefore a 28-day concrete curing period may be necessary. Tower span between 4ZB168, 4ZB167A and GMA1 with downleads will be constructed. The temporary mast will be removed, and tower span between 4ZB163 and GM1 will be constructed with downleads. The stage will include remote end protection changes, with a change to tower 4ZB167-255 (88 towers) circuit identification plates and flag brackets. The stage will conclude with commissioning of a new Bodelwyddan - Deeside 1 and new Bodelwyddan - Pentir 1 circuit.

Stage 4 will also include establishment of temporary working areas and access routes to enable reconductoring or replacing conductors and wires. Following establishment of these areas and routes, the reconductoring or replacing works will commence alongside the dismantling, removal and construction of towers. These areas include:

- Conductor and earth wire pulling zones of approximately 100m by 60m for conductor pulling, guying conductors to the ground and concrete blocks, and connecting conductors to the cross-arm fittings of the next structure. Hydraulic winches, pullers, tensioners, reel winders and reel cradles will be used, amongst other equipment. These will be at approximate OS Grid Reference SJ 01578 73153 and SJ 00060 73771.
- Construction zones of approximately 100m by 60m for excavation, concreting, reinforcements bar placements, stub erection, tower erection, cross arm modifications, insulators, cross arm fittings, shield wire fittings, gantry structures, temporary material storage, assembling, earthing, fence gates, cable routing and rerouting and other substation related activities. Excavators, cranes for erection, load trucks, gin pole and hoist, riggers, and concrete trucks will be used amongst other equipment. This will be at approximate OS Grid Reference SJ 01885 73010.

- Easement zones approximately 25m either side of tower structures have been assigned for building overhead lines through a wayleave agreement and adhering to the guidelines of NGET. These will be between approximate OS Grid Reference SJ 01885 73010, SJ 00672 73505, SJ 00372 73630, SJ 00058 73761, and SH 99723 73685.

3.2.5 Stage 5: Pentir – Deeside – Bodelwyddan 1 circuit outage

Stage 5 includes construction of span between tower 4ZB163 and GM1 with downleads (see Appendix C drawing PDD-32281-SBS-005 P06 for locations and references). Crossarms will be added to tower 4ZB167A, with spans from 4ZB168 to 4ZB167A to GMA1 constructed with downleads. Tower 4ZB167, the cable sealing end compound cable, and conductors between 4ZB167B and 4ZB168 will then be removed. There will be remote end protection changes, with a change to tower 4ZB167-255 (88 towers) circuit identification plates and flag brackets. The stage will conclude with commissioning of a new Bodelwyddan - Deeside 2 and new Bodelwyddan - Pentir 2 circuit.

The cable removal between the cable sealing end compound and the existing substation will include removal of the Connahs Quay – Pentir 1 circuit. The cable length outside of NGET land is approximately 465m. There will also be removal of fibre optic and multicore cables which run to the overhead lines tower instead of the cable sealing end compound. The cable will be removed via open cutting methods and lifted from the trench before being cut into lengths of approximately 1m for ease of handling. The lengths of cable will be taken to a nominated NGET recycling site where all materials are recycled. Assuming the cable volume is approximately 2.2 cubic metres (m³) with standard skip sizes approximately three (3) cubic metres, the excavated cable should fit into one skip for transport offsite. Excavated subsoil will be utilised for refilling and reinstatement following cable removal, and backfill material will be brought to site to make up the volume of materials removed. Imported backfill material is equal to the volume of cables which is estimated to be approximately 230m³. It is estimated that this will take 23 lorries at a capacity of 10m³ to transport onsite.

Reconductoring or replacing of conductors and wires works will continue and conclude in Stage 5.

3.2.6 Stage 6: Post outage and final arrangement

Stage 6 includes reinstatement and landscaping (see Appendix C, drawing PDD-32281-SBS-006 P06 for locations and references).

3.3 Operation

During operation, the overhead lines and towers would be subject to routine maintenance checks as part of wider network inspections. No new permanent access routes will be required for any of the overhead line towers.

The overhead line works would be designed, constructed and operated in accordance with applicable health and safety legislation, complying with design safety standards including the National Electricity Transmission System Security and Quality Supply Standard, which sets out the criteria and methodology for planning and operating the National Electricity Transmission System. The overhead line works will comply with the Electricity Safety, Quality and Continuity Regulations 2002. All electricity companies are bound by these rules, standards and technical specifications. They are required to uphold them by their operator's licence.

3.4 Decommissioning

There are no plans to decommission the proposed overhead lines and towers as these will form an integral part of the electricity network.

If decommissioning were to be required, the regulatory framework, good industry practices and the future baseline could have altered. The Applicant would consider and implement an appropriate decommissioning strategy taking account of good industry practice, its obligations to landowners under the relevant agreements and all relevant statutory requirements. The decommissioning works would follow the Applicant's processes at the time for assessing and reducing any environmental impacts and risks.

Decommissioning would be likely to involve removal using similar working methods to those outlined during construction. It is anticipated that any temporary access tracks and working areas required for decommissioning

would be removed and the site reinstated to its former use. Decommissioning would follow the waste hierarchy such that materials would be reused where possible before recycling and disposal were considered.

4. Consultation

This Environmental Report supports two applications made pursuant to Section 37 of the Electricity Act 1989 to DESNZ.

A summary of the consultation undertaken prior to the substation extension planning application being subject to its statutory pre-application consultation is contained in Table 4-1.

Table 4-1: Summary of Consultation

Consultation Body	Type of Consultation	Summary of Consultation
<p>Denbighshire County Council</p> <p>23 June 2022 regarding landscape and visual surveys, and 1 August 2023 regarding substation extension EIA Screening Opinion Request Letter</p>	<p>Landscape and visual assessment proposals, substation extension and overhead line works</p> <p>Substation extension EIA Screening Opinion Request Letter, substation extension</p> <p>Permitted development letter, substation extension</p> <p>Planning application, substation extension</p>	<p>An enquiry about landscape and visual assessment proposals was responded to by Denbighshire County Council. The consultation can be viewed in Appendix F. The response was considered and applied to the landscape and visual assessment, included in Section 5.3, as well as the EIA Screening Opinion Request Letter.</p> <p>Although a formal EIA Screening Opinion has not been provided by Denbighshire County Council, it is understood that Denbighshire County Council has indicated to NGET that the substation extension, taking account of the overhead line works required, does not comprise EIA development and that this would be outlined in the Form B application rather than a formal opinion. The letter considered the proposed overhead line works in combination with the substation extension to give a comprehensive understanding of the potential for likely significant cumulative effects resulting from the proposals as a whole.</p> <p>The Permitted Development letter for works to the existing substation has not yet been responded to by Denbighshire County Council. The request can be viewed in Appendix F.</p>
<p>Ministry of Defence</p> <p>Consulted on 24 July 2023</p>	<p>Air safety letter</p>	<p>A response was received from the Ministry of Defence Safeguarding Manager which outlined that they had no safeguarding objections to this proposal. The Ministry of Defence additionally requested design considerations and notification of UK DVOF & Powerlines at the Defence Geographic Centre, which NGET are reviewing. The consultation can be viewed in Appendix F.</p>
<p>Liverpool John Lennon Airport</p> <p>Consulted on 24 July 2023</p>	<p>Air safety letter</p>	<p>A response was received from the Liverpool John Lennon Airport Environment & Safeguarding Advisor, providing the Safeguarding Map and requesting coordinates and heights of works. Following provision of this information, no further response was received. Based on the provided Safeguarding Map, the proposed overhead line works are within the "All buildings, structures, erections and works exceeding 150 metres in height (492.2 feet) should be notified" zone and do not exceed the permitted height. The consultation can be viewed in Appendix F.</p>
<p>Hawarden Airport</p> <p>Consulted on 24 July 2023</p>	<p>Air safety letter</p>	<p>A response has not yet been received from Hawarden Airport regarding air safety and the overhead line works. The consultation can be viewed in Appendix F.</p>
<p>Local community</p> <p>Consulted Q4 2023.</p>	<p>Community consultation events and representations period</p>	<p>The pre-application community consultation events and the representations period following these ended in Q4 2023.</p>

5. Environmental Appraisal

5.1 Introduction

5.1.1 General Approach

This section summarises the general approach to the environmental appraisal of potential impacts resulting from the overhead line works, and methods to avoid or reduce them.

In accordance with good practice and to consider advice from Denbighshire County Council for the proposed substation extension relevant to the overhead line works, the following topics are considered within Sections 5.2-5.7 of this environmental appraisal:

- Ecology and Biodiversity;
- Landscape and Visual;
- Traffic and Transport;
- Archaeology and Cultural Heritage;
- Socio-economic Effects; and
- Other Environmental Considerations (air quality, noise and vibration, flood risk and water environment, and geology, soils, land contamination and waste).

The environmental appraisal firstly describes the baseline. This is the reference level of the environmental conditions without implementation of the overhead line works and accompanying works, against which the potential impacts are assessed. Desk-based studies have been undertaken to inform the baseline using available data held in the public domain which is referenced throughout. Site surveys have also been undertaken to inform the appraisal. These are described in Sections 5.2-5.7 of this report where undertaken.

Where sensitive receptors are identified, the potential impact to the baseline is then assessed. The acceptability of the overhead line works and their potential impacts are considered against local and national planning policy in the Planning, Design and Access Statement (see Appendix G).

The appraisal also takes into account good practice measures and construction methodologies to avoid or reduce potential impacts.

The topic sections also consider the cumulative effects of the overhead line works on the environment when considered with other developments. The other developments considered are existing and planned energy and electrical infrastructure in the vicinity of the overhead line works, as requested for inclusion by Denbighshire County Council planning services (in response to landscape surveys and scope, 22 July 2022).

The other developments include:

- existing substations to the south of Glascoed Road (Bodelwyddan substation, Gwynt-y-Môr Offshore Wind Farm substation and Burbo Bank Extension Offshore Wind Farm substation);
- the existing Scottish Power Distribution Network substation on land to the east of St. Asaph Business Park;
- the existing flexible gas fired power station at TRB Drive on the St. Asaph Business Park;
- Elwy Solar Energy (Case Ref: DNS/3247619);
- Awel-y-Môr Offshore Wind Farm (The Planning Inspectorate National Infrastructure Planning Ref: EN010112);
- St. Asaph Solar Farm (Case Ref: CAS-01392-D2T3F3);
- Mona Offshore Wind Farm (The Planning Inspectorate National Infrastructure Planning Ref: EN010137);

- Morgan Offshore Wind Farm (The Planning Inspectorate National Infrastructure Planning Ref: EN010136); and
- IGP Solar Farm and battery energy storage system.

The associated proposed substation extension is also considered for cumulative effects.

A pipeline diversion is required to the south of the substation extension, which will be delivered by a third-party utility provider, and this is considered in the appraisal of the cumulative effects with the overhead line works. The pipeline owner and operator is Wales and West Utilities who will be utilising their permitted development rights to divert the pipeline and reinstate the land.

5.2 Ecology and Biodiversity

5.2.1 Baseline

5.2.1.1 Study Area

The overhead lines are set within a predominantly rural landscape, comprising agricultural fields, hedgerows, woodland and ditches (centred on OS Grid Reference SJ 01513 73567). A business park is approximately 25m to the north of the substation, and an existing offshore wind farm substation also abuts the National Grid substation 150m to the east.

The survey area comprises the permanent and temporary working areas for the overhead line works and is referred to as the 'works boundary'. The spatial scope of the study area takes account of all areas where significant adverse effects to ecological features could occur throughout the lifetime of the overhead lines including the construction footprint and potential locations of any ancillary works, compounds and varying Zones of Influence for the ecological receptors present.

The baseline for biodiversity is reported within Appendix H which details the methodologies and results of the desk study and field surveys. A summary is presented below. An importance valuation of ecological features identified has also been provided in accordance with the methodology outlined in Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines.

5.2.1.2 Designated Sites

One Special Area of Conservation (SAC), for which bats are a qualifying feature, was identified within 30km of the overhead line works:

- Mwyngloddiau Forest Gwydir (Gwydir Forest Mines) SAC, approximately 25km southeast of the works boundary (central OS Grid Reference: SH795578) is a collection of small sites which support lesser horseshoe bat (*Rhinolophus hipposideros*). This site is of International importance.

The search for SACs, Special Protection Areas (SPA), Ramsar sites, National Nature Reserves, Sites of Special Scientific Interest (SSSI) and Local Nature Reserves within 2km of the overhead line works revealed two statutory designated sites (see Figure 1, Appendix H):

- Coedwigoedd Dyffryn Elwy (Elwy Valley Woods) SAC, approximately 1.3km south of the works boundary (central OS Grid Reference: SJ020691). Annex I habitats that are a primary reason for selection of this site comprise Tilio-Acerion forest, an ancient semi-natural woodland. Coedwigoedd Dyffryn Elwy (Elwy Valley Woods) SAC is of international importance for biodiversity.
- Coedydd ac Ogofâu Elwy a Meirchion SSSI, is also approximately 1.3km south of the works boundary and is a component part of the Coedwigoedd Dyffryn Elwy (Elwy Valley Woods) SAC (see above). In addition to ancient woodland habitats, calcareous grassland and rare vascular plant assemblages are present. A diverse assemblage of bat species, including lesser horseshoe bat, have been recorded roosting in caves within the woodland. Coedydd ac Ogofâu Elwy a Meirchion SSSI is of National importance for biodiversity.

The desk study revealed 13 non-statutory designated sites, all are Local Wildlife Sites (LWS), within 2km:

- The closest is Coed Cord and Coed y Saeson LWS comprised of three areas of ancient woodland which feature alder (*Alnus glutinosa*), ash (*Fraxinus excelsior*), pedunculate oak (*Quercus robur*) and birch (*Betula sp.*) communities. The boundary of the Coed Cord parcel of the larger LWS is approximately 100m south of the existing substation at its closest point. This site is of National importance for biodiversity due to its irreplaceable ancient woodland habitats.
- The remaining 12 LWSs are greater than 600m from the works boundary (full details included in Appendix H).

5.2.1.3 Habitats

Habitats present within the overhead lines works area comprised agricultural fields (cropland and modified grassland) with boundary hedgerows (priority habitat) and dry ditches (see Figure 3, Appendix H).

The main access route would utilise the existing substation access from Glascoed Road, comprising a tarmac road bordered by other neutral grassland of moderate to poor condition and tall ruderal vegetation, species poor, managed hedgerows, dense scrub, and scattered trees.

In addition to the Coed Cord and Coed y Saeson LWS described above, an area of restored ancient woodland (un-named) is present within 20m of the works boundary. Areas of lowland mixed deciduous woodland (county importance) and other woodland (local importance) were recorded within 50m of the works boundary. Additional areas of ancient woodland habitats and traditional orchard and parkland priority habitats are also within 2km of the works boundary (see Figure 2, Appendix H).

5.2.1.4 Species

5.2.1.4.1 Great crested newts and other amphibians

Desk study data returned multiple records of great crested newt (GCN) and more common amphibians including common toad (*Bufo bufo*), common frog (*Rana temporaria*) and smooth newt (*Lissotriton vulgaris*) within 2km of the works boundary. An aerial assessment of the area identified no ponds or waterbodies within the works boundary but 10 within 250m. Three ponds (ponds 1, 2 and 9, see Figure 4, Appendix H) returned positive eDNA results indicating likely presence of GCN.

However, the cropland, hard standing and poor agricultural grasslands within the works boundary provide sub-optimal terrestrial amphibian habitat with semi-natural habitats having a short sward and being intensively managed through regular ploughing, grazing and poaching. Nevertheless, field boundary features such as hedgerows, field margins (unmapped), and small areas of tall ruderal habitat (unmapped) provide more suitable terrestrial habitats for amphibians including GCN. GCN and other amphibians are of **local** importance for biodiversity.

5.2.1.4.2 Reptiles

The desk study returned nine records of grass snake (*Natrix helvetica*) within 2km of the works boundary. Suitable refugia and foraging habitat for reptiles, including grass snake, were recorded within the works boundary comprising hedgerows, tall ruderal vegetation and dry ditches. The cropland and grassland habitats within the works boundary provided sub-optimal potential as reptile habitat due to their short sward and heavily managed nature. A small population of reptiles are assumed to be present and are of **local** importance for biodiversity.

5.2.1.4.3 Hazel dormouse

The desk study returned three records of hazel dormouse (*Muscardinus avellanarius*) within 2km of the works boundary. The closest record was approximately 1.2km southwest within Coed Plas Newydd woodland in 2013. Dormice are considered rare in this part of Wales (Wembridge *et al.*, 2016). The ancient woodland (Coed Cord and Coed y Saeson LWS), approximately 100m south-east of the survey area provided potential habitat for dormouse, with connectivity to the works boundary via the surrounding hedgerows. However, the hedgerows present were heavily managed by farming practices reducing suitability for dormouse.

5.2.1.4.4 Bats

All buildings and structures within the works boundary were as assessed as providing negligible suitability for roosting bats. Twenty-one trees with bat roost potential within 50m of the proposed overhead line works were identified. Dusk emergence and dawn re-entry surveys were carried out on trees with high and moderate potential to support roosting bats in August and September 2022, and a combination of climbing and dusk emergence and dawn re-entry surveys were continued in April and May 2023. Two trees were found to support confirmed bat roosts within the works boundary, T7a and T15 (see Figure 5, Appendix H). Both trees were summer day roosts of soprano pipistrelle (*Pipistrellus pygmaeus*) (two bats recorded) and common pipistrelle (*Pipistrellus pipistrellus*) (one single bat recorded) bats.

Activity (foraging, commuting, or social calls) of a low number of common bats were recorded during all dusk and dawn surveys with a single fly-by of a lesser horseshoe bat also being recorded.

The bat ecological features at this location are of **local** importance for biodiversity.

5.2.1.4.5 Breeding birds

Scrub, hedgerow, and scattered trees within the works boundary had potential to support tree and shrub nesting birds. Grassland field margins and arable habitats had the potential to support ground-nesting birds. The works boundary also had potential to be used by foraging barn owl (*Tyto alba*) but there was negligible potential for roosting and nesting barn owl within buildings or trees within the works boundary.

The existing towers provided suitable areas for nesting birds. However, no evidence of Schedule 1 (Wildlife and Countryside Act 1981 (as amended)) listed bird species was recorded during the field surveys. The value of the habitats within the works boundary for breeding birds is of **local** importance.

5.2.1.4.6 Other notable fauna

A single disused badger sett (a single hole) was recorded in 2021, as part of the Preliminary Ecological Appraisal (not provided as superseded by more recent habitat and species survey). However, no evidence of this sett was recorded during the subsequent surveys in 2022 and 2023. A live badger was observed during a dusk emergence bat survey foraging along the road to the north of the works boundary. Badger are of **local** biodiversity importance.

No suitable habitat for otter (*Lutra lutra*), water vole (*Arvicola amphibius*) or white-clawed crayfish (*Austropotamobius pallipes*) were recorded within the works boundary. The habitats present and desk study do not indicate the presence of important invertebrate assemblages. These ecological features are not considered further within this report.

Small mammals including hedgehog (*Erinaceus europaeus*) are likely to be active across the works boundary particularly in hedgerows and scrub. The small mammal assemblage is of **local** importance.

5.2.2 Measures to Avoid or Reduce Impacts

5.2.2.1 Embedded Mitigation

Ecological advice has been provided in the early stages of development design and potential ecological constraints have been continually fed into the process. The overhead lines are designed to retain as many mature trees as practicable and avoid areas of woodland. To avoid or reduce the effects of local compaction of ground within the root protection zones of retained trees, or other accidental damage, appropriate tree protection measures would be implemented in accordance with BS 5837:2012 'Trees in relation to design, demolition and construction, Recommendations' (BSI, 2012).

Standard good practice construction guidelines to avoid or reduce impacts to the terrestrial, aquatic and riparian environment would be followed. It is predicted that this would be sufficient to prevent any impacts caused by accidental pollution incidents such as fuel spills and sediment release during construction activities as well as dust control. Active construction plant would result in release of vehicle emissions but these would be minor and temporary such that no effect on ecological receptors is anticipated.

All overhead line works would take place during daylight hours. Noise from construction activities would be unavoidably generated but this would be temporary and at a level that is unlikely to generate a disturbance response from noise sensitive species. In the unlikely event disturbance, for example, to birds were to occur, there is plentiful alternative habitat available nearby.

5.2.2.2 Designated Sites

The overhead line works are highly localised, replacing an existing feature with a similar one at an adjacent location. There are no pathways to effect any designated sites.

5.2.2.3 Habitats

In line with the mitigation hierarchy the design has avoided and minimised impact as much as possible. The various activities involved with delivering the overhead line works can all be delivered without the loss of any trees. However, there will be some temporary loss of hedgerow to facilitate access, removal of old and installation of new pylons, and installing new overhead line conductors (wires). In total, approximately 198m of hedgerow would be impacted (H5, H9, H17, H19 and H20) - see the Arboricultural Impact Assessment report – Appendix D for details of trees and hedgerows within the proposed works footprint. In addition to facilitate the works there would be some minor, temporary loss of modified grassland at the existing and proposed pylon base locations. Lowering of hedgerow height to install the conductors onto the new pylons may be necessary where the overhead line oversail hedgerows. Modified grassland would be reseeded and the hedgerow would be left to regenerate on completion of works. No other habitats are anticipated to be impacted either directly or indirectly by the proposals.

There are no pathways to effect on any additional habitats.

5.2.2.4 Species

Protected or notable species identified during the desk study and field surveys with potential to be impacted by the proposed substation extension include GCN and other common amphibians, reptiles, hazel dormouse, bats, breeding birds, badger, hedgehog, and other common small mammals. An outline of the relevant legislation, potential impact and measures to avoid or reduce impacts is provided in Table 5-1.

Table 5-1: Measures to Avoid or Reduce Impacts on Species

Species	Legislation	Potential Impact	Measures
GCN Other amphibians: particularly common toad	<ul style="list-style-type: none"> Conservation of Habitats and Species Regulations 2017 (as amended) Wildlife and Countryside Act 1981 (as amended) S7 species in the Environment (Wales) Act 2016 	<p>Presence of GCN within terrestrial habitats within 250m of the north-east tower location.</p> <p>Sub-optimal habitats for GCN present in the footprint of overhead line works – temporary loss of modified grassland and loss of 198m of hedgerow.</p>	<p>In isolation, vegetation clearance would be under a precautionary working method statement for the overhead line works. However, as the substation extension would be undertaken at the same time, the vegetation clearance and groundworks necessary for pylon works would be included in the GCN mitigation licence required for those works:</p> <ul style="list-style-type: none"> An ecologist will provide a watching brief and perform hand-searching of the vegetation during clearance and other works in habitat areas suitable for amphibians. Two staged vegetation clearance to encourage amphibians to move away from the works area. Any common amphibians and small mammals found would be relocated to alternative, undisturbed habitats nearby. All refuge or potential hibernation features would be disassembled by hand and relocated out of the work area during the amphibian active season (generally April-October).
Reptiles; grass snake, slow worm, common lizard	<ul style="list-style-type: none"> Wildlife and Countryside Act 1981 (as amended) S7 species in the Environment (Wales) Act 2016 	<p>Sub-optimal habitats present in the form of heavily managed and grazed grassland.</p>	<ul style="list-style-type: none"> An ecologist will provide a watching brief and perform hand-searching of the vegetation during clearance and other works in habitat areas suitable for reptiles. Two staged vegetation clearance to encourage reptiles to move away from the works area. Any animals found would be relocated to alternative, undisturbed habitats nearby. All refuge or potential hibernation features would be disassembled by hand and relocated out of the work area during the reptile active season (generally April-October).
Hazel dormouse	<ul style="list-style-type: none"> Conservation of Habitats and Species Regulations 2017 (as amended) Wildlife and Countryside Act 1981 (as amended) 	<p>Loss of 198m of hedgerow and some additional lowering of hedgerows may be required for lowering or installation of</p>	<p>A precautionary approach to hazel dormouse would be implemented. It is considered unlikely that hazel dormouse is present within the works boundary but the following measures would be implemented under a non-licensed method statement with the supervision of a licensed dormouse ecologist:</p> <ul style="list-style-type: none"> A pre-clearance check by an ecologist for evidence of hazel dormouse would be undertaken No vegetation clearance can occur during the breeding season (July-September).

Species	Legislation	Potential Impact	Measures
	<ul style="list-style-type: none"> ▪ S7 species in the Environment (Wales) Act 2016 	conductors that oversail them.	
Bats	<ul style="list-style-type: none"> ▪ Conservation of Habitats and Species Regulations 2017 (as amended) ▪ Wildlife and Countryside Act 1981 (as amended) ▪ S7 species in the Environment (Wales) Act 2016 	<p>To be retained: T7a (SJ 01415 73409) – confirmed pipistrelle (<i>Pipistrelle sp.</i>) summer day roost.</p> <p>To be retained: T15 (SJ 01359 73280)- Confirmed Soprano Pipistrelle summer day roost for 2 bats.</p>	<ul style="list-style-type: none"> ▪ If works change and removal of the existing overhead lines requires the felling of T15, a bat mitigation licence will be sought from Natural Resources Wales. This would likely require a specified timeframe for exclusion of the roost and felling, and provision of bat boxes on retained trees. ▪ Any additional trees with bat roost potential which require removal or pruning would be subject to a pre-works inspection by a suitably experienced ecologist. Any loss of potential roosting features would be compensated for by the installation of bat boxes. ▪ To avoid or reduce the effects of local compaction of ground within the root protection zones of retained trees, or other accidental damage, appropriate tree protection measures would be implemented in accordance with BS 5837:2012 'Trees in relation to design, demolition, and construction'. ▪ Additional artificial lighting should be kept to a minimum. Any lighting scheme to be installed during the construction phase of the overhead line works, would be designed under the principals as outlined in the Bat Conservation Trust (BCT) Guidance for Bats and Artificial Lighting in the UK (BCT, 2018), including: <ul style="list-style-type: none"> - avoiding light spillage onto potential roosting features, woodland and hedgerow - lights should be turned off when not needed - warmer colour temperatures should be favoured which have a lesser impact on bats than white light with a greater blue or ultraviolet content
Breeding birds	<ul style="list-style-type: none"> ▪ Wildlife and Countryside Act 1981 (as amended) ▪ S7 species in the Environment (Wales) Act 2016 	Site infrastructure (including pylons) has potential for breeding birds. Other breeding bird habitat includes hedgerows.	<ul style="list-style-type: none"> ▪ Vegetation clearance or decommissioning of existing infrastructure, if completed during the nesting bird season (the end of February to mid-August), would be subject to a pre-works check for nesting birds by a suitably experienced ecologist. ▪ Any active nests found within an area where there is a risk of damaging or destroying the nest, would result in work stoppage. The nest would be left with a suitable stand-off, to be agreed upon and assessed by the ecologist.
Badger, hedgehog, and other small mammals	<ul style="list-style-type: none"> ▪ Protection of Badger Act 1992 ▪ Wildlife and Countryside Act 1981 (as amended) 	Hedgerows adjacent to the overhead line works provide habitat for badger, hedgehog and	<ul style="list-style-type: none"> ▪ A pre-construction walkover survey will be undertaken to check for any change in protected species presence (e.g. badger setts). ▪ During construction, where excavations cannot be covered, features should be provided (such as timber planking or a ramp) to allow a means of escape for trapped animals. ▪ All stored materials which could be used as refugia by small mammals should be suitably covered. ▪ Vehicle and plant access will aim to minimise tracking over habitats where small animals could be present

Species	Legislation	Potential Impact	Measures
	<ul style="list-style-type: none"> 57 species in the Environment (Wales) Act 2016 	other small mammals.	
Invasive Species	<ul style="list-style-type: none"> Wildlife and Countryside Act 1981 (as amended) 	No Schedule 9 listed invasive plant species recorded within the works boundary.	<ul style="list-style-type: none"> A pre-works walkover to check for newly established invasive non-native plant species and the development of a management plan setting out measures to be taken if their presence is found.

5.2.3 Potential Impacts

5.2.3.1 Construction

The duration and extent of the proposed construction programme for the OHL programme anticipates delivery in late 2028 or early 2029.

Where potential impacts have been avoided, as discussed in Section 5.2.2, these are not repeated here.

5.2.3.1.1 Statutory and Non-Statutory Designated Sites

The Screening Stage Habitats Regulations Assessment (HRA) fully assesses the potential for any likely significant effects on the two SACs. This is provided in Appendix I. In summary, due to the small-scale nature of the proposed substation extension and the relative location, distance and lack of connectivity, no impacts to designated sites are anticipated.

5.2.3.1.2 Habitats

In line with the mitigation hierarchy, the design has avoided and minimised impact as much as possible with no trees being lost and only 198m of hedgerow being temporarily lost or affected. All of which will then be reinstated. The proposals for both the overhead line works and the substation extension developments are shown in Appendix S Environmental Masterplan. In addition, only minor, temporary loss of some areas of modified grassland at the existing and newly proposed pylon base locations would be required. No significant adverse effects on habitats are anticipated from the construction phase of the overhead line works.

Off-site compensation is proposed to provide compensation for habitat loss within the development and provide biodiversity benefit. Off-site compensation is to be secured by a commuted sum for work on Denbighshire County Council's Green Gates Nature Reserve approximately 750m northeast of the proposed substation extension to achieve Net Benefit for Biodiversity.

5.2.3.1.3 Species

The overhead line works could result in some adverse effects on species during construction through activities such as vegetation clearance. However, these would either reduce or be avoided once measures (see Table 5-1, and Appendix H) have been applied.

Construction activities for the overhead line works, such as vegetation clearance and groundworks, could lead to disturbance of some individuals of species. Disturbance could lead to avoidance of foraging habitats. However, as there is alternative foraging habitat within the local area and the disturbance will be temporary and short-term, disturbance is not considered to negatively affect the conservation status of any species.

No significant adverse effects on species are anticipated from the construction phase of the overhead line works.

5.2.3.2 Operation

During the operation the proposed overhead lines will not need regular access and there will not be any additional noise, disturbance, or pollution. No significant adverse effect is anticipated.

5.2.3.3 Cumulative Effects

Due to the small scale of the overhead line works and local value of ecological receptors identified within the works boundary, no significant adverse ecology and biodiversity effects from the proposed development are anticipated.

Although there are several other proposed developments (as listed in Section 5.1.1) as well as the associated proposed substation extension works planned, cumulative effects on ecology and biodiversity are highly unlikely in combination with the overhead line works. The scale of habitat affected (and therefore also any dependent species) by the proposed overhead line works is relatively small and temporary. All impacted habitat will be reinstated or permitted to re-establish. Works to provide Net Benefit for Biodiversity will be undertaken via a

commuted sum paid to Denbighshire County Council for habitat establishment on its Green Gates Farm Nature Reserve 750m northwest of the overhead line works. While the Mona Offshore Wind Farm project proposes an underground cable and new substation to the south of the existing Bodelwyddan substation, a solar farm is proposed to the southwest of the proposed overhead line works, and other proposed developments will have effects on biodiversity and mitigation proposals, the nature and scale of the Bodelwyddan overhead line works are so minor in comparison that no in-combination effect is anticipated, even if construction works were to overlap.

5.2.3.4 Net Benefit for Biodiversity

Net Benefit for Biodiversity has been considered throughout the design process and has been implemented through the mitigation hierarchy in design to avoid and reduce impacts but will also be implemented through off-site mitigation.

Minor and temporary losses of poor condition modified grassland habitat and hedgerows would be unavoidable. However, both will be reinstated upon completion of the works.

In order to deliver an overall improvement in biodiversity through the proposals and to achieve Net Benefit for Biodiversity, off-site compensation is proposed to be secured by a commuted sum for work on Denbighshire Country Council's Green Gates Nature Reserve.

5.3 Landscape and Visual

5.3.1 Introduction

The purpose of this Landscape and Visual Appraisal (LVA) is to identify the potential effects associated with the construction and operation of the overhead line works on landscape character and views. The approach to the LVA has been tailored to suit the type and scale of the overhead line works and the likely extent and nature of potential effects.

The topics of landscape and visual amenity have been considered individually. The European Landscape Convention defines landscape as '*an area, as perceived by people, whose character is the result of the action and interaction of natural and / or human factors.*' Landscape takes its character from a combination of elements, including landform, watercourses, land use and pattern, land cover or vegetation, open space and cultural heritage influences.

To a large extent, people experience the landscape visually, and the quality of views can affect the quality of life. This appraisal addresses potential changes in the quality of existing views, considering the extent to which the overhead line works would be visible from surrounding residential properties, farms, footpaths and roads.

The following sections summarise the study area, the planning policy background of the overhead line works, and the methodology used for this assessment. This is followed by a description of the baseline conditions for each phase (construction and operation) and a summary of potential effects. Appendix J details the landscape and visual methodology.

The LVA has been informed by UK legislation, National Policy Statements, Planning Policy Wales (PPW) Edition 12, and local development plans.

5.3.1.1 Study Area

Establishing the landscape and visual baseline initially comprised a desk top study informed by aerial photographs, mapping and collating information on heritage features and designations, land use, open spaces, and vegetation and cultural heritage influences, as well as the locations of any screening features and potential visual receptors.

The study area and search area for this landscape and visual appraisal have been informed by the guidance note GN46 'Using LANDMAP in Landscape and Visual Impact Assessments' and refined by site survey. The study area boundary is shown in Appendix K and Appendix L.

The study area for the overhead line works was initially set as 5km from the centre of the works with a wider search area set to 8km to cover the wider context in which the overhead line works are proposed as recommended for the size of the proposed structures given in the GN46 guidance.

A zone of theoretical visibility (ZTV) of the overhead line works was generated using a bare earth terrain model combined with National Forest Inventory (NFI) data. The ZTV can be seen in Appendix L. The ZTV incorporates screening vegetation provided in the NFI, but it does not include other forms of screening vegetation (e.g., hedgerows and hedgerow trees or individual field trees) within this landscape. The ZTV does not incorporate other surface features (e.g., buildings and other built form), which would also have a screening effect for the overhead line works. The ZTV methodology is in Appendix M.

The extent of visibility was checked through a combination of desk study and site survey work to determine the visual receptors. The visibility from selected viewpoints, visual baseline, and Landscape Character Areas (LCAs) were checked on site in August 2022 and March 2023. It was determined that the visibility would not be greater than 2km and so the study area and search area were amended to 2km and 5km respectively.

5.3.1.2 Methodology

This appraisal identifies and evaluates the potential effects arising from the overhead line works upon the application works boundary and surrounding environment. A detailed methodology is included in Appendix J.

There is no requirement for an Environmental Impact Assessment to support this Application. In line with current guidance contained in GLVIA3 for non-EIA Landscape and Visual Appraisals such as this, the terms 'significant' and 'not significant' have not been used. However, it is important to set out the grading of the scale of the potential impacts based on the detailed information available regarding the nature of the overhead line works, the scale, duration and permanence of the change and the size of the resource or area affected.

The level of effect is assessed through a combination of two considerations – the sensitivity of the landscape character and visual amenity (views) of identified receptors; and the magnitude of effect (an evaluation of the geographical extent, duration and severity of the impact upon the receptors) that will result from the overhead line works. Appendix J includes criteria for determining values for sensitivity and magnitude of effect and the appraisal process has used professional judgement based on these criteria throughout.

During the appraisal, each receptor has been assessed against a scale of 'high', 'medium' or 'low' sensitivity considering its value and susceptibility. The magnitude of effect for each receptor has then been assessed against a scale of 'major', 'moderate', 'minor' or 'negligible', considering the scale of the effect, its duration, and its geographical extent. The resulting landscape and visual effects have been determined through consideration of both the sensitivity of the landscape and visual receptors and the predicted magnitude of effect arising from the construction and operation of the overhead line works. Effects have been assessed based on the Level of Effect matrix in Appendix J and have been described as 'major', 'moderate', 'slight' or 'negligible' and as adverse or beneficial, for example whether the change detracts from an existing landscape, or view, or enhances it.

Effects on landscape character and views, resulting from the construction and operation of the overhead line works, have been described for construction, operation year 1 and operation year 15. The assessment of these effects can be found in Appendix O. The winter assessments are to show the worst-case scenario when trees are not in leaf, whereas the summer assessment illustrate any screening effects from existing vegetation.

The combined effect of the proposed development and other planned developments have been described for a winter's day during construction and winter's day in operation year 1 only. This is because it would not be possible to state with certainty where proposed mitigation planting would remain due to future and ongoing development.

Four photomontages (Type 3 Visualisations as per LI TGN 06/19) have been prepared for sensitive visual receptors. The photomontages are presented in Appendix P with the photomontage methodology in Appendix Q.

5.3.2 Assumptions and limitations

The following are a list of the assumptions and limitations associated with the LVA:

- All representative viewpoints have been restricted to publicly accessible areas. The assessment of changes to views from private and inaccessible viewpoints (e.g., private property), including upper storey views, have therefore be made using the professional judgement of a Chartered Landscape Architect, based on an assessment from a nearby representative viewpoint (e.g. adjoining PROW or highway). Where publicly accessible viewpoints have been inaccessible during site surveys, the assessment of this viewpoint has been based on a combination of professional judgement, desktop surveys and site knowledge.
- Where planning applications have not yet been submitted (e.g. the proposed MaresConnect interconnector project and IGP Solar Farm and battery energy storage system project), and/or the details of proposed schemes are not publicly available, the proposed scheme has not been included in the cumulative assessment.
- The initial survey was conducted in summer 2022 due to requirements of the programme. A further survey to take photomontage photography from selected viewpoints was undertaken in March 2023 to assess the worst-case scenario vegetation without foliage.
- Public consultation was undertaken in late 2023 on the proposed development. The Consultation Report accompanying the application explains the feedback received and whether and how design responses were made.
- There are no proposals to permanently light the OHL during operation based on the information received. Night-time effects on landscape character and visual receptors during the hours of darkness are therefore considered unlikely.

5.3.3 Baseline

The following sections provide a description of the existing landscape context, LCAs and views within the study area, supported by Appendix K and Appendix N.

The permanent features introduced to the landscape, as a result of the overhead lines development, are limited to four fields of farmland between the existing Connah's Quay to Pentir overhead line and the field west of the existing Bodelwyddan substation and adjoining Gwynt-y-Môr Offshore Wind Farm substation. During construction (Stages 2 to 5 as described in Sections 3.3.3 to 3.3.5 of this report), temporary activity will take place in some of the adjacent agricultural fields.

To the north of the works boundary is a dense woodland strip beyond which lies the St. Asaph Business Park. To the east are mature woodland blocks. The development works boundary lies at a low point with the surrounding land to the south, east and west rising gently towards hills. There are no national statutory landscape designations (e.g. National Parks, National Landscapes (formerly known as Areas of Outstanding Natural Beauty) or Heritage Coasts) within the 2km study area. One local non-statutory landscape designation (Special Landscape Area (SLA)) is within the 2km study area to the east of the development (see Designated Sites below).

5.3.3.1 Designated Sites

There are no national statutory landscape designations within the 5km search area. The closest World Heritage Site (WHS) is Castles and Town Walls of King Edward I in Gwynedd, approximately 23km to the north-east. The closest National Park is Snowdonia, approximately 24km to the west. The closest National Landscape (formerly AONB) is Bryniau Clwyd A Dyffryn Dyfrdwy (Clwydian Range And Dee Valley), approximately 5.5km to the east.

There are two local non-statutory landscape designations within the 5km search area and one is in the 2km study area. The Afon Aled valley mosaic SLA is approximately 2.5km to the south east, and the Betws yn Rhos SLA is approximately 1.5km to the east.

There are several Registered Parks and Gardens within the 5km search area, including Llannerch to the south-east and Bodelwyddan Park and Kimmel Park to the north-west.

Viewpoints have been considered from Bryniau Clwyd A Dyffryn Dyfrdwy (Clwydian Range and Dee Valley) National Landscape and Bodelwyddan Registered Park and Garden. Viewpoints have not been considered from

any other designated sites listed above due to the local topography, distance, and intervening screening features.

5.3.3.2 Listed Buildings

Viewpoints from the following listed buildings have also been considered as part of this LVA. Those relevant to this assessment, along with their corresponding viewpoints, are listed below.

- Rhuddlan Castle, a Grade I listed building, 5km to the north (VP18);
- St. Margret's Church (The Marble Church), a Grade II* listed building 2.2km to the north-west (VP13);
- St Asaph Cathedral, a Grade I listed building, 2.5km to the north east (VP14); and
- St. Mary's Church, Cefn, a Grade II listed building 1.75km to the south-east (VP21).

5.3.3.3 Landscape

LCAs are distinctive areas with distinguishing characteristics, such as landform, vegetation, open spaces and land use. In the absence of an up-to-date published (local or regional) landscape character assessment for Denbighshire, these areas have been described for the study area through desk-based searches and on-site assessment. The relevant LCAs have been based on a combination of the descriptions of landscape units described in the published Conwy and Denbighshire Landscape Sensitivity and Capacity Assessment for Wind Energy Developments (2013) and current LANDMAP classifications. The LCAs were checked on site to determine the appropriateness for the landscape character baseline.

National

At a national level, the overhead lines site is at the north-eastern fringe of the National Landscape Character Area (NLCA) 09, Rhos. This is a landscape characterised by undulating landform in a series of rural foothills and river valleys, mainly sheep-grazed pasture in a mixture of field patterns, with strongly delineated mature hedge boundaries and occasional woodland blocks. The neighbouring NLCAs are Vale of Clwyd 11 to the east and North Wales Coast 8 to the north. It is not likely that the NLCAs will be impacted by the overhead line works to any significant degree and they have therefore been scoped out of the assessment.

The study area is also covered by NRW's LANDMAP system, a nationally complete GIS resource that maps and classifies the Welsh landscape. The five spatial datasets (Geological Landscape, Landscape Habitats, Visual & Sensory, Historic Landscape and Cultural Landscape) directly related to the overhead lines site are listed below:

- Geological Landscape Aspect Area: Bodelwyddan – "Gentle, north-facing slope of Westphalian Coal Measures with undulating topography, blanketed with Quaternary till. The slope is down from the limestone ridge in the south to the coastal plain and the alluvial Clwyd estuary";
- Geological Landscape Aspect Area: Cefn Meiriadog – "North west-south east trending limestone ridge with limestone exposed at several localities. There are several caves in the limestone and a wooded limestone pavement at the southern end";
- Cultural Landscape Aspect Area: Cefn Estate – "An area of mosaic rolling lowland where the attractive landscape quality of the aspect area whilst high, does not enable the overall evaluation of the area to achieve more than moderate due to the proximity of industrial development and frequency of this landscape type within the wider area";
- Landscape Habitat Aspect Area: Cefn Improved Grassland – "An intensively farmed improved grassland landscape with some arable, and a good network of hedges containing many mature trees, many small blocks of semi-natural broadleaved and planted mixed woodland, and some parkland";
- Landscape Habitat Aspect Area: Bodelwyddan Lowland Parkland – "A lowland parkland landscape of improved grassland, amenity grassland and some arable with a mix of veteran trees, semi-natural broadleaved and planted mixed woodland and ponds";
- Visual and Sensory Area: Limestone Valley-Cefn – "Strongly wooded river valley with limestone outcrops exposed in places linking St. Asaph in the north and Henllan to the south. The valley itself is

strongly influenced by the well defined mixed woodland structure that delineates the underlying topography - in places this becomes more evident as limestone outcropping occurs on the upper slopes. A more open and larger scale valley complex than the adjacent Upper Elwy complex displaying a consistent landscape pattern of field parcels”;

- Visual and Sensory Area: Cefn Estate – “Wooded former estate landscape lying on the edge of St. Asaph and the industrial areas surrounding Bodelwyddan. The area displays a fine array of woodland blocks and a well-defined field pattern delineated by hedgerows with a high incidence of mature hedgerow trees. Settlements are limited to small hamlets/villages and scattered farmsteads although the more urban influence of St. Asaph forms a definite boundary to the north and east, the area still has a relatively enclosed nature”; and
- Historic Landscape Aspect Area: Pentre-Mawr – “Organic enclosures south and west of St. Asaph, fieldscapes which have grown up over time, a predominantly rural environment”.

Local

At a local level, the LCAs listed below have been identified within the study area. These have been based on existing site knowledge, the LANDMAP information above, and the baseline landscape units identified within the Conwy and Denbighshire Landscape Sensitivity and Capacity Assessment for Wind Energy Development (2013).

- Eastern Lowlands (Cefn Meiriadog Vale Slopes) LCA;
- Limestone Farmlands (Abergele to Denbigh) LCA; and
- Vale Farmlands (Vale of Clwyd) LCA.

Following desktop studies and site visits, it was determined that only the Eastern Lowlands (Cefn Meiriadog Vale Slopes) LCA would be affected by the overhead line works and therefore at risk of encountering notable effects. This is due to the containment of views towards the overhead lines works, resulting from intervening landform within the local landscape, and the long distances between the proposed development and the other neighbouring LCAs. The two other identified LCAs: Limestone Farmlands (Abergele to Denbigh) LCA and Vale Farmlands (Vale of Clwyd) have therefore been scoped out of the assessment of landscape effects.

The key characteristics of the Eastern Lowlands (Cefn Meiriadog Vale Slopes) LCA, and the corresponding assessment of its quality, value, susceptibility, and sensitivity are summarised below. The criteria used to determine sensitivity is described in Appendix J.

Eastern Lowlands (Cefn Meiriadog Vale Slopes) LCA – Key Characteristics

Gently undulating pastoral lowland of medium scale with cultural heritage interest. Mosaic of irregular and semi-regular medium sized pastures with frequent small broadleaved woodlands and vegetated river valley. Pastoral fields are bound by mature hedgerows that are themselves a characteristic feature that contribute to the short range and contained views that are typical of the locality. Man-made influence is evident in the managed landscape and frequency of dispersed farmsteads and rural properties. Modern development is most notable along the A55, at St. Asaph Business Park and where pylon lines cross the landscape unit.

Distinctive skylines of the Clwydian Range lie to the east, but otherwise skylines are not prominent in this landscape unit. Skylines are occasionally punctuated by pylons and other built development. There is frequent road traffic along the Glascoed Road in the north of the character area. Views are typically enclosed and filtered by landform and vegetation (woodland blocks and hedgerow). There are few outward views, other than eastwards towards the Clwydian Range from the higher parts of the character area. There are views to and from important landscapes and cultural heritage features including The Bryniau Clwyd A Dyffryn Dyfrdwy (Clwydian Range and Dee Valley) National Landscape and Bodelwyddan Registered Park and Garden.

Eastern Lowlands (Cefn Meiriadog Vale Slopes) LCA – Value & Susceptibility

LANDMAP classifications for this area are evaluated overall as Moderate Landscape Value and Moderate Cultural Heritage Value.

Quality (**moderate to high**): Scenic quality and character is typically moderate to high (LANDMAP evaluation) with views to and from important landscape features: the north coast can be seen as can the Clwydian Range from higher parts of the LCA. It is a typically attractive rural landscape with some modern development and human activity which lessen the sense of remoteness and tranquillity.

Value (**medium**): There are several landscape elements contributing to scenic and perceptual quality in this character area. These are the mosaic field pattern, intermittent woodland cover and defined hedgerow boundaries including mature trees. The undulating topography along with the trees and woodland just described provide a sense of enclosure within the valley and frame views from higher up the hillside. The pylon route that crosses the LCA, the busy Glascoed Road and the substation and Business Park are described as detracting elements that reduce the landscape value.

Susceptibility to proposed changes (**low to medium**): The LCA includes modern development including existing pylons crossing the LCA and there are plenty of field boundary trees and woodland blocks to offer screening, so there is some capacity for the LCA to accommodate proposed changes. Existing energy infrastructure in the vicinity of the overhead lines site includes high voltage overhead lines, existing substations to south of Glascoed Road (Bodelwyddan substation, Gwynt-y-Môr Offshore Wind Farm substation and Burbo Bank Extension Offshore Wind Farm substation), the existing Scottish Power Distribution Network substation on land to the east of St. Asaph Business Park, and the existing flexible gas fired power station at TRB Drive on the St. Asaph Business Park.

Eastern Lowlands (Cefn Meiriadog Vale Slopes) LCA – Sensitivity

Based on the above assessment, it has been determined that the landscape is of **medium sensitivity** with moderately valued characteristics considered reasonably tolerant of change. The LCA therefore has some ability to accommodate the overhead line works without undue harm.

5.3.3.4 Visual

The overhead lines site and the surrounding predominantly agricultural landscape are relatively flat and low lying in the immediate vicinity and north towards the coast. To the south, the land rises up a small limestone hill range with agricultural fields and woodland blocks. The overhead lines site is well screened from the St. Asaph Business Park (located in the north) and from the south and east by mature trees and hedgerows delineating field boundaries and relatively large woodland blocks. Although, from the west, the overhead lines site is more open without the screening of large woodland blocks, the landscape is still populated frequently by individual mature trees within irregular field boundary hedgerows. Hedgerows are generally managed between 1.6-1.8m and are sometimes above head height due to the lie of the land.

Views from the higher ground are more open with views east to the Clwydian Range and north to the coast. Nevertheless, the undulating topography and the intermittent tree blocks, field boundary trees and hedgerows often interrupt the wider views of the hills, St. Asaph Business Park, the existing pylons and the settlement of St. Asaph.

The rural landscape is occasionally interrupted by commercial development and energy infrastructure features such as the existing substation, pylons, and overhead lines. The largest development is the St. Asaph Business Park, approximately 50m to the north of the Bodelwyddan Substation site. Residences within the study area are focussed on small settlements such as Pentre-mawr, and Groesfford Marli, with other small groups of dwellings on the Glascoed Road and on Lon Coed Esgob.

Residences are detached and semi-detached houses and farmsteads. Several residences to the south and west of the overhead lines site within these settlements are likely to have partial or filtered views of the overhead line works from their properties.

A representative viewpoint (VP) approach has been used to determine the potential for effects on people's views. The locations are shown in Appendix N and the relevant views can be seen on annotated photo sheets in Appendix R. Viewpoints from receptors have been recorded in a landscape and visual survey and are listed below. Where there were no views of the overhead line works, the selected viewpoints have been scoped out of the assessment of effects and are noted in Table 5-2 below.

There is no accompanying photograph view for VP15 or VP23 because the viewpoint location was inaccessible at the time of the landscape and visual survey. Assessments for these viewpoints are based on a combination of professional judgement, desktop surveys and site knowledge.

Table 5-2: Representative Viewpoint Descriptions

Viewpoint	View from	Description	Sensitivity	Scoped In
VP1 Approx. dist. from works boundary: 950m	Bodelwyddan Registered Park and Garden	Open panoramic views south-east towards the hills of the Clwydian Range. Distant hills are occasionally screened by taller vegetation in the short distance. Partial glimpsed views of the distant Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines, where the tops of two existing pylons (to the west of 4ZB167 pylon) are partially visible above the skyline. The existing substation is not visible due to the screening from intervening woodland blocks and individual trees. It is therefore unlikely that the proposed extension would be visible from this location.	High	No (see Representative Views Appendix R)
VP2 Approx. dist. from works boundary: 260m	Public right of way (PROW) behind residential receptor Tyddyn Meredydd	Open panoramic views north to coast and Clwydian Range across open fields with hedges and mature boundary trees in middle distance. 4ZB167 pylon is a noticeable feature in the view in the middle distance, a third of which protrudes above the skyline of the hills. The existing GM001 and GM002 pylons are visible in the background of the view, as is the substation which is partially screened by field boundary trees. There are views towards the existing substation, which would be further screened in summer when intervening vegetation is in leaf.	High	Yes (see Photomontage Appendix P)
	Residential receptor Tyddyn Meredydd	The principal views from Tyddyn Meredydd are towards the south-east and north-west. There is also a view north-east from a conservatory extension on the east side of the house, which has a narrow view down into the valley across open fields. It is likely that the top of 4ZB167 pylon is visible above the hedgerows at middle distance. It is also likely the GM001 and GM002 pylons, and the existing substation, are partially visible behind intervening field boundary trees and hedges that offer some screening, although the majority of features would be present in the background. Commercial development and energy infrastructure features are a key characteristic of the views.	High	Yes (see Photomontage Appendix P)
VP3 Approx. dist. from works boundary: 460m	Entrance to PROW off access road to existing Bodelwyddan and Gwynt-y-Môr Offshore Wind Farm substation	Short-distance views across the access road to the large mature trees on the west side of the access road, which screen views of the existing substation and nearby pylons. In summer, there would be more screening when the intervening vegetation is in leaf.	High	Yes (see Representative Views Appendix R)

Viewpoint	View from	Description	Sensitivity	Scoped In
VP4 Approx. dist. from works boundary: 560m	From PROW including residences at Lon Coed Esgob	Partially open views south-west above the high hedges from the PROW with distant top of the 4ZB167 pylon visible. The principal views from the residence are south facing. There are large mature screening trees on the western boundary of the property, which would likely filter views south-west to the corner of existing substation and access road from the property's upper storey windows. There are likely to be open views from upper and lower storey south to Burbo bank substation (150m from property), woodland blocks and hills to the south. There are also likely to be views to the existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines and associated pylons above the existing woodland block and against backdrop of hills.	High	Yes (see Representative Views Appendix R)
VP5 Approx. dist. from works boundary: 90m	Group of residential receptors at Pentre Mawr	From the ground floor of the properties, the views north-east include the road and a tall hedge in the short distance, which screens the easterly views. Views become more open as the ground drops away to the north, revealing mature trees, 4ZB166 pylon and existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines in the middle distance. Views from the upper floor of the properties are likely to be open to the east and north-east with partial distant glimpsed views of the existing substation, through the mature hedgerow trees. There are likely to be full upper-storey views of the existing pylons associated with the Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines in the middle distance.	High	Yes (see Representative Views Appendix R)
VP6 Approx. dist. from works boundary: 810m	Residential receptor The Cottage Villa at Glascoed Road	Principal views south-west are open across the busy Glascoed Road towards the regenerating scrub and agricultural buildings, mature trees and pylon in the middle distance. Views beyond are to the distant hills of fields and woodland. 4ZB167 pylon can be faintly seen in the distance against the backdrop of the hills. The existing substation cannot be seen due to the intervening vegetation, and it is therefore unlikely that the proposed extension would be visible from this location.	High	Yes, for overhead lines (see Representative Views Appendix R)
VP7 Approx. dist. from works boundary: 510m	St. Asaph Business Park (Qioptic Ltd) south at Glascoed Road	Enclosed views south across Glascoed Road to Qioptic Ltd three storey building and small car park in the short distance. In summer, intervening mature trees and vegetation would wholly screen existing substation, which is located immediately to the south. However, there may be glimpsed views through to existing substation in winter when trees are not in leaf. Top of 4ZB167 pylon is visible above the trees. There are likely distant views from third floor to hills to the south, including partial views of existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines and the other associated pylons.	Low	Yes (see Representative Views Appendix R)
VP8 Approx. dist. from works boundary: 1km	PROW Faenol Proper south-east	Open, long-distance views to hills to the south, across rural grazing and arable fields with hedges, field boundary mature trees and woodland blocks, which are occasionally interrupted by pylons and building rooftops. There is no view to the existing substation due to layers of intervening vegetation in winter and summer. It is therefore unlikely that the proposed extension would be visible from this location.	High	Yes, for overhead lines, (see Representative Views Appendix R)

Viewpoint	View from	Description	Sensitivity	Scoped In
VP9 Approx. dist. from works boundary: 780m	PROW Lon Coed Esgob	Open views above hedges lining PROW to the south-west. Middle-distance views of woodland and long-distance views to hills and fields with more woodland blocks. The existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines, along with their associated pylons, are visible in the middle to long distance of views, often projecting above line of hills in the background. The existing substation is not be visible from this location and it is therefore unlikely that the proposed extension would be visible from this location.	High	Yes, for overhead lines (see Representative Views Appendix R)
VP10 Approx. dist. from works boundary: 220m	PROW Hillside	Open panoramic views north-east to distant coast and the hills of the Clwydian Range. Views to the hills and coast are partially screened in the short distance by field boundary trees. Views across arable and grazing fields are often broken up by hedges and mature trees with occasional woodland blocks and settlement. Commercial buildings, substation development and pylons are present in the middle distance. 4ZB166 and 4ZB167 pylons protrude above the skyline of hills and coast. There are long-distance views of pylon GM001, with the existing substation partially visible.	High	Yes (see Representative Views Appendix R)
VP11 Approx. dist. from works boundary: 110m	PROW Valley	Open panoramic views. Hedges and fields in the short distance with occasional mature trees. Middle-distance views across mainly woodland blocks with occasional low pylons (backgrounded by woods) and energy infrastructure buildings (end of existing substation building and gantries visible). The existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines, along with several pylons, are visible to the south-east in the middle to long distance. 4ZB167 pylon in the middle distance is backgrounded mostly by sky. There are long-distance panoramic views of the Clwydian Range.	High	Yes (see Photomontage Appendix P)
VP12 Approx. dist. from works boundary: 150m	Residential receptor at Waen Meredydd	Open principal views south-east to woodland and across fields delineated with hedges, occasional mature trees and farm gates in the short distance. In the middle distance, the existing substation can be seen and the existing GM001 and GM002 pylons protrude slightly above distant woodland block skyline. There are open oblique views south across nearby fields to wooded hills where the 4ZB167 pylon is a dominant feature.	High	Yes (see Photomontage Appendix P)
VP13 Approx. dist. from works boundary: 1.6km	St. Margret's Church (The Marble Church)	Open views across laybys and road to stone wall and hedgerow with trees in the short distance. Hedge and trees partially screen more distant views, although there are occasional glimpsed views to fields and woodland blocks beyond. Very distant views (1.7km) of two pylons associated with the existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines (neither of which are located near the site boundary). There is no visibility of the existing substation extension due to lie of the land and intervening woodland blocks and vegetation. It is therefore unlikely that the proposed extension would be visible from this location.	Medium	No (see Representative Views Appendix R)

Viewpoint	View from	Description	Sensitivity	Scoped In
VP14 Approx. dist. from works boundary: 2.4km	St. Asaph Cathedral	Short-distance views from the cathedral grounds across the amenity lawn scattered with mature trees to tall brick boundary wall. Views towards the surrounding landscape are screened by nearby tall mature trees. A few neighbouring rooftops are visible. The existing substation and pylons cannot be seen from this location. It is therefore unlikely that the proposed extension would be visible from this location.	Medium	No (see Representative Views Appendix R)
VP15 Note: No photograph view. Approx. dist. from works boundary: 160m	Residential receptor on Groesfford Marli Road.	Principal view east-west from property. Easterly views open towards distant Clwydian Range. Views across open fields broken up by hedgerows bordering Groesfford Marli Road to settlement of Pentre Mawr in the middle distance. Views to the buildings are partially screened by group of deciduous and evergreen trees to the north of the road. The existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines route can be seen with pylons stretching into the long distance. 4ZB147 pylon is visible but distant and mostly against the backdrop of the Clwydian Range. The existing substation is screened by the group of trees to the north of the road is unlikely to be visible in winter without leaf cover.	High	Yes (no photograph view)
VP16 Approx. dist. from works boundary: 130m	PROW west	Open and long-distance views to the south-west. Large woodland blocks screen views to the north and north-west. Views to the south-west are across fields with hedges and mature trees to the existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines and associated pylons, which are wholly visible across much of the open views. 4ZB167 pylon is visible from sections of the footpath but the existing substation is not. It is therefore unlikely that the proposed extension would be visible from this location. Pylons are a key characteristic of the open views to the south-west.	High	Yes, for overhead lines (see Representative Views Appendix R)
VP17 Approx. dist. from works boundary: 570m	Residential receptors at Ty'n-y-fford-bach, west	Open views west across nearby road to hedges and horse paddock in the short distance. Partial views of the existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines, along with three associated pylons, which are partially visible above the skyline. 4ZB167 pylon is not visible nor is the existing substation due to topography and intervening vegetation of woodland blocks, hedgerows and mature trees. It is therefore unlikely that the proposed extension would be visible from this location. Pylons are a key characteristic of the view.	Medium	No (see Representative Views Appendix R)
VP18 Approx. dist. from works boundary: 4.3km	Rhuddlan Castle south	Open views across the Clwyd River floodplain and associated embankments with scattered vegetation in the short distance. Long-distance views south to wooded hills. The existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines and associated pylons are faint elements in the long distance and visible against the backdrop of the hills (other than where two pylons rise up to St. Asaph). The skyline of distant hills is occasionally broken by mature trees in the middle distance. St. Asaph Cathedral tower is visible in the long distance above trees. Views to the existing substation are screened by intervening vegetation. It is therefore unlikely that the proposed extension would be visible from this location.	High	Yes, for overhead lines (see Representative Views Appendix R)

Viewpoint	View from	Description	Sensitivity	Scoped In
VP19 Approx. dist. from works boundary: 620m	Residential receptor Isfryn Farm north-west	Likely principal views north-west from hillside property down into the coastal plains across irregular fields with clearly defined boundary hedge and tree planting. Short-distance views of fields and mature trees that partially screen the middle-distance views of woodland blocks and the existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines and associated pylons. Distant views of coast and Offshore Wind Farm turbines interrupted by pylons and overhead lines. It is unlikely that the existing substation and the proposed substation extension would be visible due to intervening field boundary tree planting; however, the top of 4ZB167 pylon may be visible above trees. Energy infrastructure features are a key characteristic of the view.	High	Yes, for overhead lines (see Representative Views Appendix R)
VP20 Approx. dist. from works boundary: 5.9km	PROW at AONB Clwydian Range in Rhualt off B5429	Views south-west over mostly wooded landscape with occasional fields and rooftops of settlements visible. Telegraph poles and wires and some buildings in Rhualt are visible in the short distance amongst the mature trees. Long distance faint views to Bodelwyddan Castle and Park and St. Margret's Church (The Marble Church). In the long distance, the existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines and associated pylons can be faintly seen against the backdrop of the hills and valley to the south-west. The existing substation is not visible from this location, and it is unlikely that the proposed extension would be visible from here, or indeed higher up the Range, due to the intervening screening vegetation. The top of St. Asaph Cathedral is visible in the middle distance.	High	Yes, for overhead lines (see Representative Views Appendix R)
VP21 Approx. dist. from works boundary: 1.4km	St Mary's Parish Church	Open panoramic views north across fields and settlements interspersed with trees and hedges towards the coast and coastal hills of the Clwydian Range. Short-distance views include agricultural buildings and fields with scattered mature field boundary trees. Middle-distance views include views of the existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines and associated pylons, which are mostly backgrounded by the darker wooded landscape. However, two pylons to the north-west are partially visible against the backdrop of the sea and sky. There are no views to the existing substation due to intervening vegetation. It is therefore unlikely that the proposed extension would be visible from this location.	Medium	No (see Representative Views Appendix R)
VP22 Approx. dist. from works boundary: 130m	PROW near Pentre Mawr residences	Open view north-east to the hills of the Clwydian Range. Short-distance views of fields and hedges with mature field boundary trees. 4ZB166 pylon is a dominant feature in the foreground with the existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines visible across much of the view. GM001 and GM002 pylons can be seen in the middle distance between a break in the mature trees. During winter, there are glimpsed views of the existing substation, although views would be mostly screened from in summer. There is a partial view of the 4ZB167 pylon, which can be glimpsed through some intervening scrub in the foreground. Commercial development and energy infrastructure are a key characteristic of the view.	High	Yes (see Photomontage Appendix P)
VP23	Hendy's Farm Residences to the	Access was not sought to residences on private land much higher up the hill, but from desk top studies of aerial photography the principal views from the two residences are to the north-west-south east and the	Medium	Yes (no photograph view)

Viewpoint	View from	Description	Sensitivity	Scoped In
<p>Note: No photograph view.</p> <p>Approx. dist. from works boundary: 400m</p>	<p>south of public road</p>	<p>east-west, which are not in the direction of the development. A woodland block, several individual trees and a hedge are also present to the north and north-east of the properties, providing screening for any non-principal or oblique views.</p>		

5.3.4 Measures to Avoid or Reduce Impacts

Measures have been taken in the siting of the pylons to avoid the removal and trimming of trees as far as reasonably practicable, within the required operational parameters to ensure as much screening as possible remains.

Measures have also been taken in the selection of the pylons to ensure that the materials and colours chosen match the existing pylons in the area to reduce the visual impact of the development.

Land used temporarily for the construction works would be reinstated to its preconstruction condition and use, where practicable, bearing in mind any restrictions on planting (e.g. safety clearances from overhead line conductors), land use and future land requirements (see below).

The proposed development is likely to result in limited hedgerow loss, which is documented in the Arboriculture Impact Assessment (refer to Appendix D). To assist with the screening of views and to help assimilate the proposed development into the surrounding landscape, the lengths of existing hedgerows removed to accommodate the proposed development would be reinstated where practicable.

Where there is permanent loss of trees and hedgerow, a commuted sum will be provided to fund works on Denbighshire County Council's Green Gates Farm Nature Reserve approximately 750m northwest of the overhead line to compensate the loss and meet Net Benefit for Biodiversity requirements. The proposals for both the overhead line works and the substation extension developments are shown in Appendix S Environmental Masterplan, and include:

- The reinstatement of 198 linear m of hedgerows throughout the proposed development site; and
- The reinstatement of 0.3 hectares of pastoral land at the cable sealing end compound.

The land immediately surrounding Bodelwyddan substation has existing constraints of a water pipeline to the north and a gas pipeline to the south. The gas pipeline would be diverted to run south of the substation extension before turning northwest to connect to its existing route and continue running west. There would also be future underground cable connections into the substation from other developments to the north, west and south of the substation extension. Due to the other proposals emerging in the locale, it is therefore not possible to provide compensatory habitats on land adjacent to the substation or the proposed overhead line works, including tree or shrub planting on the land adjacent and around the substation extension. As no mitigation planting would be implemented in the immediate locale of the extended substation, due to these operational and land ownership constraints, it is likely that the effects experienced by receptors would be reduced post-construction, but not eliminated.

5.3.5 Potential Impacts

Impacts on landscape and visual receptors during construction would be caused by movement of plant and equipment on site, the dismantling and raising of the structures, temporary material stockpiles and the temporary loss of approximately 198 linear m of hedgerow as identified in the Arboricultural Impact Assessment (Appendix D).

Landscape and visual effects during operation of the overhead line works proposed would occur from the addition of one pylon and the replacement of two low-height pylons with two full-height pylons, although pylons can already be seen in the landscape and within views into the site. This would be particularly noticeable where there are no existing trees or woodland blocks to partially screen or filter the view.

At operation, there would be four new pylons (lattice steel towers), replacing the two shorter 27m pylons (GM001 and GM002) and the single 49m tower (4ZB167). Two of the pylons would be 55m in height (GM1 and GMA1) and replacing the two existing 27m high pylons adjacent to the proposed substation extension. The two other proposed pylons (4ZB167A and 4ZB167B) are a similar style and the same height as 4ZB167, which is being removed. They would be close to the existing location of 4ZB167.

The full appraisal of landscape and visual effects for the overhead line works is set out in Appendix O. The summary of landscape and visual cumulative effects is described below. The text below includes a description of cumulative effects of the substation extension and the proposed overhead line works because neither the

overhead line development, nor substation extension, can exist in isolation. To avoid underreporting the level of effects, the two developments have been combined in this way.

5.3.5.1 Cumulative effects

The combined effect of the proposed development and other planned developments (as outlined in Section 5.1.1) from representative viewpoints has been considered in the text that follows. The existing energy infrastructure such as pylons, overhead lines and existing substations (Gwynt-y-Môr Offshore Wind Farm substation and Burbo Bank Extension Offshore Wind Farm substation) were considered in the baseline conditions.

Denbighshire County Council has identified proposed energy infrastructure developments to be assessed in combination with the proposed substation extension (refer to Section 5.1.1). These have been reviewed for inclusion within this chapter against the application status and outcomes; the available information regarding the proposals; the extent of the proposed overhead lines study and search areas; and the likely significant effects on identified landscape and visual receptors. The following projects have therefore been included in the assessment of cumulative effects in the chapter:

- The proposed extension to the Bodelwyddan substation to enable the connection of the two double circuit overhead lines;
- The proposed Awel-y-Môr Offshore Wind Farm Nationally Significant Infrastructure Project. The development includes a new substation on land to the west of St. Asaph Business Park approximately 1.3km to the north-west of the National Grid overhead lines works boundary. The Secretary of State granted development consent for this application in September 2023 (National Infrastructure Planning ref: EN010112). The DCO application included visualisations of the substation and proposed mitigation planting at year 0 and year 15 from Faenol Broper PRoW which is also one of the proposed development viewpoints. The Awel-y-Môr development programme states that general construction on the whole development is due to start in 2026 and end in 2030. It is unknown when the Awel-y-Môr substation will be constructed within this timeframe; and
- The proposed Mona Offshore Wind Farm Nationally Significant Infrastructure Project. The development includes new onshore infrastructure that connects to the main offshore wind turbine generators and offshore substation. The new onshore infrastructure comprises transition joint bays (connecting the offshore and onshore cables), onshore underground cables, onshore substation and connection by underground cables into the extended Bodelwyddan National Grid Substation. The offshore export cables will make landfall in Llanddulas, North Wales and the Mona Onshore Cable Corridor will be approximately 15km long culminating with a new substation. The Mona DCO application is at the post-examination stage and awaiting the recommendation to the Secretary of State from the Examination Authority. The application includes visualisations of the substation from locations included within visual assessment and proposed mitigation planting at year 1 and year 15. The Mona Offshore Wind Farm development programme states that general construction on the whole development is due to start in 2026 and end in 2030. The Onshore Substation construction is expected to take up to 33 months in total.

5.3.5.2 Construction

In a worst-case scenario, there may be up to three stages of sequential construction for that overlap with the final months of construction of the Bodelwyddan substation extension, which is close to the proposed development. This would mean that there is more construction activity, so effects may be slightly higher during this short period, but they are still likely to be low level.

The Awel-y-Môr development and Mona Offshore Wind Farm are currently programmed to commence in 2026 and to be operational by 2030. It is not known at what stage the Awel-y-Môr substation would be constructed within this programme. In a worst-case scenario, the Awel-y-Môr substation and Mona Offshore Wind Farm substation and underground cable laying would be in construction for a short period of the overhead line works.

The full appraisal of landscape and visual effects arising from the construction of the overhead line works is set out in Appendix O Landscape & Visual Effects Table. The cumulative effects arising from other developments (as outlined in Section 5.3.5.1) during construction are described below and summarised in Table 5-3.

5.3.5.2.1 Landscape

The Eastern Lowlands (Cefn Meiriadog Vale Slopes) LCA would be directly impacted (albeit locally) by the construction activity associated with all four developments. Localised disturbance from construction plant and machinery would slightly alter the relative tranquillity experienced in the vicinity of the works. Construction would require plant and machinery (e.g., cranes), which would be different to those typically present in the landscape as part of regular farming practice.

Construction methods adopted throughout the red line boundary have sought to minimise impact on existing vegetation and protect existing hedgerows and trees, where practicable, although there would be some localised losses within the landscape. The Arboricultural Impact Assessment (refer to Appendix D) notes that, in a worst-case scenario, approximately 198 linear m of hedgerow would be temporarily removed to facilitate construction for the overhead line works. Seven individual trees; one tree group equating to approximately 0.0123ha of canopy cover; and 89 linear m of hedgerow would also require removal during construction of the proposed Bodelwyddan Substation extension. The disruption of a field boundary and reduction in size of the field due to the footprint of the development would slightly alter the extent of the irregular, medium-sized scale of the mosaic field pattern that is characteristic of the LCA.

The construction works would largely result in short term, temporary changes that would be focused on localised parts of the landscape. The influence of the construction activity, including the combined construction effects from other development (Bodelwyddan substation extension and Awel-y-Môr development and Mona Offshore Wind Farm substation and underground cable laying), would result in a localised change. Overall, this would result in a minor adverse change on the medium sensitivity LCA, resulting in a *slight adverse* landscape effect.

5.3.5.2.2 Visual

The undulating topography, existing woodland blocks and frequent field boundary trees and hedgerows would help to screen the proposed developments in some capacity from most viewpoints.

At construction, the majority of viewpoints and visual receptors would have filtered long-distance views of the construction activities. Most of these views towards the construction works would be screened by field boundary trees and/or high hedges, which are common features of the local landscape. These receptors would therefore experience a *slight adverse* cumulative visual effect.

At viewpoints VP2, VP11 and VP12 (see Photomontages VP2, VP11 & VP12 in Appendix P), more of the proposed construction works would be visible.

VP11 and VP12 are predominantly open panoramic views with little existing vegetation in the short or middle distance to offer any screening of the proposed construction activity. Furthermore, vegetation clearance to facilitate construction for the overhead line works would provide clearer views of the construction works for the Bodelwyddan substation extension. Due to the scale of the change and the short duration of the works, the cumulative visual effects would be *moderate adverse*.

The residents at Tyddyn Meredydd (see Photomontage VP2) would have short to long-distance views towards the construction works. Due to the high sensitivity of the visual receptor and the likelihood of views towards the development from the property's conservatory, these receptors would experience a *moderate adverse* cumulative visual effect. The PROW users associated with viewpoint VP2 would experience a *slight adverse* cumulative visual effect as the construction works would be visible from a short section of the route.

Work on the Awel-y-Môr development and Mona Offshore Wind Farm development may be concurrent with the end of construction activity for the overhead line works. The combined visual impact would be most noticeable from the viewpoints VP2, VP8, VP10, VP12, VP22 which represent nearby residents and the users of the PROW. The combined construction activities have the potential to result in *moderate or major adverse* visual effects described in Table 5-3.

5.3.5.3 Operation

The full appraisal of landscape and visual effects arising from the overhead line works is set out in Appendix O Landscape & Visual Effects Table. The combined operational effects during operation are described below and summarised in Table 5-3.

5.3.5.3.1 Landscape

At commencement of operation, the level of tranquillity would improve in the vicinity of the proposed development due to the removal of the construction activity associated with the overhead line works and the Bodelwyddan substation extension (Bodelwyddan substation extension would also be operational from year one of the overhead line works operation). However, the Awel-y-Môr development and Mona Offshore Wind Farm would likely be still under construction, including the movement of plant, earthworks and construction of buildings and equipment, meaning the overall level of tranquillity across the wider landscape would not yet be restored to pre-construction levels.

Landscape quality within the Eastern Lowlands (Cefn Meiriadog Vale Slopes) LCA would be impacted by the combined operational impacts of the developments along with the introduction of further energy infrastructure features, including the substation buildings and equipment and the increase of three pylons and more overhead lines. Despite the additional elements, they would not be considered incongruous given the type of energy infrastructure features that are already present within the Eastern Lowlands (Cefn Meiriadog Vale Slopes) LCA.

Locally, there would be a perceptible change within the Eastern Lowlands (Cefn Meiriadog Vale Slopes) LCA due to a slight overall increase in scale and number of energy infrastructure features present in the landscape. This would result in a slight alteration to the characteristic components of the LCA. Consequently, a minor adverse impact on a medium sensitivity landscape would remain, leading to the continuation of a **slight adverse** landscape effect.

5.3.5.3.2 Visual

The undulating topography, existing woodland blocks and frequent field boundary trees and hedgerows would help to screen the proposed developments in some capacity.

Most viewpoints and visual receptors would experience a **slight adverse** cumulative visual effect during operation. The majority of the viewpoints and visual receptors would have long-distance filtered or partial views of the proposed development. For these visual receptors, one or two of the pylons are glimpsed or partially screened to some extent by field boundary trees and/or high hedges that are common features of the local landscape.

At viewpoints VP2, VP11 and VP12 (see Photomontages VP2, VP11 & VP12 in Appendix P), more of the proposed overhead line works and substation development would be visible.

VP11 and VP12 are predominantly open panoramic views with limited existing vegetation in the near or middle distance to offer any screening of the larger scale pylons, which would be viewed against the sky. A perceptible reduction in tree cover resulting from the vegetation clearance works during the construction period for the Bodelwyddan substation would also remain. Although energy infrastructure features are a key characteristic of these existing views, the operational impact of the new overhead lines in combination with the operational impact of Bodelwyddan substation extension is likely to alter the balance of elements in the view. The cumulative visual effects on these receptors associated with viewpoints VP11 and VP12 would therefore remain **moderate adverse**.

The residents at Tyddyn Meredydd (VP2) would have short to long-distance views towards pylons 4ZB167B and GM1 and GMA1. In combination with the open, long-distance view of Bodelwyddan substation extension, the cumulative visual effect would remain **moderate adverse**. This is due to the high sensitivity of the visual receptor and the likelihood of views towards the nearby overhead line development from the conservatory. The PROW users associated with viewpoint VP2 would continue to experience a **slight adverse** cumulative visual effect at operation as the overall impacts would only be seen over a short section of the route.

As mentioned above, the construction work on the Awel-y-Môr substation development may be concurrent during the operation of the overhead lines works. The cumulative visual impact during operation would be most noticeable for the users of a PROW at Faenol Broper (see viewpoint VP8), where the combined effects would likely increase the scale of the change due to the proximity of Awel-y-Môr construction activities. However, given that the visual change is likely to be experienced from a short section of the route and over a short duration, the cumulative visual effect would remain **slight adverse**. This impact would likely reduce once the Awel-y-Môr substation construction works are complete, and the mitigation planting is adequately established.

The construction of the Mona Offshore Wind Farm project is proposed to commence in 2026 and would be concurrent with the Bodelwyddan Projects and the Awel-y-Mor substation development. Cumulative visual impacts would be most noticeable within 500m of the Bodelwyddan projects and Mona Offshore Wind Farm project. Footpaths and residents at viewpoint locations VP2, VP10, VP12, VP16 and VP22 would experience a **major or moderate adverse** cumulative effect at year 15 when mitigation planting associated with those projects is considered to have sufficiently established for assessment.

Each project has its own methodology, so the projects are assessed in a slightly different ways. Overall, cumulative effects for the Bodelwyddan project (overhead line works and substation extension) and Mona Offshore Wind Farm project would not give rise to a more significant level of effect than would happen with Mona Offshore Wind Farm project in isolation.

Table 5-3: Combined Construction and Operational Visual Effects

Viewpoint	Significance of Combined Visual Effects* (Residual effects)	Overhead Line Works	Bodelwyddan Substation	Awel-y-Môr Substation	Mona Offshore Wind Farm (substation and underground cabling)
VP2 – PROW	Major adverse (Mona Offshore Wind Farm substation would give rise to major adverse visual effect in isolation)	Short to long-distance views of temporary works areas for all new pylons, seen over short section of the PROW route in a small part of wide view. Most distant tower would be erected first.	Long-distance views of proposed substation extension, seen over short sections of the PROW route. Small part of wide view..	Long-distance partial views of part of construction works for the development. Mitigation planting would screen proposed development once established.	Short to medium distance open or partially filtered views to the substation construction and the completed substation, and cable laying seen over short section of the PROW route. Mitigation planting would partially screen the sub-station once established although the substation would remain prominent in the view and constitute a major discordant element in the view.
VP2 – Residential	Major adverse (Mona Offshore Wind Farm substation would give rise to major adverse visual effect in isolation)	Open, middle to long-distance views from a high sensitivity receptor of 4ZB167B, GM1 and GMA1. Large part of narrow view.	Open, long-distance views from a high sensitivity receptor of proposed substation extension. Small part of narrow view.	Long-distance partial views of part of the construction works for the development. Mitigation planting would screen proposed development once established.	Short to medium distance open or partially filtered views to the substation construction and the completed substation, and cable laying. Mitigation planting would partially screen the sub-station once established although the substation would remain prominent in the view and constitute a major discordant element in the view.
VP3	Slight adverse	Glimpsed middle-distance views of pylons GM1 and GMA1 through existing mature trees in winter, which would be well screened in summer.	Largely screened short-distance glimpsed views of distant proposed substation extension from very short section of the PROW. Screening from existing field boundary trees.	N/A	Largely screened but potentially glimpsed long-distance views of substation construction and the completed substation from very short section of the PROW. Unlikely to be any views of ground level cable laying activities. Screening

Viewpoint	Significance of Combined Visual Effects* (Residual effects)	Overhead Line Works	Bodelwyddan Substation	Awel-y-Môr Substation	Mona Offshore Wind Farm (substation and underground cabling)
					from woodland blocks and existing field boundary trees.
VP4	Slight adverse	Filtered oblique long-distance views of the tops of 4ZB167A and 4ZB167B pylons from the upper storey of the residence and the PROW. More screening in summer when the vegetation is in leaf.	No views of proposed substation extension from this location due to screening vegetation. Oblique glimpsed views of the construction traffic.	N/A	Largely screened but potentially glimpsed long-distance views of substation construction and the completed substation from upper storey of the residential property. Unlikely to be any views of ground level cable laying activities. Screening from proposed mitigation, woodland blocks and existing field boundary trees.
VP5	Slight adverse	Long-distance partial views of pylons GM1 and GMA1 and middle-distance partial to full views of 4ZB167A and 4ZB167B. Partial screening from existing intervening field boundary trees.	Middle distance filtered views of proposed substation extension from upper storeys of residences.	N/A	Partially screened medium-distance views, by intervening sloping landform, of substation construction and the completed substation from residential properties. Short and middle-distance views of ground level cable laying activities. Screening from existing field boundary trees and hedgerows, and mitigation planting once established.
VP6	Slight adverse	Long-distance views of all pylons. Softened against backdrop of hills.	N/A	N/A	N/A
VP7	Slight adverse	Middle-distance partial views of GM1 and GMA1 pylons from upper floors of low sensitivity receptors. Some screening from existing vegetation.	Largely screened views of proposed substation extension in winter from low sensitivity receptors. Views towards the substation would be	N/A	N/A

Viewpoint	Significance of Combined Visual Effects* (Residual effects)	Overhead Line Works	Bodelwyddan Substation	Awel-y-Môr Substation	Mona Offshore Wind Farm (substation and underground cabling)
			completely screened in summer when existing vegetation in leaf.		
VP8	Slight adverse	GM1 and GMA1 pylons would be noticeable features in long-distance partial views from a short section of the PROW route.	N/A	Short-distance full views of the construction works for the development. Mitigation planting would screen the proposed development once established.	Largely screened but potentially glimpsed long-distance views of substation construction and the completed substation from a short section of the PROW route. Unlikely to be any views of ground level cable laying activities. Screening from intervening woodland blocks and existing field boundary trees.
VP9	Slight adverse	GM1 and GMA1 pylons would be noticeable features in long-distance views from a part of the route. Visibility softened against backdrop of hills.	N/A	N/A	Largely screened but potentially glimpsed long-distance views of substation construction and the completed substation from a short section of the PROW route. Unlikely to be any views of ground level cable laying activities. Screening from intervening woodland blocks and existing field boundary trees.
VP10	Major adverse (Mona Offshore Wind Farm substation would give rise to major adverse visual effect in isolation)	Middle to long-distance views of the new pylons from a short section of route. Three pylons would be fully visible, and one would be partially visible. Mostly softened by backdrop of hills.	Largely screened, middle to long-distance views of proposed substation extension from short sections of the PROW. Screening from existing field boundary trees.	Long distance partial views of part of the construction works for the development. Mitigation planting would screen proposed development once established.	Short to medium-distance open or partially filtered views to the substation construction and the completed substation. Short distance views to cable laying seen over a part of the PROW route. Mitigation planting would partially screen the sub-station once established although the substation would remain prominent in the view

Viewpoint	Significance of Combined Visual Effects* (Residual effects)	Overhead Line Works	Bodelwyddan Substation	Awel-y-Môr Substation	Mona Offshore Wind Farm (substation and underground cabling)
					and constitute a major discordant element in the view.
VP11	Slight adverse	Middle to long-distance views of three tall pylons partially backgrounded by the sky. Increase in scale and number of energy infrastructure features. Visible for whole stretch of short route.	Proposed substation extension would be occasionally visible along the length of the route in the middle distance. Four existing field boundary trees would partially screen the new development. Development would comprise a small part of the view. Development would be in keeping with existing energy infrastructure features.	N/A	Short to medium-distance open or partially filtered views to the substation construction and the completed substation. Short distance views to cable laying seen over a part of the PROW route. Existing hedgerow trees and a small part of the mitigation planting would mostly screen the sub-station once established. Seeding would establish across the cable corridor.
VP12	Moderate adverse (Mona Offshore Wind Farm substation would give rise to moderate adverse visual effect in isolation)	Short to middle-distance views of the three tall pylons, which would be mostly backgrounded by the sky. Increase in scale and number of energy infrastructure features.	Predominantly open, slightly oblique short-distance views of proposed substation extension from the principal view of the residence. Substation extension would represent a slight increase the visual prominence of the overall substation development to the south-east but would take up a small part of the overall view. Seven individual trees and a small tree group, forming part of the middle-distance views, would be removed during the construction phase.	N/A	Medium to long-distance open or partially filtered views to the substation construction and the completed substation. Long distance views to cable laying seen over a part of the PROW route. Some screening from intervening existing field boundary trees and small reduction in visibility due to proposed mitigation planting although the substation would perceptibly damage the view.
VP15	Slight adverse	Middle to long-distance views. Slight increase in scale as one pylon would be replaced by two in close proximity. The development would	N/A	N/A	N/A

Viewpoint	Significance of Combined Visual Effects* (Residual effects)	Overhead Line Works	Bodelwyddan Substation	Awel-y-Môr Substation	Mona Offshore Wind Farm (substation and underground cabling)
Note: No photograph view.		form a small part of the overall view, and the change would not alter the overall balance of elements in the view.			
VP16	Moderate adverse (Mona Offshore Wind Farm substation would give rise to moderate adverse visual effect in isolation)	Long-distance occasional views of small part of development. The development would form a small part of the overall view, and the change would not alter the overall balance of elements in the view.	N/A	N/A	Medium to long-distance open or partially filtered views to the substation construction and the completed substation. Medium to long-distance views to cable laying seen over a part of the PROW route. Some screening from intervening woodland blocks and existing field boundary trees although the substation would perceptibly damage the view.
VP18	Slight adverse	Very long-distance views of tops of all new pylons. Mostly backgrounded by the hills. The development would form a very small part of the overall view, and the change would not alter the overall balance of elements in the view.	N/A	N/A	N/A
VP19	Slight adverse	Long-distance partial view of tops of two new pylons 4ZB167A and 4ZB167B against the backdrop of the sky. Increase in scale of energy infrastructure features within the principal view.	N/A	N/A	Largely screened but potentially glimpsed long-distance views of substation construction and the completed substation. Unlikely to be any views of ground level cable laying activities. Screening from woodland blocks and existing field boundary trees.

Viewpoint	Significance of Combined Visual Effects* (Residual effects)	Overhead Line Works	Bodelwyddan Substation	Awel-y-Môr Substation	Mona Offshore Wind Farm (substation and underground cabling)
VP20	Slight adverse	Very long-distance view of the tops of all new pylons. Pylons would be mostly backgrounded by the hills. The development would form a very small part of the overall view, and the change would not alter the overall balance of elements in the view.	N/A	Very long-distance partial views of construction works for part of the development. Mitigation planting would screen proposed development once established	N/A
VP22	Major adverse (Mona Offshore Wind Farm substation would give rise to major adverse visual effect in isolation)	Long-distance, partial views of part of the development. Small increase in scale of energy infrastructure features in the view.	Largely screened, middle to long-distance views of proposed substation extension from a short section of PROW and nearby residences.	N/A	Short to medium-distance open or partially filtered views to the substation construction and the completed substation. Short distance views to cable laying seen over a part of the PROW route. Mitigation planting would partially screen the sub-station once established although the substation would remain prominent in the view and constitute a major discordant element in the view.
VP23 Note: No photograph view.	Slight adverse	Long-distance partial view of part of the development, which would be screened by existing intervening vegetation. A small part of the development would be visible in the non-principal view.	Largely screened, long-distance views of proposed substation extension from the non-principal view.	Oblique long-distance partial view of part of construction works for the development. Mitigation planting would screen proposed development once established	Largely screened, long-distance views of proposed substation. No views of cable laying.

*Refers to the Project significance criteria for Landscape and Visual

5.3.6 Summary and Conclusion

Man-made influence is already evident in the landscape of the Eastern Lowlands (Cefn Meiriadog Vale Slopes) LCA with commercial development most notable at St. Asaph Business Park and where overhead lines supported by pylons cross the managed landscape. The proposed overhead lines development and the Bodelwyddan substation extension and fencing upgrade would be located near to the existing energy infrastructure (i.e. existing substations and pylons), and they would therefore be characteristic of the local landscape. The two proposed schemes would slightly change the balance of energy infrastructure features (substation and pylons) within the landscape, although this increase is unlikely to result in a notable adverse change to landscape character.

In combination with the substation development and the Awel-y-Môr development, there would be localised effects on the LCA during construction. This would be partially reduced once plant and machinery have been removed from site during operation, although the landscape would remain disrupted during the construction of the Awel-y-Môr substation. The Eastern Lowlands (Cefn Meiriadog Vale Slopes) LCA would experience a *slight adverse* cumulative landscape effect at operation.

The existing undulating landscape is frequently populated by trees and woodland blocks, and therefore in combination views of the four developments are likely to be limited. However, in combination views of the overhead lines development, the Bodelwyddan substation extension with the Mona Offshore Wind Farm development are likely to result in **moderate or major adverse** effects from some nearby locations during construction. These impacts are likely to continue through operation and receptors at VP2, VP10, VP 12, VP16 and VP22 are likely to experience **moderate and major adverse** visual effects, largely due to the impacts arising from the Mona Offshore Wind Farm development.

Mitigation measures are shown in Appendix S Environmental Masterplan and would be implemented to help screen views towards the development and assimilate it into the surrounding landscape. However, as no mitigation planting can be implemented in the immediate locale of the extended substation, due to operational constraints, it is likely that the effects experienced by receptors would be reduced post-construction but would not be eliminated.

5.4 Traffic and Transport

5.4.1 Baseline

5.4.1.1 Introduction

Jacobs has been commissioned by the Applicant to provide traffic and transportation advice to support a planning application via Section 37 of the Electricity Act 1989 in respect of overhead line works relating to an extension to the Bodelwyddan substation, on Glascoed Road, St. Asaph.

5.4.1.2 Site Location and Composition

5.4.1.2.1 Local Highway Network

Part of the overhead line works site would be accessed from the B5381 Glascoed Road via a private road to the north of the Bodelwyddan substation site. The private road forms the minor arm of a priority t-junction with the B5381 Glascoed Road and a stop line is on the private road for vehicles wishing to access the B5381 Glascoed Road.

The B5381 Glascoed Road is a single-carriageway road running in an east-west direction and both lanes have a carriageway width of approximately 3.5m. The speed limit of the B5381 Glascoed Road is 40 miles per hour (mph) along the frontage of the private access road which reduces to 30mph to the immediate west of the site access. The B5381 Glascoed Road provides a direct vehicular connection to St. Asaph to the east and to various villages to the west.

The junction of Glascoed Road, Ffordd Richard Davies, and Ffordd William Morgan is 500m to the west of the private access road and takes the form of a 4-arm roundabout. All four arms of the circulatory operate under priority control and provide two lanes on entry except for the western arm of the B5381 Glascoed Road which

provides one lane. Ffordd William Morgan forms the northern arm of the roundabout, this road provides a connection between the A55 National Wales Expressway to the north with the B5381 Glascoed Road to the south.

A secondary access is proposed along the B5381 Glascoed Road, approximately 1.5km to the west of the 4-arm roundabout at the junction of B5381 Glascoed Road and Ffordd William Morgan. This section of the B5381 Glascoed Road is also a single-carriageway road and is approximately 5.5m wide. The speed limit of this section the B5381 Glascoed Road is 60 mph.

Ffordd William Morgan is a single carriageway road running in a north-south direction. Both lanes have a carriageway width of approximately 3.5m, with a 2m footway provided along the eastern side of the carriageway and cycle and footway provided along the western side of the carriageway. The speed limit of the Ffordd William Morgan is 30mph along its entire length. Ffordd William Morgan provides a direct vehicular connection to A55 North Wales Expressway to the north.

The A55 is the major road in the area which connects many towns and cities in North Wales. Junction 26 of the A55 North Wales Expressway is approximately a two-minute car journey north of the site access. It is envisaged that most of the traffic wishing to access the site will travel via Junction 26 and along the roads described above.

5.4.1.2.2 Accident Data

The DfT document "Guidance on Transport Assessments" states that, "Critical locations on the road network with poor accident records should be identified. This is to determine if the proposed development will exacerbate existing problems or, if proposed, whether highway mitigation works, or traffic management measures will help to alleviate the problems" (DfT, unknown).

In order to identify critical locations on the network with poor accident records, the personal injury accident data from the most presently available 5-year period has been obtained from the online resource CrashMap.

A summary of the number and severity of the accidents at each junction in the study area is presented in Table 5-4.

Table 5-4: Personal Injury Accident Data Summary

Road	Fatal	Serious	Slight	Total
B5381 Glascoed Road	0	0	1	1
Ffordd William Morgan	0	2	0	2

B5381 Glascoed Road

One 'slight' severity accident occurred within the study area along the B5381 Glascoed Road over the five-year period. One accident over a five-year period is not considered to be an unusual frequency for this type of road. Therefore, the existing accident record on this road does not represent a material concern in the context of the development.

Ffordd William Morgan

Two 'serious' severity accidents occurred within the study area along the Fford William Road over the five-year period. Two accidents over a five-year period are not considered to be an unusual frequency for this type of road. It is important to note that the accidents occurred at different junctions along Fford William Morgan, therefore, the existing accident record on this road does not represent a material concern in the context of the development.

5.4.1.3 Site Access

The overhead line works will gain access from the existing private road to the north of the site off the B5381 Glascoed Road (and from a secondary access, see below). The private road forms the minor arm of a priority T-junction with the B5381 Glascoed Road. Existing safety measures are in place at the site access in the form of a stop line. Visibility to the west is restricted due to a hedgerow and fence line which runs along the southern

side of Glascoed Road. As a result, visibility from the site access is impacted for vehicles wishing to turn left onto the B5381 Glascoed Road.

The speed limit of the B5381 Glascoed Road is 40mph along the frontage of the private access road which reduces to 30mph to the immediate west of the site access. According to Table 2 of the Design Manual for Roads and Bridges (DMRB) TD 9/93, the stopping sight distance (SSD) should be 101m for westbound traffic and 63m for eastbound traffic travelling along Glascoed Road. The site access provides visibility splays in excess of 2.4m x 101m along Glascoed Road to the east in accordance with the 40mph road, and 2.4m x 37m to the west (measured to the centreline of the carriageway), as presented in **Figure 5-1**. It is acknowledged that visibility to the west is below the SSD for a 30mph road, however, there have been no accidents based on the current operation of the site and there is therefore no reason to expect this to change as a result of the OHL works.

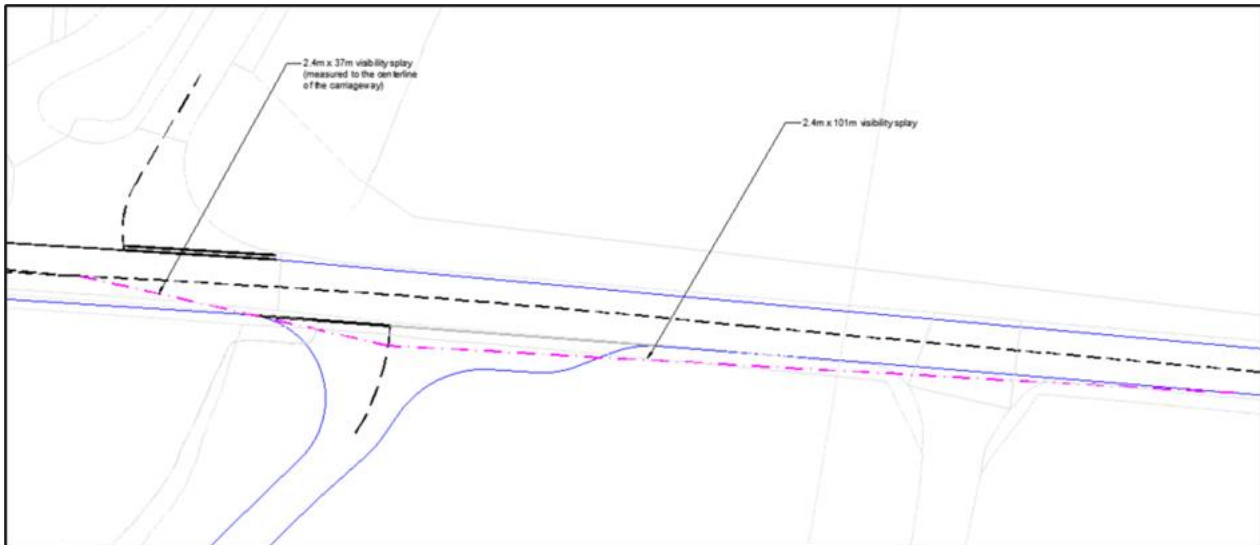


Figure 5-1: Visibility Splays

A swept path analysis of the private access road and Glascoed Road has been undertaken for a 16.5m long articulated heavy goods vehicle (HGV), which is the longest vehicle allowed on roads without a convoy, similar to what would be used to deliver materials to the overhead line works. Whilst it is envisaged that HGV deliveries would access and egress the overhead line works to the west, in the direction of Junction 26 of the A55, Figure 5-2 and Figure 5-3 illustrate a HGV accessing and egressing the private access road in all directions. Figure 5-2 illustrates a HGV crossing the centreline of Glascoed Road when making a left turn out of the private access road. However, it is important to note that the accident data shows no reported incidents in this area. Therefore, this is an indication that this manoeuvre will not impede vehicles making a left turn out of the private access road or vehicles travelling along Glascoed Road or exacerbate an existing road safety issue.



Figure 5-2: Swept Path Analysis Egress

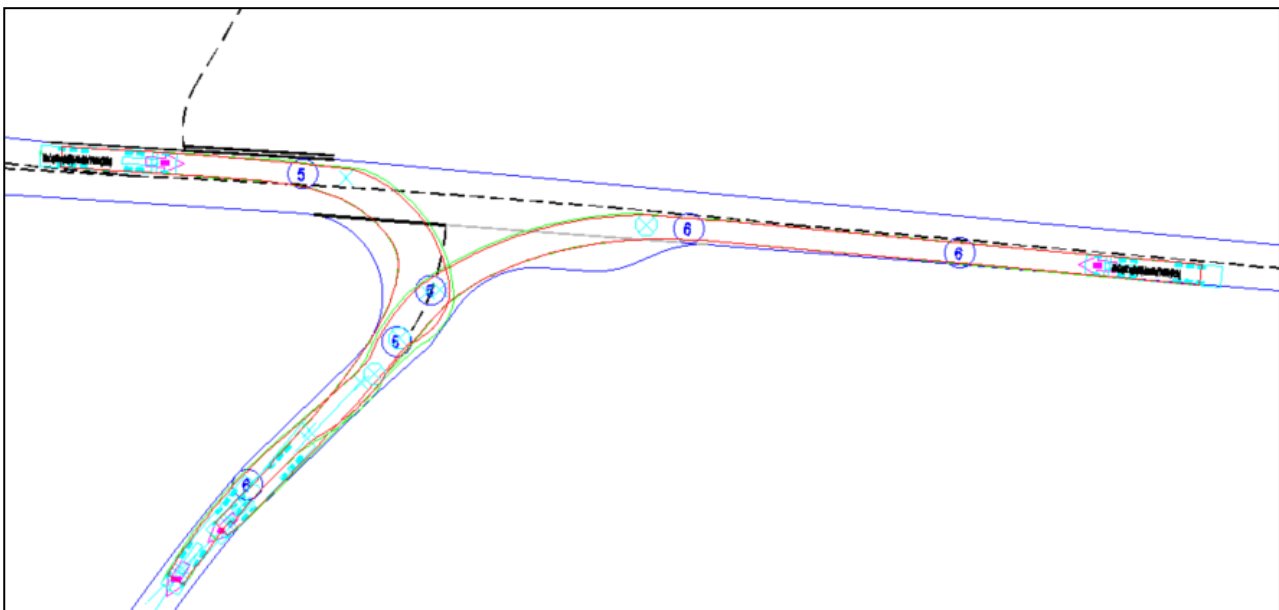


Figure 5-3: Swept Path Analysis Access

5.4.1.3.1 Secondary Access

A secondary access is proposed off the B5381 Glascoed Road approximately 1.5km to the west of the 4-arm roundabout at the junction of B5381 Glascoed Road and Ffordd William Morgan. This is an existing private gated access which provides access to the adjacent fields, and to the existing tower and OHL in the field.

The speed limit of the B5381 Glascoed Road is along this section is 60mph. Therefore, in accordance with DMRB, the SSD should be 215m for westbound and eastbound traffic travelling along Glascoed Road. As shown in Figure 5-4, the site access provides visibility splays in excess of 2.4m x 215m along Glascoed Road to the

east in accordance with the 60mph road, and 2.4m x 143m to the west. The visibility splay to the west has been measured to the tangent of the bend in the road.

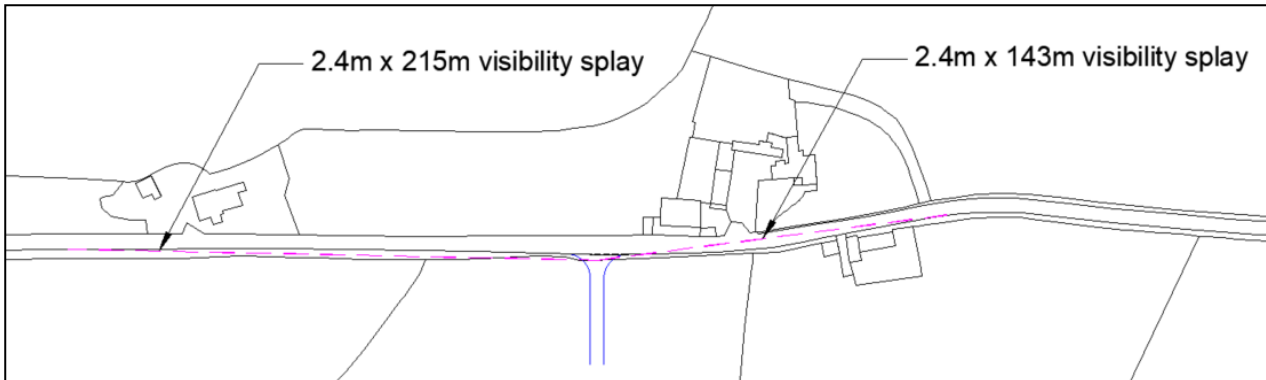


Figure 5-4: Site Access Visibility Splays

A swept path analysis of the western access road and Glascoed Road has been undertaken for a 16.5m long HGV as displayed in Figure 5-5. It is envisaged that HGV deliveries would only require access and egress to the east, in the direction of Junction 26 of the A55.

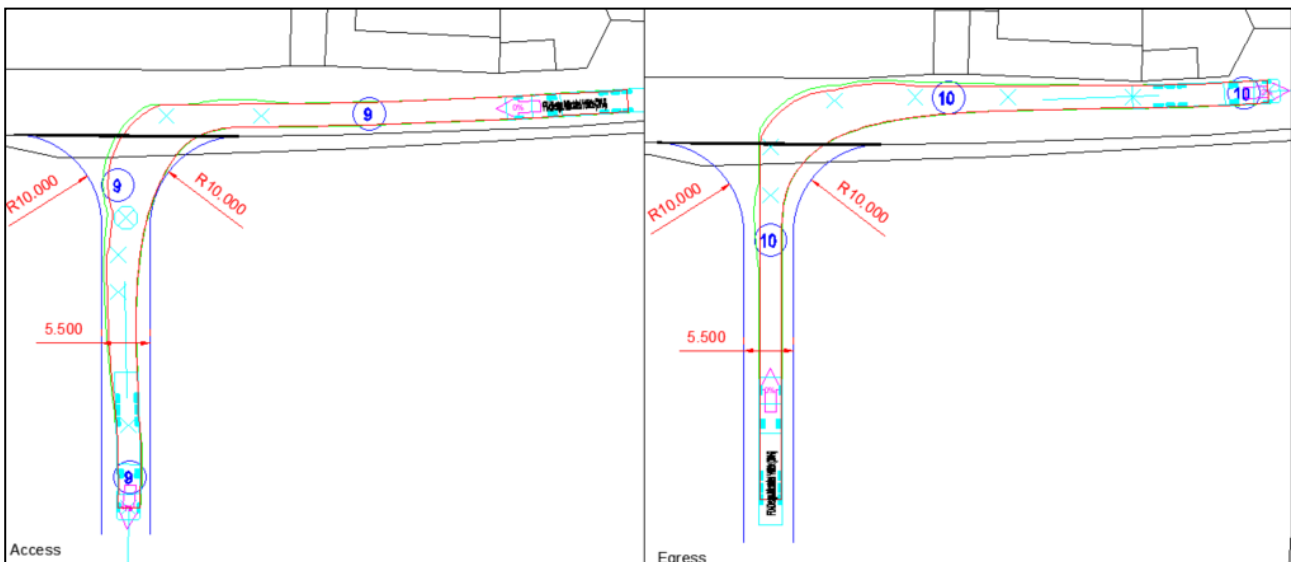


Figure 5-5: Western Access Road/ Glascoed Road Swept Paths

5.4.2 Measures to Avoid or Reduce Impacts

To ensure minimal impact with regard to traffic and transportation, a Construction Traffic Management Plan (CTMP) would be prepared. The purpose of a CTMP is to manage construction traffic on the public highway (including HGVs, staff vehicles and Light Goods Vehicles (LGVs) movements). It comprises management, implementation and enforcement plans to be used from the outset of construction and throughout the construction programme. A CTMP will provide key information on the anticipated construction programme of the OHL such as construction worker numbers and timescales. A CTMP outlines appropriate measures for the mitigation of the impacts of any adverse environmental effects associated with construction traffic, in addition to covering all aspects of construction-related traffic, including construction materials, equipment, and personnel.

The aim and objective of a CTMP is to identify those measures, over and above the overarching transport strategy, to reduce the effects of construction traffic. It also aims to minimise reliance on the use of private vehicles by promoting and encouraging the use of sustainable modes of transport.

At this stage, it is envisaged that there would be no remaining potential impacts in relation to the construction of the overhead line works following the implementation of a CTMP.

5.4.3 Potential Impacts

5.4.3.1 Construction

The construction phase of the overhead lines is expected to last approximately 6 months. The estimated number of construction and staff vehicles required over the 6-month period to construct the overhead lines has been determined by using engineering judgement.

During the peak of construction, it is expected that there will be a maximum of 19 personnel vehicles present on-site daily. In addition to this, during the peak of construction, there will be 5 HGVs per day which will require access to the overhead line works. It should be noted that these HGV trips will be spread out across the day. Table 5-5 outlines the total number of vehicles per day required to access the overhead line works, assuming 20 working days per month.

Table 5-5: Construction Phase Schedule

Month	Main Site Access			Western Site Access			Combined
	Daily No. of HGVs two-way	Daily No. of LGVs and Cars two-way	Total Daily No. of Vehicle trips two-way	Daily No. of HGVs two-way	Daily No. of LGVs and Cars two-way	Total Daily No. of Vehicle trips two-way	Total Daily No. of Vehicle trips two-way
1	10	14	24	-	-	-	24
2	2	34	36	-	-	-	36
3	2	34	36	-	-	-	36
4	4	36	40	2	2	4	44
5	8	36	44	2	2	4	48
6	4	20	24	2	2	4	28

Based on the data presented in Table 5-5, it has been determined that during the peak construction period, there will be a maximum of 48 two-way vehicle trips per day. It should be noted that 10 of these two-way trips will be HGV trips delivering materials to the site which will likely be delivered outside of the peak network hours. Construction activities will be carried out over a period of 9 hours on a typical weekday, which will enable the potential for HGV trips to be distributed uniformly throughout the day. To ensure minimal impact with regard to traffic and transportation, a Construction Traffic Management Plan would be prepared (see Section 5.4.2).

Table 5-5 shows that up to 19 personnel vehicles will be present on site each day resulting in 38 two-way trips. As a worst case scenario, it is anticipated that all staff will drive to the site, however, in reality, some staff are likely to travel to site in a car share. Construction work will be carried out on weekdays from 07:30-17:30, and occasionally on weekends between 08:00-17:30.

Given the modest trip generation during the construction phase equating to 48 vehicles per day during the peak, coupled with the short construction period of 6 months, it is not considered proportionate to undertake further assessment such as trip distribution or modelling.

5.4.3.2 Operation

It is envisaged that the overhead lines would require an attendant to carry out routine inspections. In case of equipment faults during the year, a team is dispatched to the site, but these are infrequent and unplanned. The overhead line works operational impact is limited, so there will be no significant adverse effect on the highway network, and no further assessment is required.

5.4.3.3 Cumulative Effects

The cumulative traffic impact of the overhead line works during the construction phase has been considered. Previous consultations with Denbighshire County Council identified consented planning applications that may have a cumulative effect on or in-combination with the overhead line works (as outlined in Section 5.1.1).

A review of the other developments has been undertaken. Where planning applications have not yet been submitted (e.g. the proposed MaresConnect interconnector project and IGP Solar Farm and battery energy storage system project), and/or the details of proposed schemes are not publicly available, the proposed scheme has not been included in the cumulative assessment.

The overhead line works shares access with the Burbo Bank Offshore Wind Farm substation, which has been identified by Denbighshire County Council as a cumulative development. It was not possible to obtain vehicle flow data for the Burbo Bank Offshore Wind Farm substation, but it is anticipated that it will generate a negligible number of vehicle trips based on its similarity to the Bodelwyddan substation extension.

The overhead line works construction programme is expected to run alongside the later stages of the substation extension construction programme. The net traffic impact has been calculated. This establishes the difference between the traffic related to the substation extension and the traffic related to the overhead line works during the overhead line works peak construction period. The results are shown in Table 5-6.

Table 5-6: Overhead lines Peak Cumulative Net Traffic Generation

Wider Project	Daily No. of HGVs two-way	Daily No. of LGVs and Cars two-way	Total Daily No. of Vehicle trips two-way
Overhead Line Works	10	38	48
Substation Extension	0	20	20
Net Trips	10	58	68

As can be seen from the above table the cumulative flows would result in a total of 68 daily two-way vehicle movements accessing the site during the peak construction period of the overhead line works. It is envisaged that the overhead line works' construction would not have a material effect cumulatively.

An Environmental Statement was produced in February 2024 for the Mona Offshore Wind (Farm) Project. The construction phase is scheduled for 2026 and will coincide with the construction of the OHL. The project's study area covers the road links within the substation extension study area, so a cumulative assessment has been undertaken for these road links.

Table 5-7 displays the daily baseline traffic flows for 2026 in comparison to the peak daily construction flows for the Mona Offshore Wind Farm project. Additionally, the table includes a comparison of the 2026 daily baseline traffic flows with the combined peak daily construction vehicle flows for the Mona Offshore Wind Farm Project and the National Grid overhead line, taken from Table 5-6.

Table 5-7 Cumulative Assessment Trip Generation Comparison

Link	2026 baseline traffic flows		Construction Traffic Flows		% Increase	
	Total Vehicles	HGVs	Total Vehicles	HGVs	Total Vehicles	HGVs
Mona Offshore Wind Farm project vehicle flows						
B5381 Glascoed Road between Engine Hill and Ffordd William Morgan	1,811	241	261	101	14%	42%
B5381 Glascoed Road between Ffordd William	4,217	509	233	123	6%	24%

Link	2026 baseline traffic flows		Construction Traffic Flows	% Increase		
Morgan and National Grid Substation Access						
Ffordd William Morgan between A55 and Carlton Court	4,111	420	535	218	13%	52%
Ffordd William Morgan between Carlton Court and B5381 Glascoed Road	6,373	531	535	218	8%	41%
Mona Offshore Wind Farm Project vehicle flows + National Grid OHL vehicle flows						
B5381 Glascoed Road between Engine Hill and Ffordd William Morgan	1,811	241	309 (+48)	111 (+10)	17% (+3%)	46% (+4%)
B5381 Glascoed Road between Ffordd William Morgan and National Grid Substation Access	4,217	509	281 (+48)	133 (+10)	7% (+1%)	26% (+2%)
Ffordd William Morgan between A55 and Carlton Court	4,111	420	583 (+48)	228 (+10)	14% (+1%)	54% (+2%)
Ffordd William Morgan between Carlton Court and B5381 Glascoed Road	6,373	531	583 (+48)	228 (+10)	9% (+1%)	43% (+2%)

Table 5-7 indicates that the Mona Offshore Wind Farm project is projected to increase total vehicle traffic by 14% on the Glascoed Road to the west of Fford William Morgan, and by 6% on the section of Glascoed Road to the west of the substation access. As outlined in the Mona Offshore Wind Project Environmental Study, the anticipated construction traffic flows are expected to have a negligible to low impact on these road links.

Cumulatively, the daily vehicle flows from the National Grid OHL will result in a 3% increase in total traffic on the Glascoed Road to the west of Fford William Morgan, and a 1% increase on the section of Glascoed Road to the west of the substation access. Therefore, the proposed vehicle flows will not have a significant impact on these links.

5.4.4 Summary and Conclusions

The operational impacts of the overhead lines will be negligible. An attendant will carry out routine inspections of the overhead lines, and in case of equipment faults, a team is dispatched to the site. However, these faults are infrequent and unplanned. Therefore, there will be no material operational impact on the highway network.

The construction impacts associated with the overhead lines are expected to occur over a total of 6 months. During the peak of construction, it is anticipated that the works will generate 10 HGV trips two-way and 38 LGV and Cars trips two-way per day. Construction deliveries will take place over a 9 hour period on a typical weekday enabling the potential for HGV trips to be distributed uniformly over the course of the day. The cumulative traffic impact with other developments outlined in Section 5.1.1 is expected to be negligible.

The construction phase is limited to a 6-month period and thus, the transport impacts of the construction phase will be negligible. Additionally, the operational phase and the cumulative traffic impact with other developments outlined in Section 5.1.1 will also have an immaterial impact on the network.

In conclusion, the overall transport impacts of the overhead line works are non-material and will not have a significant bearing on the local highway network.

5.5 Archaeology and Cultural Heritage

5.5.1 Relevant Legislation, Policy and Guidance

Legislation, policy and guidance in respect of archaeology and cultural heritage (also identified as the historic environment) in Wales includes the following:

- The Ancient Monuments and Archaeological Areas Act 1979 (legislation);
- Planning (Listed Buildings and Conservation Areas) Act 1990 (legislation);
- Historic Environment (Wales) Act 2016 (legislation);
- PPW 12 provides the national planning policy framework for the consideration of the historic environment supplemented by guidance contained in Technical Advice Note (TAN) 24: The Historic Environment (policy); and
- Cadw, the Welsh Government's historic environment service, provide associated best practice guidance on the historic environment (guidance).

5.5.2 Baseline

The baseline for archaeology and cultural heritage is informed by the Heritage Appraisal included at Appendix T.

Data sources used to inform the baseline included:

- British Geological Survey (BGS);
- Cof Cymru (National Historic Assets of Wales) for information of designated heritage assets;
- Clwyd Powys Archaeological Trust (CPAT) Historic Environment Record (HER) for information on non-designated archaeological sites and monuments; non-designated historic buildings and previous archaeological investigations;
- Planning Inspectorate for information on consented and current DCO projects being examined in the planning system for information on supporting studies and investigations, for example the Awel y Môr and Mona Offshore Wind Farms;
- Denbighshire County Council for information on consented and ongoing projects within the planning system for information on supporting studies and investigations, for example the proposed Bodelwyddan BESS and Solar Farm;
- Portable Antiquities Scheme (PAS) for information on finds made by metal detectorists;
- National Library of Wales for historic tithe mapping;
- Historic mapping and aerial imagery available online, including the National Library of Scotland; and
- National Resources Wales online for Light Detection and Ranging data (LiDAR).

The study area for archaeology and cultural heritage comprises the footprint of the overhead line works plus a 500m radius surrounding area. The study area excludes access routes and areas where limited heritage impacts would occur, e.g. works areas for pulling new conductor lines. The study area is considered appropriate due to the nature of the overhead line works and anticipated sensitivity of the receiving environment. The 500m study area allows for identification of heritage assets that could be directly physically affected by the overhead line works and those which could be impacted as a result of changes to their settings. In addition, assessment of known non-

designated archaeological assets and previous investigations within the 500m study area allows for the potential for previously unknown archaeological (archaeological potential) remains to be gauged.

The baseline is discussed by three sub-topics below: Archaeological Remains, Historic Buildings and Historic Landscapes.

5.5.2.1 Archaeological Remains

There are no designated archaeological assets recorded within the overhead line works or within the 500m study area.

There is one non-designated archaeological asset recorded within the footprint of the overhead line works (HER 143526) which relates to an area of former medieval ridge and furrow cultivation earthworks identified by CPAT from LiDAR data. Another area of ridge and furrow (HER 143532) lies to the immediate south. As these assets represent relict cultivation features that have already been recorded, they are considered to be of local archaeological interest at best (low value).

Within the 500m study area, 33 non-designated assets are recorded. Of these, 19 assets relate to areas of former ridge and furrow cultivation of limited archaeological interest; and seven assets relate to the route of the former Roman Road which underlies the existing B5381 Glascoed Road approximately 300m to the north of the overhead line works. The remaining assets represent a variety of post-medieval findspots, milestones, lime kilns, wells and the sites of former buildings of local archaeological interest.

There are no finds recorded by the PAS within the footprint of the overhead line works.

In the 500m study area, the only PAS artefact recorded is a post-medieval musket ball (HER 141423) found approximately 340m to the north-west of the overhead line works. This asset has been removed from the study area and is therefore attributed a negligible value.

Based on the findings of the previous archaeological investigation undertaken during the construction of the adjacent substation, the absence of any anomalies of potential or probable archaeological interest detected during the geophysical survey work undertaken for Mona Offshore Wind Farm, and taking into consideration the evidence discussed in the Heritage Appraisal, the risk of encountering significant previously unknown archaeological remains within the overhead line works footprint can reasonably be identified as low.

The overhead line works footprint has remained on the periphery of the known settlement cores from at least the medieval period and is likely to have been used as agricultural land. While there is some evidence of earlier prehistoric and Roman activity within the vicinity, no such evidence was found in the adjacent watching brief nor is such activity suggested by the results of the geophysical survey.

5.5.2.2 Historic Buildings

There are no designated or non-designated historic building assets recorded within the proposed overhead line works footprint.

Within the 500m study area, one Grade II Listed Building (Pentre Meredydd) is present comprising a sub-medieval vernacular thatched house (Cadw 19929) approximately 170m to the south of the overhead line works. The setting of this asset is predominantly rural with its topographic position allowing for open views towards the existing overhead lines and substation to the north. In this instance setting is considered to make a small positive overall contribution to significance as the asset is a rural building set within a rural agricultural landscape that has undergone limited change. As a designated Listed Building, this asset is identified to be of high value (national importance), albeit it is recognised that the asset is in a poor condition, being on the heritage at risk register, and is not a heritage asset of the highest significance (Grade I or Grade II*).

There are no locally listed buildings within the overhead line works or 500m study area.

In the study area, there are 34 non-designated historic buildings recorded by the HER. These assets are all post-medieval agricultural buildings of local historical and architectural interest.

5.5.2.3 Historic Landscape

There are no designated historic landscape assets (WHS, Registered Battlefields or Registered Parks and Gardens) within the overhead line works or study area.

The Historic Landscape Character (HLC) of the overhead line works is identified to be irregular fieldscapes and woodland with hedgerow boundaries. This type of landscape is described as:

'Organic enclosures south and west of St. Asaph, fieldscapes which have grown up over time, a predominantly rural environment'.

The historic landscape is assessed to be of local (low) value.

5.5.3 Measures to Avoid or Reduce Impacts

A precautionary programme of archaeological monitoring during groundworks in previously undisturbed areas.

No other mitigation measures are recommended.

5.5.4 Potential Impacts

5.5.4.1 Construction

Groundworks for the overhead line works could result in the truncation or removal of previously unknown archaeological remains, albeit the risk of significant remains being present is identified to be low. As noted above, this impact would be mitigated through a programme of formal archaeological monitoring (watching brief).

There would be a change to the wider setting of the designated Grade II Listed Building (Pentre Meredydd, Cadw 19929) approximately 170m to the south of the overhead line works. Views north from this asset would be slightly altered due to the change in alignment of the overhead lines during the construction phase. There would also be a temporary impact arising from the presence of construction plant within views to the north. However, given the presence of existing overhead lines and pylons, this change is not considered significant and would have a neutral impact on the special architectural and historical interest of the asset. The heritage interest of the building primarily derives from its fabric (evidential) and architectural and historical interests which would be unaffected.

Similarly, the non-designated historic buildings identified within the study area would also likely be subject to a neutral impact as a result of the overhead line works arising from a slight change to their settings. All these assets are sufficiently removed and screened from the overhead line works so as to be unaffected.

No impact on the HLC is predicted.

5.5.4.2 Operation

No operational impacts on archaeology or cultural heritage are identified.

Given the above, the overhead line works is considered to be compliant with the requirements of PPW and TAN 24 in relation to archaeology and cultural heritage.

5.5.4.3 Cumulative Effects

No cumulative effects between the overhead line works and the other developments outlined in Section 5.1.1 on archaeology or cultural heritage are identified.

5.6 Socio-economic Effects

5.6.1 Baseline

The overhead line works are in an industrial area surrounded by agricultural land, south-east of the village of Bodelwyddan in the county of Denbighshire. Table 5-8 shows socio-economic receptors within 5km and 500m of the overhead line works.

Table 5-8: Socio-economic receptors relative to the overhead line works

Socio-economic receptor	Socio-economic receptor, subcategories	No. within 5km	No. within 500m	Receptor specific commentary (500m)
Commercial	Hotel	45	1	There are 639 commercial receptors within 5km of the works boundary, 138 of which are within 500m. There is one hotel within 500m, Staverton B&B. The five industrial receptors and 128 offices within 500m are primarily in St. Asaph Business Park and Caer Delyn buildings. The small and medium enterprises (SMEs) include: Royal National Lifeboat Institution and Carbon Zero Renewables Ltd. Other SMEs within 500m of the overhead line works include G&GV Hughes and Green Acres Cattery.
	Industrial Buildings	177	8	
	Offices	254	128	
	Retail	149	2	
	Restaurant	2	0	
	Workshop	12	2	
Residential	Residential Properties	6511	72	There are over 6000 residential properties within 5km, 72 of which are within 500m. The closest are residential properties at Pentre Mawr Farm and along Glascoed Road.
Community	Community Facilities	41	2	There are 190 community receptors within 5km of the works boundary, including community centres, leisure clubs, education facilities etc. There are 3 community receptors within 500m of the overhead line works, Denbighshire Memorial Park and Crematorium, Cinan Church and Cefn Meiriadog County Primary School.
	Leisure	110	0	
	Public House	4	0	
	Police Station	2	0	
	Education	16	1	
	Emergency Services	4	0	
	Medical Facilities	12	0	
	Golf Course	1	0	
Tourism	Camping Site	3	0	There are 13 tourism receptors within 5km of the works boundary, including camping sites and self-catering holiday units. None of these
	Guest House	1	0	
	Self-Catering Holiday Unit	8	0	

Socio-economic receptor	Socio-economic receptor, subcategories	No. within 5km	No. within 500m	Receptor specific commentary (500m)
	Holiday Centre	1	0	receptors are within 500m of the overhead line works.

As shown in Table 5-8, the closest socio-economic (commercial) receptor of note is St. Asaph Business Park, approximately 50m north of the overhead lines at its closest point. The business park extends to some 44.5 hectares and major occupiers include: Qioptiq (high tech manufacturing), North Wales Police, Royal National Lifeboat Institution, Watkin Property Ventures, North Wales Ambulance Trust, Gyndwr Innovations/Optic (specialist engineering), and many other SMEs. Across these SMEs, over 3,000 people are employed across the 254 offices. Commercial workshops and premises within 500m of the overhead lines site include Carbon Zero Renewables Ltd and 12 workshops within the Caer Delyn buildings.

There are 6,511 residential properties within 5km of the overhead lines and of these properties, 72 are within 500m of the overhead lines; at Pentre Mawr Farm and along Glascoed Road.

In terms of community facilities, Wrexham Glyndwr University, a public research university with 5,500 students has one of three campus sites in the St. Asaph Business Park, approximately 500m from the works boundary. Cefn Meiriadog County Primary School is also within 500m of the OHL as well as Denbighshire Memorial Park and Crematorium off Glascoed Road and, Cinan Church in Groesffordd Marli, Abergele. There are 12 medical facilities including General Practitioner (GP) practises, specialist facilities, private medical care centres and four emergency services within 5km of the overhead lines, including North Wales Fire and Rescue Service and North Wales Police and air support unit.

Tourism is an important economic sector in Denbighshire. In 2017, prior to the Covid-19 pandemic, tourism contributed £490m to the local economy and supported 6,200 jobs (Denbighshire County Council, 2016). There are a number of attractors for tourists in the coastal area approximately 5km north-west of the overhead line works, including Rhyl Beach, Traeth Pensarn Beach, Tir Prince Fairground, and Rhuddlan Castle. Additionally, within 5km of Bodelwyddan, tourist attractions at St. Asaph include Brynbella Garden and St. Asaph Cathedral, as well as Bodelwyddan castle and park. There are also several holiday parks offering tourist accommodation adjacent to the coast, the closest ones being Parkdean Resorts Ty Mawr Holiday Park and Golden Sands Holiday Park. Tourist accommodation is also available in the villages of Bodelwyddan and St. Asaph, within 2km of the overhead line works, including Warner Hotel, Talardy Hotel, The Plough Inn and Lyons Eryl Hall Caravan Park and Country Club. Within 5km, tourism receptors include: three camping sites, eight self-catering holiday premises and one golf course. There are no tourism receptors within 500m of the overhead lines.

5.6.2 Measures to Avoid or Reduce Impacts

Amenity is the term used to describe the character or attractiveness of an area. Amenity effects arise because of a combination of adverse impacts from traffic and transport, visual intrusion, noise, and/or a reduction in air quality (e.g., from increased vehicle emissions). Noise and air quality have been scoped out of further assessment. Therefore, an amenity effect would only occur if a socio-economic receptor experienced a combination of visual intrusion and traffic and transport impacts. As set out under Section 5.6.3, measures employed as standard good practice would reduce amenity impacts for socio-economic receptors as far as practicable.

No specific mitigation measures are identified for socio-economic receptors. It is expected that any additional specific measures identified for relevant topics (Traffic and Transport, and Landscape and Visual) would reduce potential impacts on amenity for socio-economic receptors. For Traffic and Transport, mitigation measures include improvements such as visibility and safety measures at the access point of the construction site, reduced speed limits, ensuring workers travel during off-peak travel times to manage potential congestion and ensuring HGV trips are distributed uniformly across the working day.

5.6.3 Potential Impacts

5.6.3.1 Construction

Amenity impacts arising during construction could occur due to the combined effects of traffic and transport, noise, air quality, landscape and visual impacts. Therefore, an amenity effect would only occur if a socio-economic receptor experienced a combination of significant visual, noise, air quality, and traffic and transport impacts.

Construction of overhead lines is expected to last 6 months. Construction will typically occur during daylight hours between 07:30am-17:30pm on weekdays with potential for weekend working where necessary between 8am-17:30pm. The construction works will require temporary land take for structure dismantle zones, rights of way for access, temporary mast and scaffolding works.

In terms of visual impacts, the majority of viewpoints and visual receptors would have filtered long-distance views of the construction activities. Most of these views towards the construction works would be screened by field boundary trees and/or high hedges, which are common features of the local landscape. There will be some moderate or major adverse visual effects.

The potential traffic impacts arising during the overhead lines construction phase will be minimal, with workers entering and leaving sites during off-peak travel times; as stated in section 5.6.2.

The construction works of the overhead lines and reconductoring will require temporary land take for structure dismantle zones, rights of way for access, temporary mast and scaffolding works.

The potential traffic impacts arising during the overhead lines construction phase will be minimal, with workers entering and leaving sites during off-peak travel times; as stated in section 5.6.2. The combined effects of the visual impacts and minor traffic impacts could result in *minor adverse* amenity effects for socioeconomic receptors however the expected scale and duration of impact during the overhead lines construction stage for socio-economic receptors remains low. Amenity effects are not expected to affect the day-to-day operation of any commercial or community receptors.

5.6.3.2 Operation

As per the construction phase, amenity impacts during operation of the substation could arise due to the combined impact of traffic and transport, landscape and visual, noise and air quality impacts.

As stated in section 5.3, slight adverse or moderate adverse visual impacts are expected for a number of residential receptors due to long-distance views of the proposed development. There will be major or moderate adverse cumulative effects. Regarding traffic, it is anticipated that there will be a small number of visits throughout the year associated with maintenance. Based on the overhead lines limited operational impact, it is deemed that there will be no material impact on the highway network.

Whilst there could be visual impacts for socio-economic receptors, given impacts on traffic and the highway network are negligible, therefore there is no potential for an amenity effect.

5.6.3.3 Cumulative Effects

As stated in Section 5.1.1, there are other developments proposed within 2km of the overhead line works. In a worst-case scenario, there may be up to three stages of sequential construction that overlap with the final months of construction of the Bodelwyddan substation extension, which is close to the overhead line works. This would mean that there is more construction activity, so effects maybe be slightly higher during this short period, but they are still likely to be low level.

The cumulative visual impact of other developments alongside overhead lines construction has the potential to cause adverse impacts for socio-economic receptors during the construction phase. There are not considered to be any significant cumulative effects from air quality, noise and vibration or traffic and transport. Given the short duration of the construction works, no significant cumulative effects on socio-economic receptors during construction are expected.

In terms of operation, no significant cumulative effects are considered from traffic and transport, air quality or noise. Moderate adverse visual impacts could occur for visual receptors during operation in relation to cumulative impacts from the nearby substation extension and Awel-y-Môr developments. Similarly, the Eastern Lowlands (Cefn Meiriadog Vale Slopes) LCA could experience a slight adverse cumulative landscape effect during operation. The landscape characteristics are expected to reduce adverse visual impacts.

Overall, the scale and duration of cumulative impacts are not expected to affect the functioning of socio-economic receptors.

5.7 Other Environmental Considerations

Other aspects of the environment that were considered to have no significant adverse effects include: air quality; noise and vibration; flood risk and water environment; and geology, soils, land contamination and waste. The consideration of these environmental aspects is outlined below.

5.7.1 Baseline

5.7.1.1 Air Quality

The air quality study area is based on an area up to 500m from the overhead line works. Air Quality Management Areas (AQMA) are also considered within the wider road network which may be used by construction traffic. There are no current AQMAs declared in Denbighshire or the immediately adjacent local authorities.

The nearest sensitive receptors in relation to dust and atmospheric emissions are individual farms, the closest of which is approximately 15m south of easement access and 40m south of the temporary reconductoring or replacing of conductors and wires works. There is also a residential dwelling approximately 17m north-east of the access from Glascoed Road, a business park approximately 50m north of the substation, and the Burbo Bank Offshore Wind Farm Substation approximately 470m east of the new GMA1 tower. The nearest more densely populated residential areas are over 1.6km east in St. Asaph.

Ecological air quality receptors within the study area comprise Coed Cord and Coed y Saeson LWS. The boundary of the Coed Cord parcel of the larger LWS is approximately 145m north-east of new tower 4ZB167A at its closest point.

5.7.1.2 Noise and Vibration

A construction noise and vibration assessment has been prepared for the overhead line works, see Appendix U. The assessment is based on guidance contained within British Standard 5228:2009+A1:2014 – Code of practice for noise and vibration control on construction and open sites, Part 1 – Noise (BS5228-1). An operational noise and vibration assessment has also been prepared for the overhead line works, see Appendix V. The following noise and vibration sections summarise the information contained within these assessments.

The area of the works is rural with no major noise sources nearby, such as major trunk roads or railway lines. Existing baseline noise levels are expected to be relatively low.

The closest noise sensitive receptors to the project are the following:

- Esgob Farm (closest distance to works: 260m from the Compound Construction).
- Waen Meredydd (closest distance to works: 220m from Pylon Foundation).
- Sguboriau (closest distance to works: 120m from the Haul Routes).
- Tyddyn Meradydd (closest distance to works: 210m from the Haul Routes).

There are no sensitive receptors within 100m of the works, and so vibration from construction is not considered further.

5.7.1.3 Flood Risk and Water Environment

The study area for the water environment includes land and water features within 500m of the overhead line works.

The site boundary is in the Pont Robin Cut (Bodelwyddan) Water Framework Directive River Waterbody Catchment. The River Elwy, a Main River and Water Framework Directive River Waterbody, is approximately 1km south of the temporary overhead line works, and there are a number of smaller watercourses, drains, ditches and ponds in the immediate vicinity, the closest intersecting the working area for the new tower 4ZB167A.

There is a groundwater Source Protection Zone approximately 4km south-east of the overhead line works. The bedrock geology underlying the overhead line works area primarily comprises the Warwickshire Group, which is designated as a Secondary A aquifer, and partially the Clwyd Limestone Group, which is designated as a Principal aquifer. The superficial deposits comprise Till, which is designated as a Secondary (undifferentiated) aquifer.

A Flood Consequences Assessment has been prepared for the overhead line works. The assessment was produced in accordance with PPW and TAN 15. The following flood risk sections summarise the information contained within these assessments. See Appendix W for further information and details.

Initial discussions were undertaken with Denbighshire County Council in relation to the proposed surface water drainage arrangements to inform the Sustainable Drainage Approval Body approval. Given that the construction works associated with the reconfiguration are less than 100 square metres, Sustainable Drainage Approval Body approval is not required for the overhead line works.

The proposed works are approximately 7.5km inland, 2.3km from the nearest tidal flood risk area and between 40 to 60 metres Above Ordnance Datum which further reduces risk. There is no area of tidal risk defined in the vicinity of the site.

The works are not in a fluvial flood risk zone. The nearest area of fluvial flood risk is associated with the River Elwy in the centre of St. Asaph approximately 1.2km to the east. Additionally, the works do not cross or interact with any mapped ordinary watercourses.

No permanent assets are in surface water and small water courses flood risk extents; however, there are flood extents shown beneath the overhead lines and shown to intersect the working area. The construction works will be temporary and no permanent assets are shown to be within surface water flood risk extents.

There are no recorded histories of groundwater flooding or information that provides evidence of future groundwater flood risk throughout the county.

There are no known incidences of flooding from sewers and artificial drainage sources in the vicinity of the works or known public sewers crossing the works.

The works are not at risk from reservoir flooding.

The nearest canal to the site is Chester Canal, approximately 40km to the south-east.

5.7.1.4 Geology, Soils, Land Contamination and Waste

The study area includes the land immediately adjacent to the overhead line works.

There are no sites designated for geological importance and no groundwater dependent terrestrial ecosystems (GWDTEs) within the study area.

The bedrock geology underlying the overhead line works area primarily comprises the Warwickshire Group and partially the Clwyd Limestone Group, and the superficial deposits comprise Till.

There are no current or historic landfill sites within the study area, and the nearest historic landfill site is approximately 400m south of the right of way access for the temporary reconducting or replacing of conductors and wires works.

Electricity cables used earlier in the high voltage transmission network often were cooled by incorporating oil in the cables construction which was kept at pressure during their operation. This could lead to risk of contamination from leaks in old cables or during their removal. The cables to be removed between the cable sealing end compound and the existing substation are of the modern cross-linked polyethylene technology and do not contain oil. These cables are inert and there is no risk of contamination of land during their removal.

The works are proposed almost entirely on Predictive Agricultural Land Classification Grade 3b (moderate quality agricultural land) with some on non-agricultural land. Grade 3b is not considered Best and Most Versatile agricultural land and a soil survey was not undertaken in line with Welsh Government Guidance (Welsh Government, 2021).

5.7.2 Measures to Avoid or Reduce Impacts

5.7.2.1 Air Quality

There will be an increase in construction vehicles during the works and temporary implications for air quality, but these are anticipated to be negligible and not significant. Good practice measures that would avoid or reduce air quality impacts during construction include conforming to applicable standards for vehicle types, wash down of vehicles, wheel washing and soil management measures. Low emissions producing or electric plant and equipment will be considered to limit greenhouse gas emissions during construction.

There will be potential for dust impacts during construction, but these would be controlled through the adoption of standard good practice dust mitigation measures to prevent or reduce dust emissions.

Construction methods associated with soil stripping, creation of stockpiles and stockpile maintenance including measures to protect stockpiles and reduce the risk of dust generation from soils will be implemented to reduce impacts from dust.

Monitoring of weather forecasts and registration to weather warnings will aid preparation for earthwork operations. In dry conditions, appropriate water and dust suppression equipment will be available. In wet conditions, the site will be prepared with suitable cleaning equipment and silt controls.

Large earthworks and exposed areas or soil stockpiles will be managed to prevent windborne dust. For example, this could include covering, sealing with an excavator bucket or using water suppression.

During reinstatement, methods such as loosening the top of subsoil will be used to limit decompaction of the subsoil; this activity will avoid windy conditions and use water to damp down the surface.

Where possible, subsoil and topsoil will be returned at the earliest suitable time of year after construction has been completed. In the circumstances that work is delayed due to an unforeseen event, the measures listed above will be implemented.

During operation it is not anticipated that there will be any air quality implications. Measures to avoid or reduce impacts are not required.

5.7.2.2 Noise and Vibration

The use of Best Practicable Means during construction will be adopted on-site in order to minimise construction noise levels. This is standard sector practice in accordance with British Standard 5228-1. Examples of Best Practicable Means are as follows:

- Appropriate selection of plant and construction methods: only plant conforming with or better than relevant national or international standards, directives or recommendations on noise or vibration emissions will be used. Construction plant will be maintained in good condition with regard to minimising noise and vibration output.
- Construction plant will be operated and maintained appropriately, following manufacturer's written recommendations or using other appropriate operation and maintenance programmes that reduce noise and vibration emissions.
- Audible reversing warning systems used on mobile plant and vehicles will be of a type which, whilst ensuring that they give proper warning, have a minimum noise impact.

- Stationary equipment e.g. pumps, compressors, generators, will be situated as far as practical from receptors, and where appropriate acoustic screens are erected around them.
- Equipment known to emit noise strongly in one direction, where practical, will be orientated so that noise is directed away from noise sensitive areas.
- Screens will be used around piling equipment (if any piling is needed) and plant will be maintained in good operational condition with all engines covered and noise control measures as provided in place.
- Equipment will be shut down when not in use.
- Haul roads will be well maintained and avoid, where feasible, the use of steep gradients.
- All site employees will be reminded of their obligation to minimise noise on site.
- Where possible, the contractor will consider the use of the quietest commercially available plant that is suitable for each specific operation.

The proposed new overhead lines would carry a 'triple Araucaria' conductor system on lattice pylons. Due to its geometrical configuration the triple Araucaria design is the least electrically stressed conductor system that NGET uses. This is the best design available for reducing the effects of dry and wet noise from the proposed overhead lines during operation.

5.7.2.3 Flood Risk and Water Environment

The construction management plan will set out temporary measures to ensure existing surface water flow paths are not impeded.

Risks to the water resource features from the overhead line works are generally associated with the use of fuels and lubricants or other chemicals or additives used for construction plant and equipment. Spills of any kind may have potential significant detrimental impacts on the groundwater and surface water features. Appropriate good practice construction techniques and pollution control and management methods would be implemented throughout the works. For example, refuelling and maintenance of plant and equipment would be undertaken on areas of hardstanding with appropriately sized and well-stocked spill kits nearby or these activities will take place off-site where possible. Runoff across the site will be controlled through a variety of methods including header drains, buffer zones around watercourses, on-site ditches, silt traps and bunding. Where new or additional surfacing is required on any access tracks and compound areas, these will be permeable surfaces where ground conditions allow. Land used temporarily will be reinstated where practicable (bearing in mind any restrictions on planting and land use) to its pre-construction condition and use. Boundary features will be reinstated to a similar style and quality to those that were removed, with landowner agreement. Existing land drainage regimes would also be reinstated following construction.

The risk of impact from flooding to the overhead line works are not anticipated to be significant. Cumulative effects with other developments (as outlined in Section 5.1.1) from flood risk are not anticipated to be significant due to the nature of the other developments proposals and the measures outlined to manage flood risk. The introduction of new assets removes the capacity of the surrounding land to act as a flood area, however, new structures should be designed to cope with and maintain operation within flood scenarios following current available guidance. Measures to avoid or reduce flood risk impacts include:

- where possible, remove existing redundant hard standing before creating new areas of hard standing, such that the overall total hard standing area is not increased during construction;
- contractor to sign up to Natural Resources Wales flood warnings and specify triggers and actions (in response to receipt of a flood warning) in a construction flood management plan;
- locate construction compounds in areas with lowest feasible flood risk; and
- apply appropriate water quality controls to construction compound runoff.

Operation of the overhead lines is not considered to have significant adverse effects on flood risk. Measures to avoid or reduce impacts are not required.

5.7.2.4 Geology, Soils, Land Contamination and Waste

The contractor will adhere to all current waste and materials legislation and guidance along with the Applicant's standards for the works.

No significant impacts are currently anticipated from the overhead line works, and good practice measures will be implemented to avoid or reduce impacts including training with regards to working with potentially contaminated materials, storage of fuels, oils and chemicals, and those related to pollution events.

No potential sources of contamination have been identified, however, there remains a residual risk that unidentified contamination is present. If unexpected, contaminated ground is uncovered during construction, it shall be tested to determine the levels of contamination. Where contamination is confirmed, it will be reported to the local authority in writing. An investigation and risk assessment of the contamination will be undertaken. If the material is found to be unsuitable for reuse it will be segregated from other material and transported off-site in suitable vehicles for disposal. Vehicles will contain and cover the materials to prevent loss of leachate, dust or other material during transport. Ground arisings deemed unsuitable for reuse within the overhead line works will be disposed of appropriately, for example to a soil treatment centre or landfill.

The cross-linked polyethylene technology cables will be taken to a nominated NGET recycling site where all materials are recycled. The backfill material brought to site to make up the volume of materials removed will be appropriately licenced by the contractor.

The topsoil and subsoil removed during construction work shall be replaced, where possible, to avoid permanent loss/sterilisation of agricultural land. It is envisioned that the only areas where topsoil and subsoil shall be permanently lost are those areas where new towers will be required. The three existing towers to be removed shall be returned to agricultural land purposes. No permanent access roads or compounds will be required along the overhead lines route.

No significant impacts on geology is currently anticipated, and no mitigation has been considered at this time.

5.7.3 Potential Impacts

The following potential impacts have been identified, taking into account the measures identified in Section 5.7.2.

5.7.3.1 Construction

5.7.3.1.1 Air Quality

Dust is generated from construction activities from the handling of waste, movement of earth, the handling of materials and the tracking of vehicles. Dust can affect human health, local amenity or ecological receptors (through deposition) within the locality of the activities being undertaken. The concentrations of suspended dust particles reduce with increased distance from the construction works and the nearest residential property is approximately 15m south of right of way access and 40m south of the temporary reconductoring or replacing of conductors and wires works. Section 5.7.2.1 includes a number of good practice measures that would reduce the generation of dust during construction. Following implementation of these good practice measures and due to the temporary nature of the works within the vicinity of the closest residential property, any impacts from dust will not have significant adverse effects.

Construction vehicles and plant would also generate emissions from vehicles delivering materials and construction workers to and from the construction site. Emissions could affect receptors close to the working area and also along construction routes along the local road network. The emissions would be short term at any given location within the construction period. Air emissions would also be reduced through the implementation of good practice measures as set out in Section 5.7.2.1.

Cumulative air quality and dust effects with other developments (as outlined in Section 5.1.1) could be experienced during construction, but given that all other developments considered have either screened out these effects, assessed the effects to be not significant, or will require an assessment to determine no significant adverse effects, it is anticipated that through implementation of mitigation measures any cumulative air quality and dust implications will not have significant adverse effects.

5.7.3.1.2 Noise and Vibration

At the closest residential dwellings to the overhead line works removal and installation, the predicted daytime construction noise is below the threshold level of 65 decibels. The impact of noise during the removal and installation of overhead lines is therefore considered to be not significant.

Predicted levels of noise from vehicles using the site access route during the peak construction traffic month are below the daytime construction noise threshold of 65 decibels. As fewer vehicles are expected to access the site in the other months of the 24-month construction period, noise from construction traffic will be lower during these periods. These predicted noise levels are low compared to those from the works and would not contribute to increase the predicted levels. The impact of noise from construction vehicles is therefore considered to be not significant.

5.7.3.1.3 Flood Risk and Water Environment

During construction, earthworks have the potential to cause deterioration of surface water quality through generation of silted or polluted runoff. Good practice measures would reduce the risk of pollution to the water environment during construction by removing the pathway between source and receptors identified in the baseline.

No impacts on the flow regime of any of the watercourses or drainage ditches are anticipated, as no new crossings or any other in channel works are required.

The proposed works are at low or negligible flood risk from tidal, fluvial, groundwater, sewers, reservoirs and canals.

The construction site of the works lie partially within surface water flood extents and there is a medium flood risk during the construction phase. The impact on flood risk due to the works will inherently be temporary for the duration of the works period. Mitigation is to be provided in the associated construction management plan to avoid impeding or diverting flood water. Following implementation of the measures outlined in Section 5.7.2.3, potential impacts from flooding are low to negligible.

Cumulative effects during the construction period are not anticipated to be significant as the other developments (as outlined in Section 5.1.1) similarly outline proposals to control and manage risk to water resources.

5.7.3.1.4 Geology, Soils, Land Contamination and Waste

There are no predicted impacts on construction workers, groundwater receptors, designated sites or GWDTE.

The contamination potential of the site is considered to be low. As no current source has been identified a source-pathway-receptor linkage has also not been identified and therefore there is not considered a risk to sensitive receptors.

Any risks from spills or accidents involving construction plant, would be managed through the good practice measures outlined in Section 5.7.2.4.

Agricultural land classification Grade 3b will be temporarily impacted by the construction works. As the agricultural land to be impacted by construction is not considered Best and Most Versatile, impacts are considered mitigable following good practice measures outlined in Section 5.7.2.4. There will be permanent loss of Grade 3b agricultural land.

5.7.3.2 Operation

5.7.3.2.1 Air Quality

There are unlikely to be any significant adverse air quality impacts on human receptors from operation traffic and maintenance plant and machinery for the overhead lines.

No cumulative operational effects with other developments (as outlined in Section 5.1.1) are anticipated.

5.7.3.2.2 Noise and Vibration

As outlined in the construction noise and vibration assessment (Appendix U) and the operational noise and vibration assessment (Appendix V), none of the proposed new infrastructure to be installed as part of the works would be classified as significant noise sources.

Proposed energised equipment would connect to and would form part of the electricity transmission network and would facilitate connection to third-party infrastructure. Energised equipment includes high voltage overhead lines, and overhead line connections and line entries. Noise due to the operation of the energised equipment is considered not significant.

5.7.3.2.3 Flood Risk and Water Environment

No significant adverse impacts are expected from flood risk or on the water environment during the operation phase.

Cumulative effects during operation are not anticipated to be significant as the other developments (as outlined in Section 5.1.1) will similarly be designed to cope with and maintain operation within flood scenarios.

5.7.3.2.4 Geology, Soils, Land Contamination and Waste

No significant adverse impacts are expected for geology, soils, land contamination and waste during the operation phase.

Agricultural land classification Grade 3b will be permanently impacted by the new towers. Impacts are expected to be not significant due to the total area loss being small, the agricultural land lost to operation is not considered Best and Most Versatile, and there is no alternative sites to locate the towers on which are a lower grade than Grade 3b.

5.7.3.3 Cumulative Effects

There are not anticipated to be any significant cumulative effects from air quality, noise and vibration, flood risk and water environment, and contaminated land and waste with the proposed substation extension nor other developments (as outlined in Section 5.1.1) due to implementation of standard good practice construction methods identified in Section 5.7.2. Consideration of construction programmes for other developments to minimise construction duration overlaps will also mitigate any potential adverse effects. No significant cumulative effects with the proposed substation extension nor other developments during operation are anticipated from these environmental considerations.

6. Conclusion

This report provides a description of the overhead line works and presents an assessment of likely environmental effects, informed by the supporting appendices.

The assessment of potential environmental effects takes into account good practice measures and construction methodologies to avoid or reduce potential impacts. These are set out in the individual topic sections.

This environmental appraisal demonstrates that, with the adoption of embedded mitigation measures, specific mitigation measures, Net Biodiversity Benefit and good practice construction techniques, the proposed overhead line works would not give rise to any conflicts with relevant planning policies, designations or national or local sustainability, health and wellbeing objectives, and would serve to contribute to Wales renewable energy and net zero targets.

Acronyms, Abbreviations and References

Acronyms and Abbreviations

AONB	Area of Outstanding Natural Beauty (now known as National Landscapes)
AQMA	Air Quality Management Area
BCT	Bat Conservation Trust
BGS	British Geological Survey
CIEEM	Chartered Institute of Ecology and Environmental Management
CPAT	Clwyd Powys Archaeological Trust
CTMP	Construction Traffic Management Plan
DCO	Development Consent Order
DESNZ	Department for Energy Security & Net Zero
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
DNO	Distribution Network Operator
DNS	Development of National Significance
DTM	Digital terrain model
EIA	Environmental Impact Assessment
FTS	Fighter Training School
GCN	Great crested newt
GDPO	General Permitted Development Order
GLVIA3	Guidelines for Landscape and Visual Impact Assessment Edition 3
GP	General Practitioner
GWDTE	Groundwater dependent terrestrial ecosystem
HER	Historic Environment Record
HGV	Heavy goods vehicle
HLC	Historic Landscape Character
HRA	Habitats Regulations Assessment
km	Kilometre
kV	kilovolt
LCA	Landscape character areas
LGV	Light goods vehicle
LiDAR	Light Detection and Ranging data
LVA	Landscape and Visual Appraisal

LWS	Local Wildlife Sites
m ³	Cubic metres
m	Metre
mph	Miles per hour
NFI	National Forest Inventory
NGET	National Grid Electricity Transmission
NLCA	National Landscape Character Area
NPA	Noise Priority Area
NPS	National Policy Statements
NSR	Noise Sensitive Receptor
OS	Ordnance Survey
PAS	Portable Antiquities Scheme
PEDW	Planning and Environment Decisions Wales
PPW	Planning Policy Wales
PROW	Public rights of way
SAC	Special Area of Conservation
SLA	Special Landscape Area
SME	Small and medium enterprises
SPA	Special Protection Areas
SSD	Stopping sight distance
SSSI	Sites of Special Scientific Interest
T	Tonne
TAN	Technical Advice Note
TCPA	Town and Country Planning Act
WHS	World Heritage Site
ZTV	zone of theoretical visibility

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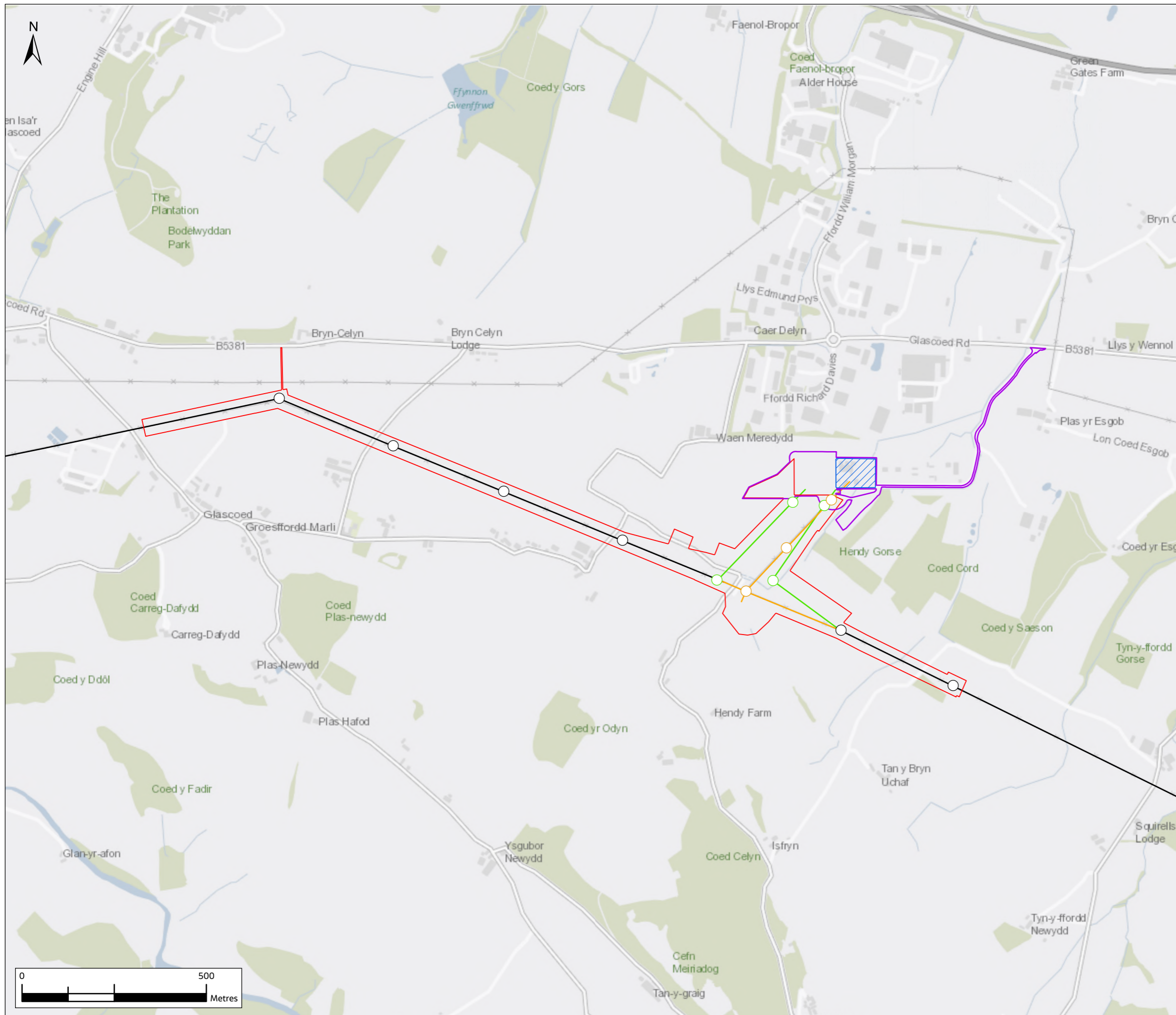
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





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Appendix A. Works Site Plan



Legend

-  Overhead Line Works and Access Boundary
-  Substation Extension Application Boundary (includes access road and existing substation)
-  Existing Substation Boundary
-  Existing Overhead Line and Towers - Retained
-  Existing Overhead Lines and Towers - Removed
-  New Overhead Lines and Towers



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03	6/17/2025	FINAL	WW	TW	TW	KW
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
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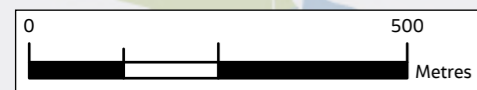
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Project
 BODELWYDDAN OVERHEAD LINES

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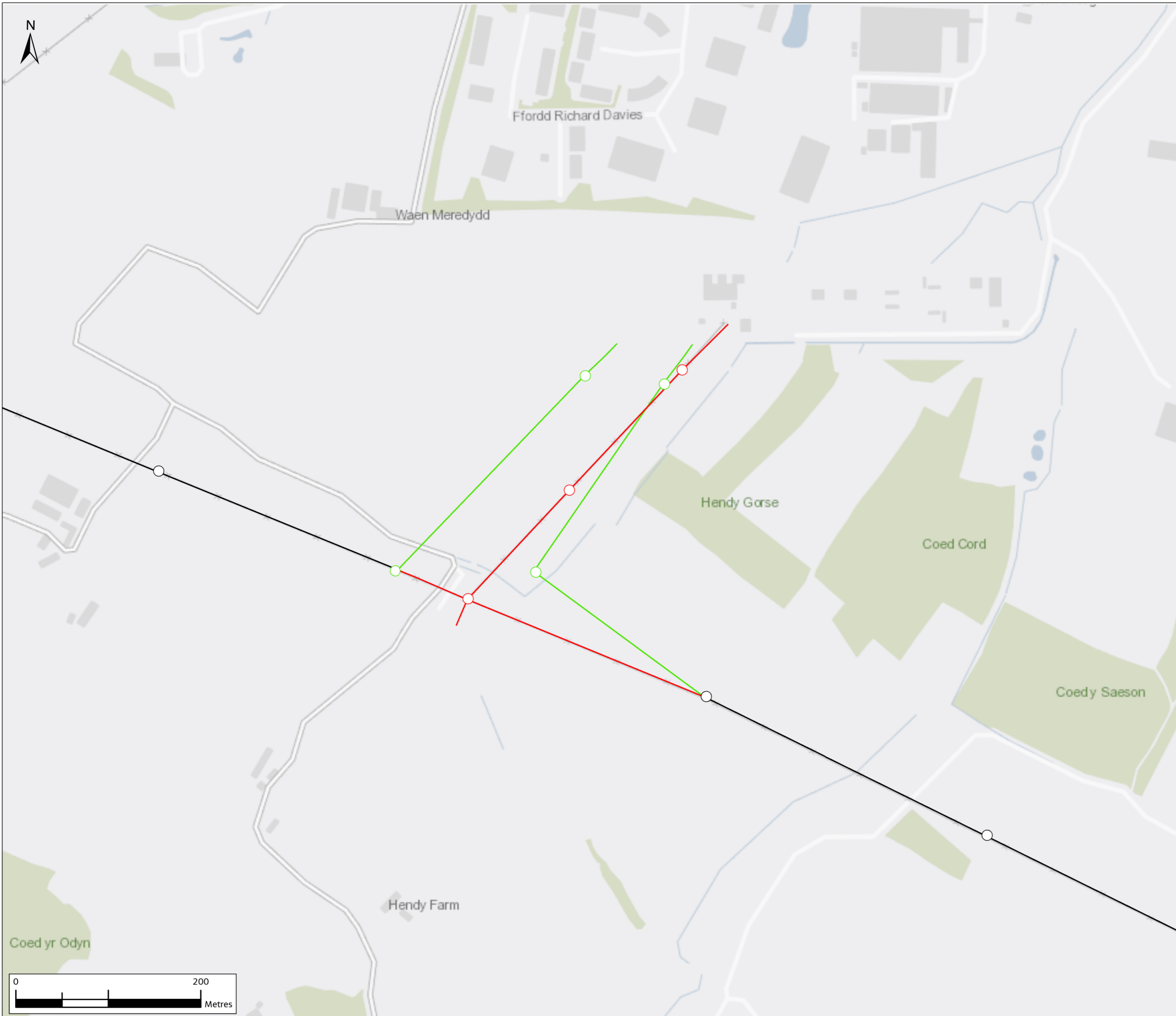
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APPENDIX A

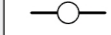




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Appendix B. Section 37 Consent Drawing



Legend

-  Existing Overhead Line and Towers – Retained
-  Existing Overhead Lines and Towers - Removed
-  New Overhead Lines and Towers



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O2	8/14/2024	FINAL	HK	TW	LG	TW
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
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Jacobs

Client
nationalgrid

Project
 BODELWYDDAN OVERHEAD LINES

Drawing Title
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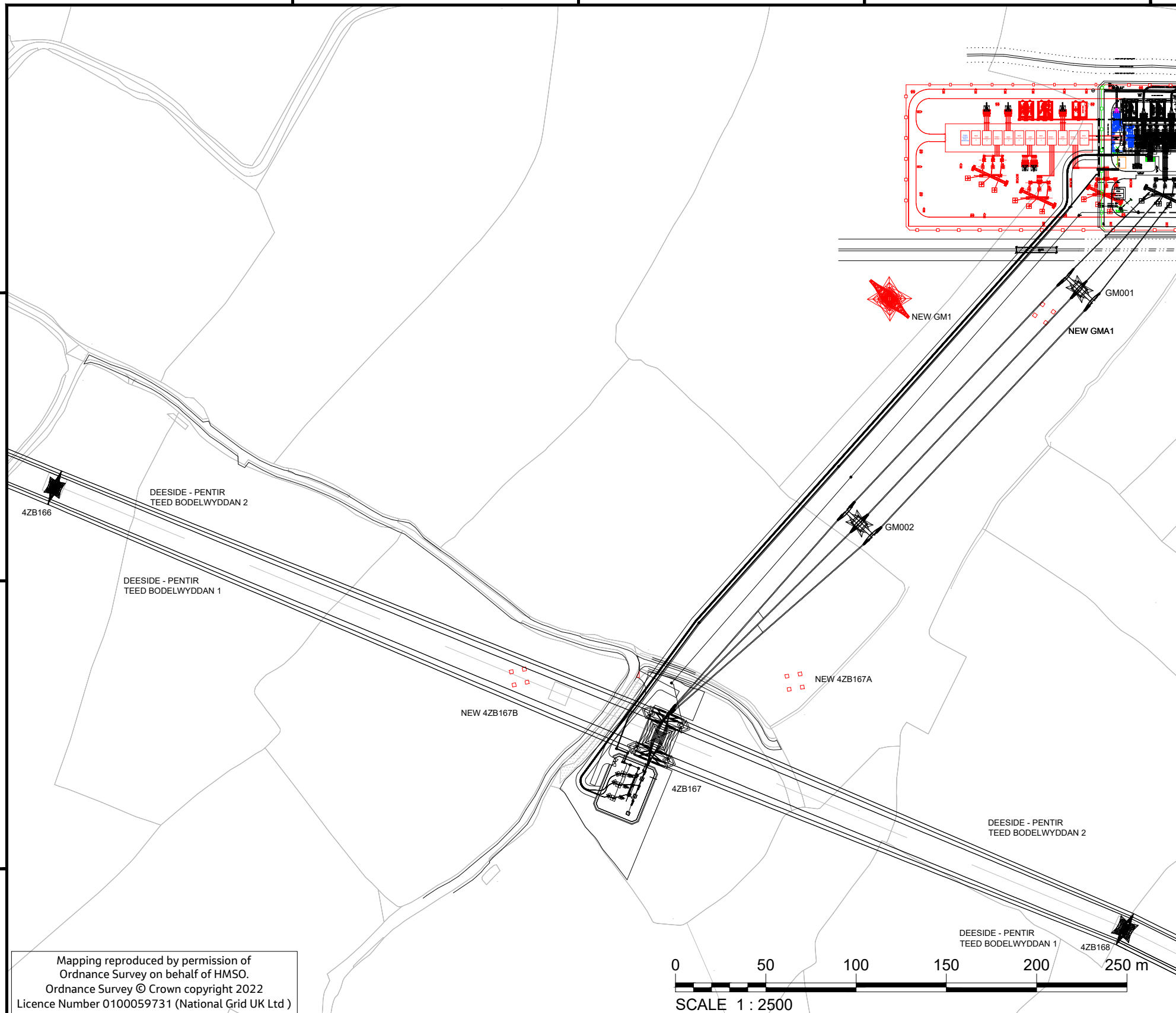
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APPENDIX B



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Appendix C. Overhead Line Works Stage-by-Stage Drawings



NOTES

1. This is a 4.2/4.3 drawing and is for development purposes only
2. All dimensions are in millimetres unless otherwise stated.

SEQUENCE OF WORK

- Stage 1. Pre-outage (assumes 2026 works for April 2027 completion)
1. Access and accommodation works at each work area.
 2. Installation of foundations at GM1, GMA1, 4ZB167A* and 4ZB167B* (*towers with potential proximity issue due to foundation construction beneath or adjacent to live conductors and therefore may require an outage to complete this work)
 3. Construction of tower GM1

LEGEND

- Energised Equipment
- New Equipment
- Equipment Removed
- OHL Tower Foundations

REFERENCE DRAWINGS

PDD-32281-SBS-002	STAGE 2
PDD-32281-SBS-003	STAGE 3
PDD-32281-SBS-004	STAGE 4
PDD-32281-SBS-005	STAGE 5
PDD-32281-SBS-006	STAGE 6

Rev	Description	Cre'd	Chk'd	App'd	Date
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P03	NOTE AMENDMENTS	RW	AS	CT	08/02/24
P04	UPDATED SUBSTATION LAYOUT	RW	CT	CT	09/05/24
P05	DESIGN REVIEW COMMENTS ADDRESSED	RW	CT	CT	30/05/24



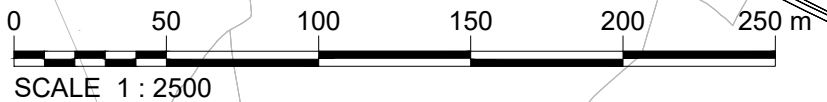
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 Scheme Name: **Bodelwyddan Generation Connection**

Document Title: **STAGE DIAGRAM STAGE 1**

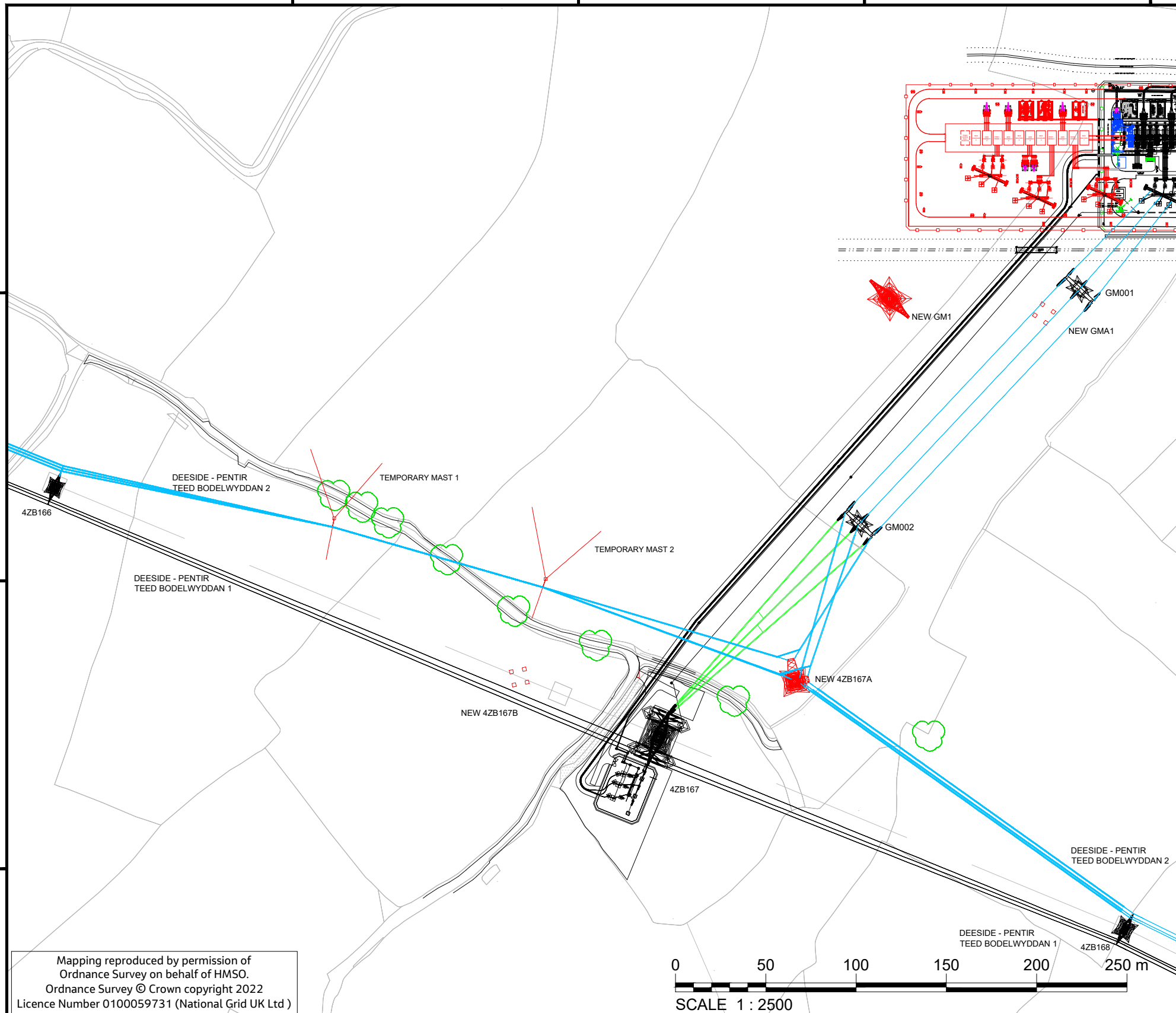
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Development Eng: AP	Document Type: DWG	Scale: 1:2500	Format: A3	Sheet(s): 1	Rev: P05

National Grid Drawing Number:
PDD-32281-SBS-001
 Originator Drawing Number:
B31000G6-JAC-ZZ-XX-DR-E-0101

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Approved	CT	Date	05/02/24	Approved	CT	Date	07/05/24	Approved	CT	Date	30/05/24



NOTES

1. This is a 4.2/4.3 drawing and is for development purposes only
2. All dimensions are in millimetres unless otherwise stated.

SEQUENCE OF WORK

- Stage 2. Pentir - Deeside - Bodelwyddan 2 circuit outage (5 weeks)
1. Construction of 4ZB167A tower body, short crossarms and temporary attachment, construction of x2 temporary masts. Construct a teed off connection between Pentir - Deeside - Bodelwyddan 2 circuit at tower 4ZB 167A; upper two phases are connected via jumpers and lowest phase conductor via temporary crossarm.
 2. Removal of connection 4ZB167 to GM002
 3. Reinstatement of circuit via temporary mast and teed arrangement at tower 4ZB167A

LEGEND

- Energised Equipment
- New Equipment
- Equipment Removed
- Isolated Equipment
- OHL Tower Foundations
- Mature trees with potential to support roosting bats

REFERENCE DRAWINGS

PDD-32281-SBS-001	STAGE 1
PDD-32281-SBS-003	STAGE 3
PDD-32281-SBS-004	STAGE 4
PDD-32281-SBS-005	STAGE 5
PDD-32281-SBS-006	STAGE 6

Rev	Description	Cre'd	Chk'd	App'd	Date
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P04	UPDATED SUBSTATION LAYOUT	RW	CT	CT	09/05/24
P05	DESIGN REVIEW COMMENTS ADDRESSED	RW	CT	CT	30/05/24



Master Scheme No: 32281 Sub-Scheme No: B31000G6 Site: BODELWYDDAN 400kV SUBSTATION

Scheme Name: **Bodelwyddan Generation Connection**

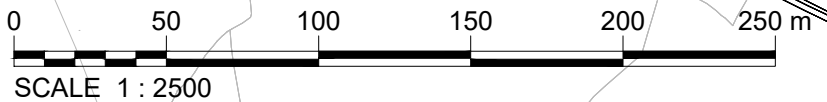
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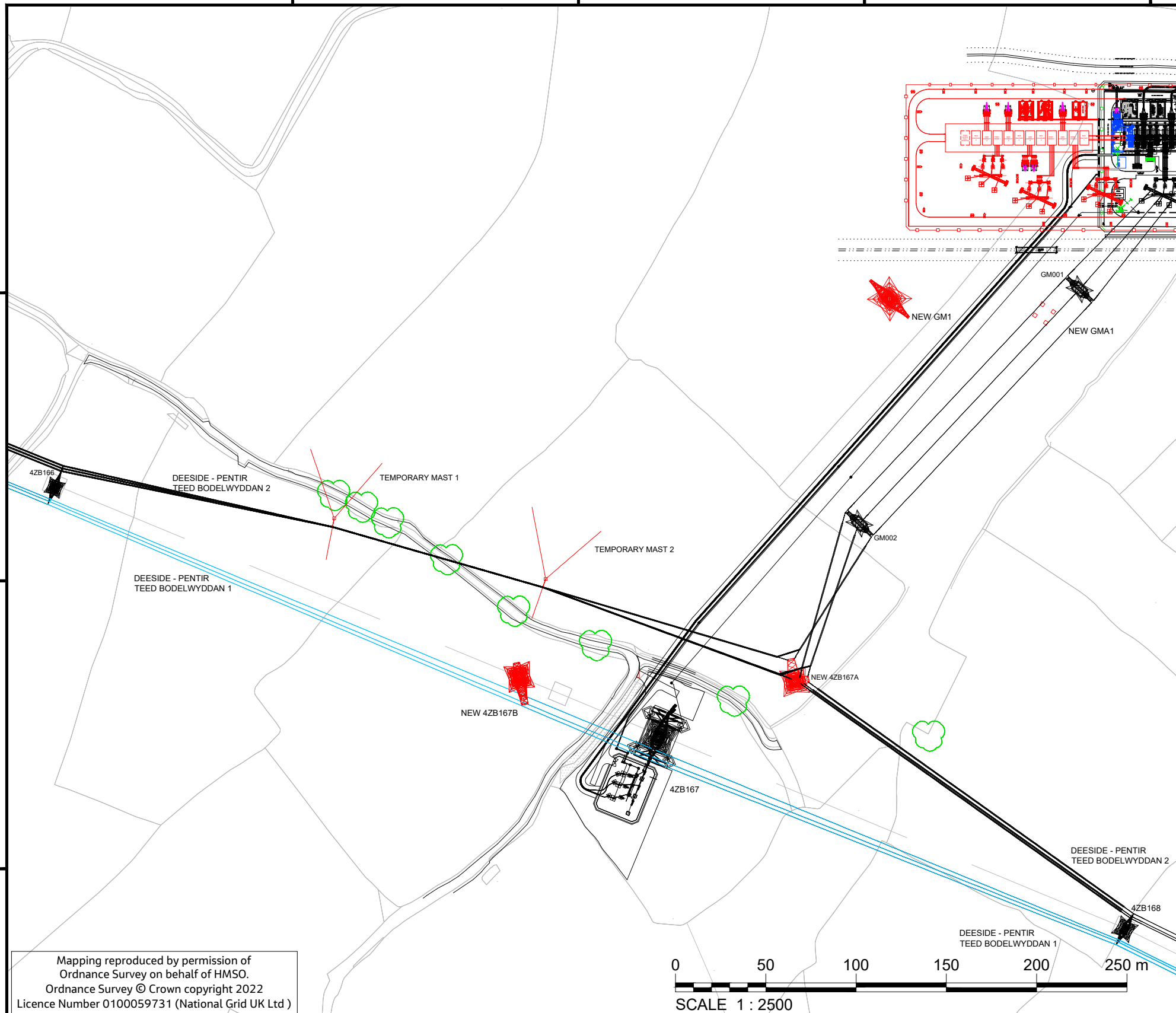
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Originator Drawing Number: **B31000G6-JAC-ZZ-XX-DR-E-0102**

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NOTES

1. This is a 4.2/4.3 drawing and is for development purposes only
2. All dimensions are in millimetres unless otherwise stated

SEQUENCE OF WORK

- Stage 3. Pentir - Deeside - Bodelwyddan 1 circuit outage (3 weeks)
1. Backstay conductors at 4ZB166. Terminate conductor on 4ZB167.
 2. Construction of 4ZB167B. Temporary low duty span 4ZB167B to 4ZB167.
 3. Reinstatement of circuit.

LEGEND

- Energised Equipment
- New Equipment
- Equipment Removed
- Isolated Equipment
- OHL Tower Foundations
- Mature trees with potential to support roosting bats

REFERENCE DRAWINGS

PDD-32281-SBS-002	STAGE 1
PDD-32281-SBS-003	STAGE 2
PDD-32281-SBS-004	STAGE 4
PDD-32281-SBS-005	STAGE 5
PDD-32281-SBS-006	STAGE 6

Rev	Description	Cre'd	Chk'd	App'd	Date
P02	UPDATED SUBSTATION LAYOUT	RW	CT	CT	19/05/23
P03	NOTE AND TOWER AMENDMENTS	RW	AS	CT	08/02/24
P04	UPDATED SUBSTATION LAYOUT	RW	CT	CT	09/05/24
P05	DESIGN REVIEW COMMENTS ADDRESSED	RW	CT	CT	30/05/24



Master Scheme No: 32281 Sub-Scheme No: B31000G6 Site: BODELWYDDAN 400kV SUBSTATION
 Scheme Name: **Bodelwyddan Generation Connection**

Document Title:
STAGE DIAGRAM
STAGE 3

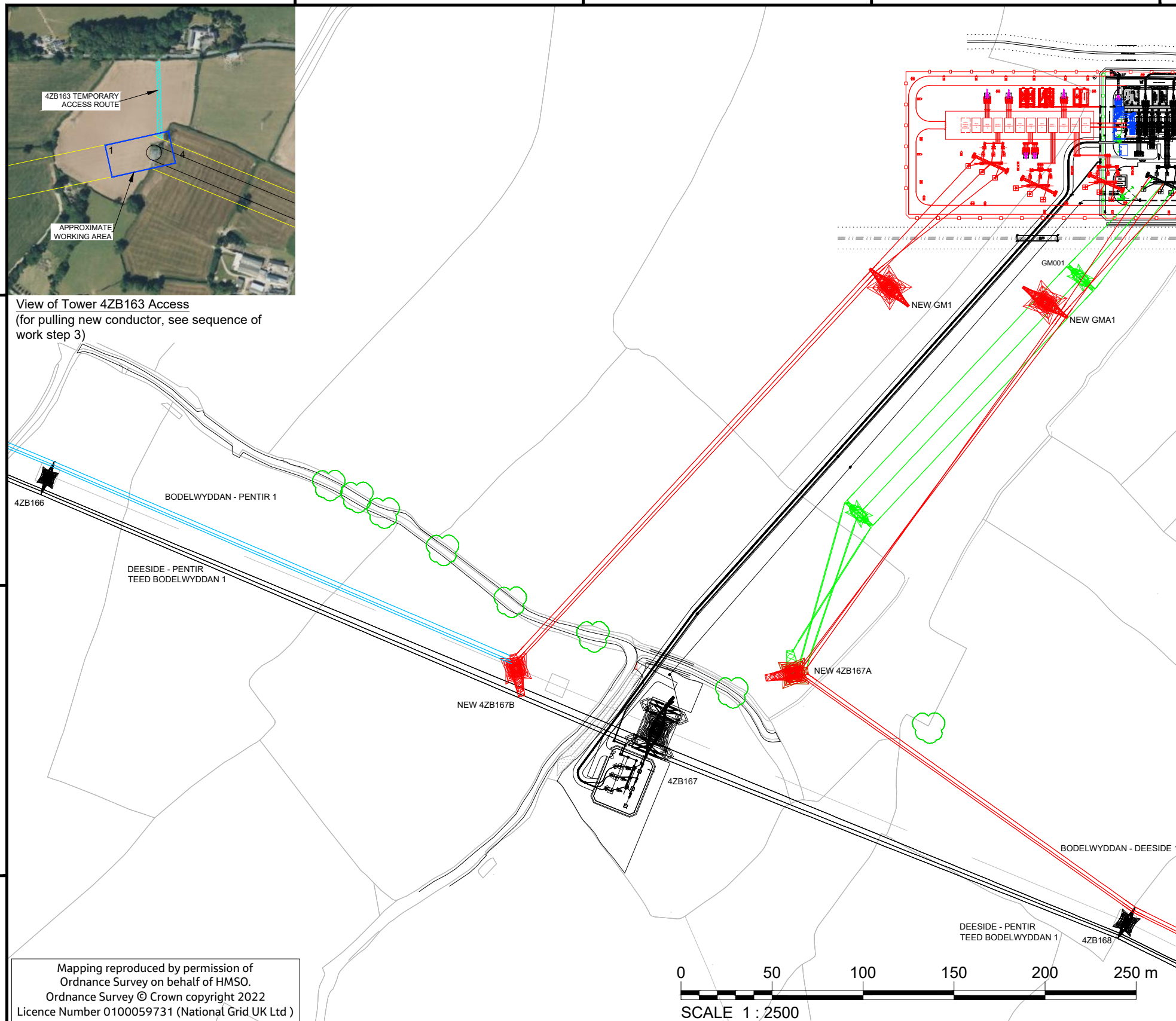
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NOTES

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- All dimensions are in millimetres unless otherwise stated

SEQUENCE OF WORK

Stage 4. Pentir - Deeside - Bodelwyddan 2 circuit outage (6 weeks subject to confirmation of remote end works)

- Dismantle GM001, GM002 and spans
- Construction of GMA1 (Possibly including foundations if not possible in stage 1, therefore 28-day concrete curing period may be necessary) and span 4ZB168 - 4ZB167A - GMA1 plus downloads.
- Removal of temporary mast, construction of span 4ZB163-GM1 plus downloads for circuit 1.
- Remote end protection changes. 4ZB167-255 (88 towers) change circuit identification plates and flag brackets. Commission new Bodelwyddan - Deeside 1 and new Bodelwyddan - Pentir 1 circuit.

LEGEND

- Energised Equipment
- New Equipment
- Equipment Removed
- Isolated Equipment
- Mature trees with potential to support roosting bats

REFERENCE DRAWINGS

PDD-32281-SBS-002	STAGE 1
PDD-32281-SBS-003	STAGE 2
PDD-32281-SBS-004	STAGE 3
PDD-32281-SBS-005	STAGE 5
PDD-32281-SBS-006	STAGE 6

Rev	Description	Cre'd	Chk'd	App'd	Date
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P03	NOTE AMENDMENTS	RW	AS	CT	08/02/24
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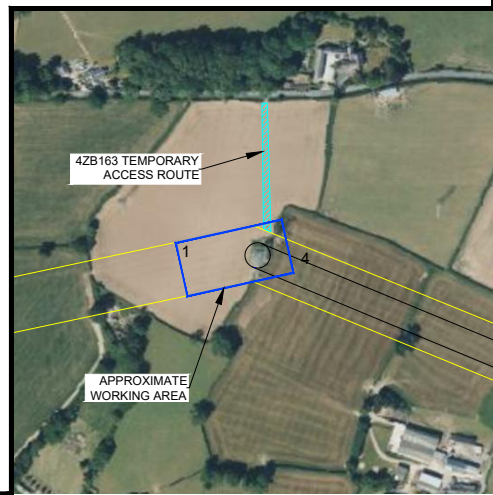
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 Scheme Name: Bodelwyddan Generation Connection

Document Title: **STAGE DIAGRAM STAGE 4**

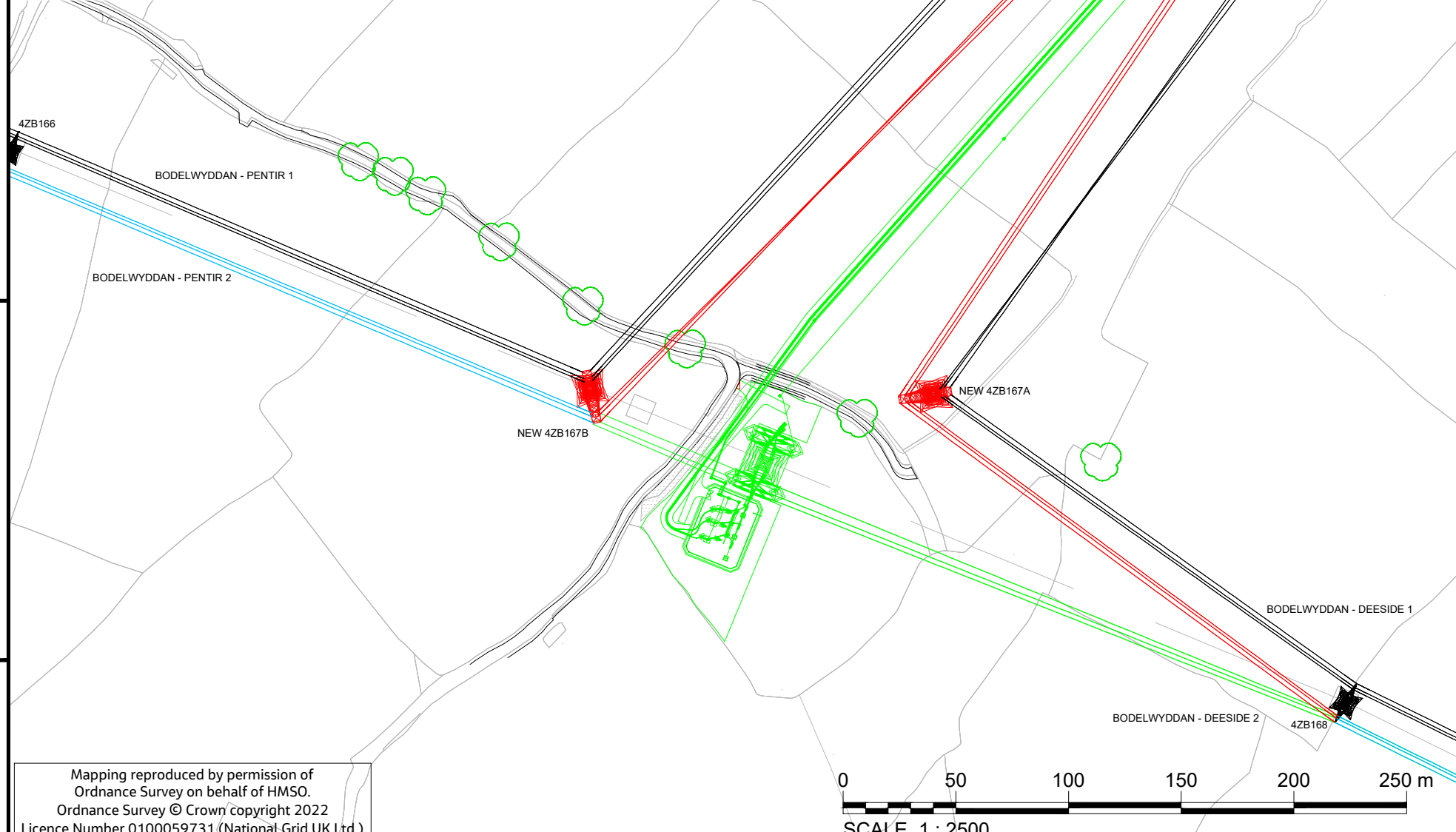
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 Originator Drawing Number: **B31000G6-JAC-ZZ-XX-DR-E-0104**

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Checked	AS		Checked	CT		Checked	CT	
Approved	CT	Date 05/02/24	Approved	CT	Date 07/05/24	Approved	CT	Date 30/05/24



View of Tower 4ZB163 Access
(for pulling new conductor, see sequence of work step 1)



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NOTES

1. This is a 4.2/4.3 drawing and is for development purposes only
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SEQUENCE OF WORK

- Stage 5. Pentir - Deeside - Bodelwyddan 1 circuit outage (4 weeks subject to confirmation of remote end works)
1. Construction of span 4ZB163-GM1 and downloads for circuit 2.
 2. Add crossarms to tower 4ZB167A, construct spans 4ZB168-4ZB167A-GMA1 and downloads
 3. Removal of towers 4ZB167, CSE compound cable and conductors between 4ZB167B and 4ZB168.
 4. Remote end protection changes. 4ZB167-255 (88 towers) change circuit identification plates and flag brackets. Commission new Bodelwyddan - Deeside 2 and new Bodelwyddan - Pentir 2 circuit

LEGEND

- Energised Equipment
- New Equipment
- Equipment Removed
- Isolated Equipment
- 🌳 Mature trees with potential to support roosting bats

REFERENCE DRAWINGS

PDD-32281-SBS-002	STAGE 1
PDD-32281-SBS-003	STAGE 2
PDD-32281-SBS-004	STAGE 3
PDD-32281-SBS-005	STAGE 4
PDD-32281-SBS-006	STAGE 6

Rev	Description	Cre'd	Chk'd	App'd	Date
P02	UPDATED SUBSTATION LAYOUT	RW	CT	CT	19/05/23
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P04	UPDATED SUBSTATION LAYOUT	RW	CT	CT	09/05/24
P05	DESIGN REVIEW COMMENTS ADDRESSED	RW	CT	CT	30/05/24



Master Scheme No: 32281 Sub-Scheme No: B31000G6 Site: BODELWYDDAN 400kV SUBSTATION

Scheme Name: **Bodelwyddan Generation Connection**

Document Title: **STAGE DIAGRAM STAGE 5**

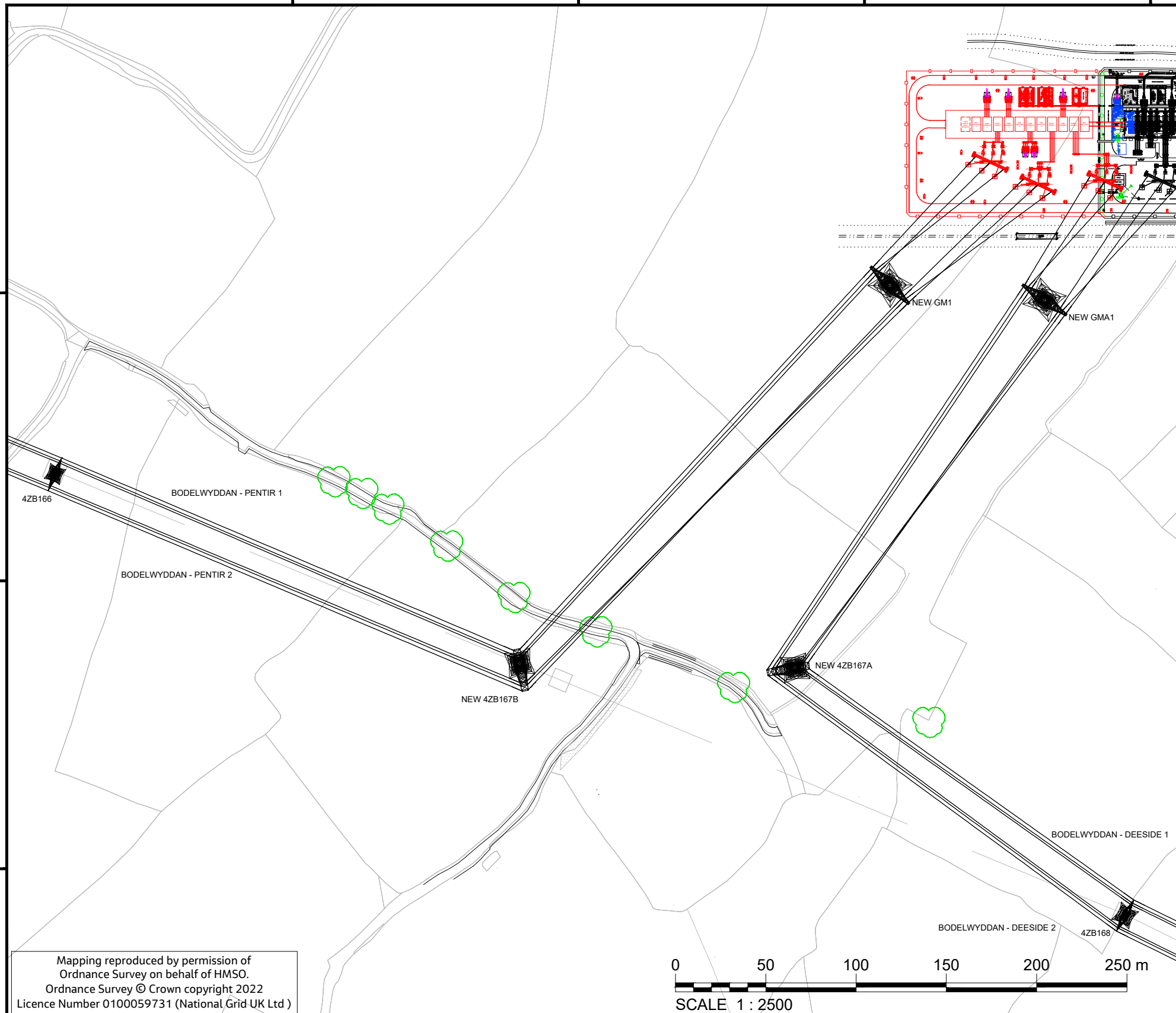
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National Grid Drawing Number: **PDD-32281-SBS-005**

Originator Drawing Number: **B31000G6-JAC-ZZ-XX-DR-E-0105**

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Approved	CT	Date 05/02/24	Approved	CT	Date 07/05/24	Approved	CT	Date 30/05/24



NOTES

1. This is a 4.2/4.3 drawing and is for development purposes only
2. All dimensions are in millimetres unless otherwise stated

SEQUENCE OF WORK

- Stage 6. Post outage and final arrangement
1. Reinstatement, landscaping, and screening.

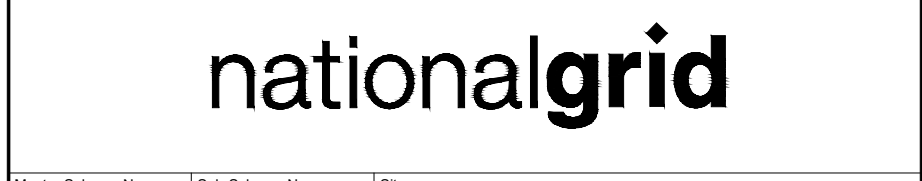
LEGEND

- Energised Equipment
- New Equipment
- Equipment Removed
- 🌳 Mature trees with potential to support roosting bats

REFERENCE DRAWINGS

PDD-32281-SBS-002	STAGE 1
PDD-32281-SBS-003	STAGE 2
PDD-32281-SBS-004	STAGE 3
PDD-32281-SBS-005	STAGE 4
PDD-32281-SBS-006	STAGE 5

Rev	Description	Cre'd	Chk'd	App'd	Date
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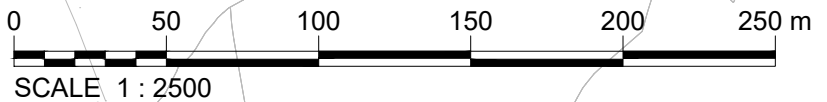
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 Scheme Name: **Bodelwyddan Generation Connection**

Document Title:
STAGE DIAGRAM
STAGE 6

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Approved	CT	Date	05/02/24	Approved	CT	Date	07/05/24	Approved	CT	Date	30/05/24

Appendix D. Arboricultural Impact Assessment



THE
ENVIRONMENT
PARTNERSHIP



BODELWYDDAN OVERHEAD LINE REPLACEMENTS

BODELWYDDAN

ARBORICULTURAL IMPACT ASSESSMENT

DECEMBER 2023

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Document Title	Arboricultural Impact Assessment
Prepared for	National Grid
Prepared by	TEP - Warrington
Document Ref	9037.01.002

Author	[REDACTED]
Date	November 2023
Checked	[REDACTED]
Approved	[REDACTED]

Amendment History					
Version	Date	Modified by	Check / Approved by	Reason(s) issue	Status
0.1	11/12/23	AAB	HEE	Approval	Draft
1.0	15/12/23	AAB	JGS	Issue	Final

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2.0 Baseline	3
3.0 Effects	13
4.0 Mitigation.....	16

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Table 5 Quantity and percentage of trees to be removed.....	14
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Figure 3 Open grown tree T68 close to existing overhead lines	5
Figure 4 Veteran tree T44 showing retrenchment and stag-heading	6

APPENDICES

APPENDIX A: Arboricultural Survey Data

APPENDIX B: Survey Method

DRAWINGS

Drawing Set 1 - Tree Constraints Plan

Drawing Set 2 - Tree Works Plan

Drawing Set 3 - Tree Protection Plan

Drawing 4 - Tree Protection Fencing Specification

Executive Summary

1. TEP has been commissioned by National Grid to conduct a survey of land at Bodelwyddan Substation and a review of designations, policies and other instruments of relevance to arboriculture. This report presents the results and effects of proposed development.
2. 71 individual trees; 9 groups of trees; 1 woodland compartment; and 36 hedges were recorded within influencing distance of the application site.
3. The tree population comprises a large number of hedgerow oaks distributed throughout the site with occasional outgrown hedges forming groups. There is a single woodland towards the eastern edge of the site that extends well beyond the survey boundary.
4. The desktop review and site survey identified no Tree Preservation Orders; no trees within a Conservation Area; no ancient woodland; 1 veteran tree; no trees within a Community Forest; and arboreal Habitats of Principal Importance including Deciduous Woodland, and Hedgerow.
5. The proposed development comprises an extension of the existing Bodelwyddan Substation with associated removal and replacement of pylons and overhead lines. This report covers the effects of the removal and replacement of the pylons and overhead lines only. The effects of the substation expansion is described in a separate Arboricultural Impact Assessment (reference: 9037.01.001).
6. Approximately 198m of hedgerow would be removed to facilitate the works, all of which is within the application boundary. No trees would be removed.
7. The development would give rise to no adverse effects on arboriculture that cannot be mitigated. Removals are limited to sections of hedgerow within temporary working areas and access routes which could be reinstated post construction. The development would therefore have the potential to result in a net balance of tree and hedgerow cover.
8. A scheme of new hedgerow planting should be required and secured by a condition of any planning consent.
9. Tree protection measures to be observed during construction are proposed in the form of a Tree Protection Plan at Drawing Set 3. The correct installation and maintenance of temporary barrier fencing should be a condition of any planning consent.
10. This report constitutes a valid basis for the evaluation of impacts on trees resulting from the proposed development for a period not exceeding 2 years from the date of the surveys. After this, it would be necessary to review baseline data and conclusions to ensure reliability.
11. All trees that would be retained can be protected in accordance with BS5837:2012. Where the recommendations of this report have been followed, any future deterioration in tree condition shall not be attributable to the development.

1.0 Scope

- 1.1 TEP has been commissioned by National Grid to conduct an arboricultural survey of land at Bodelwyddan Substation and to make an assessment in accordance with BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations.
- 1.2 This report has been produced to support a planning application for an extension of the existing Substation with associated removal and replacement of pylons and overhead lines. This report covers the effects of the removal and replacement of the pylons and overhead lines only. It describes the findings of field and desktop surveys; the effects that granting planning permission would have on arboriculture; and measures that are and/or should be incorporated in the proposed development. The effects of the substation expansion is described in a separate Arboricultural Impact Assessment (reference: 9037.01.001).

Survey

- 1.3 Surveys were undertaken on 27th June and 31st October 2023 in accordance with BS 5837 by a qualified arboriculturist. The survey method is included at Appendix B.
- 1.4 A topographical survey covered a small part of the site and was used to record the position of trees and vegetation in that area (drawing reference: 106823). The majority of the site was not covered by this survey and therefore most tree locations were estimated¹.
- 1.5 Trees on private land outside the application boundary, and at inaccessible locations² were surveyed insofar as was practicable. Whilst reasonable effort has been made to ensure the accuracy and comprehensiveness of such records, it cannot be guaranteed.

Limitation

- 1.6 This report relates to a specific development proposal and should not be interpreted as advice in any other circumstance, including but not limited to the promotion or assessment of alternative schemes; the design of foundations; management of tree risk; and tree-related subsidence.
- 1.7 This report constitutes a valid basis for the evaluation of impacts on trees resulting from the proposed development for a period not exceeding 2 years from the date of the surveys. After this, it would be necessary to review baseline data and conclusions to ensure reliability.
- 1.8 Where the recommendations of this report have been followed, any future deterioration in tree condition shall not be attributable to the development.

¹ Estimated feature locations are marked on Drawing Set 1

² Limitations to the survey are described at Appendix A

2.0 Baseline

The Site

- 2.1 The site comprises a number of agricultural field parcels to the south and west of Bodelwyddan Substation. It is centred on UK Grid Reference SJ014734

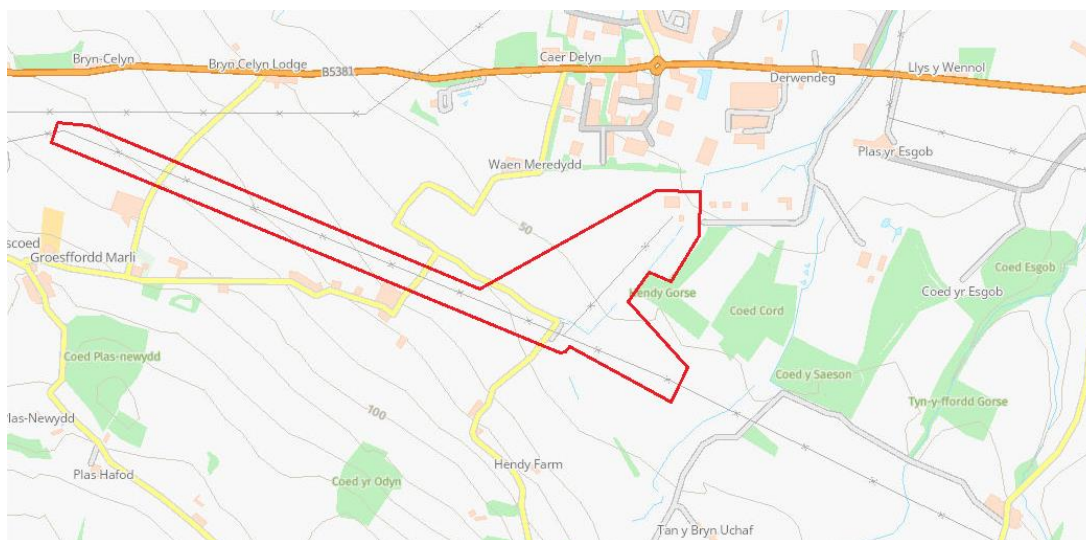


Figure 1 Site location and approximate boundary (OS Open Map Zoomstack) 1:10,000

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- 2.2 The survey area is generally flat with a gentle slope towards the south. It is bordered to the north by an industrial estate, to the east by agricultural field parcels and woodland, and the south and west by further agricultural field parcels.
- 2.3 At the time of the survey, the site was in agricultural use as both arable and pasture.

Tree Survey

- 2.4 71 individual trees; 9 groups of trees; 1 woodland compartment; and 35 hedges were recorded within influencing distance of the application site.
- 2.5 Feature locations, their quality categories, canopy spreads and root protection areas are shown on Drawing set 1. The following table provides the total canopy area for mapped trees and the total length of mapped hedgerow on Drawing Set 1. In some cases this may be more than the absolute area of cover due to canopy overlap between adjacent features.

Table 1 Existing canopy coverage

Trees	Groups	Woodland	Hedgerow
0.7459ha	0.8657ha	0.6826ha	3719m

- 2.6 All arboricultural information recorded during the survey is presented at Appendix A.

Overview

- 2.7 The tree population is extensive and comprises numerous large, well-established oak trees situated throughout the hedgerow network. There are occasional smaller trees and groups, often where hedges have lapsed from management. Large areas of continuous tree canopy cover are limited to the woodland in the east of the site.



Figure 2 Example of typical field boundary trees within hedgerows

- 2.8 Large mature oak trees are common on site but most of them are showing some amount of decline or retrenchment with stag-heading in many examples. Several of these trees are in better condition with few defects and good vigour.
- 2.9 Tree T10, growing on the edge of the woodland is distinguished by its upright form compared to the broad squat open grown trees. It has some failed limbs and some that have been removed leaving retained stubs with small decay pockets forming. It is tall and broad and visually prominent from the rest of the wooded area.



Figure 3 Open grown tree T68 close to existing overhead lines

- 2.10 Tree T4 is a very large oak at the edge of a small substation compound. It has a heavily burred stem and some retrenchment in the upper canopy with large dead branches giving a stag-headed form. Tree T67 is a huge twin-stemmed tree with a bulbous and heavily burred lower stem that is splitting and hollowing with some brown rot formation. They have some veteran characteristics but lack the complex assemblage of features that would enable them to be considered as such. They are likely to continue to develop these features and may achieve veteran status in the future.
- 2.11 Tree T44 is a very large tree, situated within a hedgerow. It has numerous features associated with veteran trees including retrenchment with stag-heading, hollowing and cavity formation, large diameter dead wood, and signs of wood-decay fungi. Despite the physical defects the tree has excellent vigour and is good example of a veteran field boundary oak that is visually prominent and provides high habitat value.



Figure 4 Veteran tree T44 showing retrenchment and stag-heading

- 2.12 Woodland W1 is a mixture of well-established large oaks with younger plantation trees such as Scots pine and Norway spruce, and regeneration of silver birch and thorn species. It has a good age and size structure and forms a large area of continuous canopy cover extending well beyond the site boundary to the east.
- 2.13 This woodland forms a continuous canopy with group G4 which comprises almost exclusively large oaks with occasional small hawthorns. It has no significant understorey or ground cover with evidence of heavy grazing and ground compaction. The age and size profile of this group is narrow with most trees large and well-established.

Tree Quality

- 2.14 Under BS 5837 trees are objectively assigned one of four categories to describe their quality. The table below includes a description of each category and the amount of trees within it. This information is presented by canopy area to allow comparison between features of varying size and maturity. Hedgerows have not been categorised.

Table 2 Summary of BS 5837 quality categorisation³

Category	Description	Total existing
A	Trees of high quality, typically with a long remaining life expectancy; and with clear and identified merit as specimens, visually, culturally or for conservation.	0.1694ha
B	Trees of moderate quality, typically with at least a medium remaining life expectancy; with remediable defects only; or low quality but with collective merit.	1.8602ha
C	Trees of low quality, typically with at least a short remaining life expectancy; unremarkable trees; young or small trees that could be replaced.	0.1780ha
U	Trees that cannot realistically be retained in the current land use for 10 years; with serious and irreparable defects, pathogens or decline.	0.0532ha

2.15 The greatest proportion of tree cover is moderate quality (Category B) with around 82% of tree cover falling into this category by area. This figure is somewhat inflated by the presence of two large areas of tree cover (W1 and G4) adjacent to the eastern boundary but Category B is still most common numerically. The remaining tree cover is fairly evenly distributed between high (Category A) and low (Category C) quality with a small number of trees falling into Category U.

2.16 These qualities are largely derived from their landscape and habitat value with a smaller number of trees displaying arboricultural value.

Root Protection Areas

2.17 Using the results of the field survey a Root Protection Area (RPA) has been calculated in accordance with BS 5837 using each tree's stem diameter at 1.5 metres⁴. The RPA represents the minimum area around each tree that must be left undisturbed to ensure its survival.

2.18 Where a tree's rooting pattern is considered to have been influenced by site conditions the RPA has been adjusted or offset to most accurately represent the likely spread of roots⁵. On this site influences on root morphology are considered to be existing roads, ditches, and agricultural practices.

³ Refer to Appendix B for the full table

⁴ Refer to Appendix A for RPA area calculations

⁵ See Drawing Set 1 for RPA shapes

Policy, designations and protection

Planning Policy

- 2.19 All trees are a material consideration in the planning process. Effects on trees will therefore be considered by the consenting authority. Adverse effects that cannot be mitigated and which are not acceptable on balance against other benefits may weigh against the granting of planning permission.
- 2.20 There should be a common sense ambition to limit tree loss to that which is strictly required to facilitate the proposal, and to achieve a good design. Trees which are retained should not be harmed and the proposal should present a reasonable account of the prospects for tree retention in accordance with BS 5837.

Planning Policy Wales

- 2.21 Planning Policy Wales states that planning authorities should protect trees, hedgerows, groups of trees and areas of woodland where they have ecological value, contribute to the character or amenity of a particular locality, or perform a beneficial and identified green infrastructure function⁶.
- 2.22 There is a strong policy presumption against loss or deterioration of irreplaceable natural resources such as semi-natural woodlands, ancient woodland and individual ancient, veteran or heritage trees. These trees should be afforded protection from development which would result in their loss or deterioration unless there are significant and clearly defined public benefits⁷.

Local Planning Policy

- 2.23 Denbighshire County Council has a Local Development Plan (adopted June 2013); however this does not contain any specific policies of relevance to trees. It contains a policy relating to Nature Conservation, policy VOE 5, which is of relevance to the MSCP site and is recreated below.

Policy VOE 5 – Conservation of natural resources

Development proposals that may have an impact on protected species or designated sites of nature conservation will be required to be supported by a biodiversity statement which must have regard to the County biodiversity aspiration for conservation, enhancement and restoration of habitats and species.

Where the overall benefits of a development outweigh the conservation interest of a locally protected nature site, mitigation and enhancement measures in or adjacent to these sites should be an integral part of the scheme.

If necessary, measures required to mitigate likely adverse effects on the qualifying features of statutory designated sites should be put in place prior to the

⁶ Planning Policy Wales paragraph 6.4.25

⁷ Planning Policy Wales paragraph 6.4.26

commencement of development. Measures required to offset any likely adverse effects will be secured by planning conditions and/ or planning obligations.

Planning permission will not be granted for development proposals that are likely to cause significant harm to the qualifying features of internationally and nationally designated sites of nature conservation, priority habitats, priority species, regionally important geodiversity sites, or to species that are under threat.

- 2.24 In addition, the council has published supplementary information that gives guidance on the interpretation and application of local planning policy. In particular, the Tree and Landscaping SPG (July 2016) is of relevance.

Tree Preservation Orders

- 2.25 A check with the local authority was undertaken on 13th July 2023. Their online mapping system confirmed that no trees within or adjacent to the site are protected by Tree Preservation Order.

Conservation Areas

- 2.26 A check with the local authority was undertaken on 13th July 2023. Their online mapping system confirmed that no trees within or adjacent to the site are within a Conservation Area.

Ancient Woodland

- 2.27 Ancient Woodland is defined in Wales as sites that have been continuously wooded since before 1600AD⁸ and is regarded as 'irreplaceable'⁹. The distribution of Ancient Woodland has been assessed on the basis of Natural Resources Wales Ancient Woodland Inventory 2021 via DataMapWales (gov.wales)¹⁰. There is no ancient woodland within or adjacent to the site.

Veteran Trees

- 2.28 Veteran trees are defined as those which, because of great age, size or condition, are of exceptional value culturally, within the landscape, or for wildlife¹¹. All ancient trees are veteran trees. Not all veteran trees are ancient, though they tend to be relatively old for the species. Ancient and veteran trees are regarded as 'irreplaceable'¹².
- 2.29 There is no comprehensive national register of veteran trees. The Woodland Trust maintains an inventory of significant trees which includes some ancient and veteran individuals¹³. At the time of writing it contained no records of relevance to the site.
- 2.30 An assessment of each tree was made by a qualified arboriculturist as part of the tree survey. There is 1 veteran tree within the site. This is listed in the table below.

⁸ Woodlands for Wales: Glossary (p.52)

⁹ Planning Policy Wales paragraph 6.4.26

¹⁰ [New map | DataMapWales \(gov.wales\)](#)

¹¹ Woodlands for Wales: Glossary (p.55)

¹² Planning Policy Wales paragraph 6.4.26

¹³ <https://ati.woodlandtrust.org.uk/>

Table 3 Veteran trees

Survey reference ¹⁴	Species	Veteran characteristics
T44	Pedunculate Oak	Retrenchment, hollowing and decay, large size

- 2.31 Not all mature trees or those of high habitat interest are veterans. Trees with individual or simple assemblages of features typically associated with veteran trees were also noted¹⁵. Such trees may become veterans but should not be treated as such for the purposes of impact assessment. This is the case for trees T4 and T67, both very large pedunculate oak which although large and old have only a small number of features associated with veteran trees.
- 2.32 To comply with planning policy¹⁶, development must not result in loss or deterioration of ancient and veteran trees unless there are significant and clearly defined public benefits. In practice, harm to such trees would constitute grounds for refusal of the majority of planning applications that cannot demonstrate the public benefits would outweigh the loss or harm of these trees.
- 2.33 No prescriptive guidance is provided with regards to protection of ancient and veteran trees within national planning policy. Therefore all protection recommendations, with the central objective being the avoidance of harm to ancient and veteran trees, are based on professional judgement, experience and relevant guidance.

Habitats of Principal Importance

- 2.34 A list¹⁷ of habitats which are of principal importance for the purpose of maintaining and enhancing biodiversity is published by Welsh Ministers¹⁸, the definitions of which appear to be based on the UK Biodiversity Action Plan (UK BAP)¹⁹. The list includes habitat types that are defined by woody vegetation, which are listed below. All features surveyed have been assessed against these definitions and those that meet the definition of a Habitat of Principal Importance have been listed in accordance with their habitat type below.
- 2.35 Habitats of Principal Importance provide a means of evaluating effects on biodiversity, and thereby a metric to demonstrate the discharge of this duty. In the context of planning, adverse effects on Habitats of Principal Importance that cannot be mitigated are material to decision making.
- 2.36 There is no mapping available of Habitats of Principal Importance for Wales. Habitat surveys were not completed as part of the tree survey but were considered as part of a separate Ecological Assessment that informed the Environmental Statement Chapter 11: Biodiversity.

¹⁴ See Appendix A

¹⁵ See Appendix A

¹⁶ Planning Policy Wales paragraph 6.4.26

¹⁷ <https://www.biodiversitywales.org.uk/File/57/en-GB>

¹⁸ Environment (Wales) Act 2016, 7 (1)

¹⁹ <http://jncc.defra.gov.uk/page-5706>

Broadleaved, Mixed and Yew Woodland

- 2.37 Five distinct types of woodland²⁰ are amalgamated in the Section 7 list of Habitats of Principal Importance²¹ under the habitat type 'Broadleaved, Mixed and Yew Woodland'.
- 2.38 Survey feature W1 appears to fit the definition of a Broadleaved, Mixed and Yew Woodland

Wood Pasture and Parkland²²

- 2.39 Wood-pasture and parkland are mosaic habitats valued for their trees, especially veteran and ancient trees, and the plants and animals that they support. They are exclusively associated with some species of insects, lichens and fungi which depend on dead and decaying wood. Grazing animals and continuity of management are fundamental to the existence of the habitat and it can be a type of ancient woodland.
- 2.40 No surveyed features appear to fit the definition of Wood Pasture and Parkland at the application site.

Traditional Orchards²³

- 2.41 Traditional orchards are defined, for priority habitat purposes, as groups of fruit and nut trees planted on vigorous rootstocks at low densities in permanent grassland; and managed in a low intensity way. Habitat structure rather than vegetation type, topography or soils, is the defining feature of the habitat.
- 2.42 No surveyed features appear to fit the definition of Traditional Orchard at the application site.

Hedgerow²⁴

- 2.43 Hedgerow is any boundary line of trees or shrubs over 20m long and less than 5m wide, and where any gaps are less than 20m wide. It may include banks, walls, ditches, herbaceous vegetation, climbing plants or trees within 2m of the centre line. All hedgerows which comprises at least 80% woody native species are included.
- 2.44 The survey identified 36 hedgerows²⁵. Of these, all meet the description of the Habitat of Principal Importance. In addition, tree group G5 is a linear boundary feature that should be regarded as also meeting this description.

Protected Species

- 2.45 No assessment of the presence of protected species has been made during the production of this report. Features of possible interest that were observed incidentally during the tree survey are recorded in Appendix A.

²⁰ Upland oak woodland; Lowland beech and yew woodland; Upland mixed ash woodland; Wet woodland; Lowland mixed deciduous woodland

²¹ <https://www.biodiversitywales.org.uk/File/57/en-GB>

²² http://jncc.defra.gov.uk/docs/UKBAP_BAPHabitats-65-WoodPastureParkland2011.doc

²³ http://jncc.defra.gov.uk/Docs/UKBAP_BAPHabitats-56-TraditionalOrchards.doc

²⁴ http://jncc.defra.gov.uk/Docs/UKBAP_BAPHabitats-17-Hedgerows.doc

²⁵ See Appendix A

- 2.46 Works to and around trees have the capacity to affect protected species where present, particularly including birds, bats, great crested newts, badgers, dormice, otters and water voles. Contractors should be familiar with the locations and sensitivities of any protected species that are present and take reasonable avoidance measures or comply with the requirements of any licence agreement in accordance with the advice of an ecologist.

Birds

- 2.47 Intentional harm to a wild bird, egg, or a nest that is in use or being built is an offence²⁶. Disturbance of certain wild birds that are building a nest, or are in, on or near a nest containing eggs or young, or disturbance of dependent young is also an offence²⁷.
- 2.48 All trees are a potential habitat for nesting birds so tree work should ideally, but not essentially, be undertaken outside the bird nesting season. Between March and August, a detailed inspection of each tree should be undertaken by a qualified ecologist to confirm the absence of nesting birds immediately prior to works.
- 2.49 Some birds nest outside the core nesting season. If an active nest is found at any time of year, work likely to affect the nest must be halted until the nest becomes inactive. This will vary depending on the species of bird but is typically up to six weeks. The advice of an ecologist regarding the duration and size of a protection buffer around the nest should be sought.

Bats

- 2.50 It is an offence to damage, destroy or obstruct access to any structure or place which is used for shelter or protection²⁸, or breeding or resting²⁹ by a bat. Mature trees often contain cavities, splits and ivy, which may be attractive to bats.
- 2.51 If the presence of a bat, or a roost or resting site is suspected whilst undertaking works on any trees, operations must be halted and the advice of appropriately licensed ecologist should be sought.

²⁶ Wildlife and Countryside Act 1981, 1 (1)

²⁷ Wildlife and Countryside Act 1981, 1 (5)

²⁸ Wildlife and Countryside Act 1981, 9 (4)

²⁹ The Conservation of Habitats and Species Regulations 2017, 43 (1)

3.0 Effects

- 3.1 In simple terms, the effects on arboriculture comprises an account of which existing trees, groups of trees, hedgerow and woodland would not be retained within the proposed development; what significance they have; and whether adverse effects would or can be mitigated or offset.

Proposed development

- 3.2 The proposed development comprises construction of temporary towers and overhead lines, removal of existing towers and overhead lines and construction of new permanent towers and lines. These works include cable pulling zones, construction areas, dismantling zones and temporary access routes.
- 3.3 The proposed layout is shown on Drawing Set 2 and Drawing Set 3 and is based on drawing PDD-32281-OHL-002 provided by National Grid.
- 3.4 An external works plan showing the detail and arrangement of drainage, levels, retaining structures and utilities was not available to inform the production of this assessment.

Tree Removal

- 3.5 This section details all tree removal which is proposed as part of the development. All trees not identified for removal can be retained in accordance with BS 5837.
- 3.6 The various activities involved with delivering the overhead line works can all be delivered without the loss of any trees. There will be some temporary loss of hedgerow to facilitate access and removal of old and installation of new pylons, and raising of new overhead lines. In total approximately 198m of hedgerow would be removed.

Table 4 Reference number and location of features that would be removed

	Trees	Groups	Woodland	Hedgerow
Remove (on-site)	-	-	-	(H5, H9, H17, H19, H20)
Remove (off-site)	-	-	-	-

(Features in brackets are those of which a part would be removed and part retained)

- 3.7 If planning permission is granted with reference to this report, the removal of any feature not listed above and shown on Drawing Set 2 for removal would constitute a material amendment and may therefore require an application to vary the consent.

3.8 The following table provides an overview of the quantity and the percentage of trees that would be removed and a breakdown of the number of instances of removal by quality category. It uses canopy area to describe effects on Trees, Groups and Woodland. The reported areas may be higher than the absolute area of tree cover on the site due to overlap between adjacent features.

Table 5 Quantity and percentage of trees to be removed

Feature	Number of features affected				
	Category A	Category B	Category C	Category U	Hedges
Trees	-	-	-	-	5
Groups	-	-	-	-	
Woodland	-	-	-	-	
Total loss	0ha	0ha	0ha	0ha	198m
Proportion of existing	0%	0%	0%	0%	5%

3.9 All trees will be retained, the loss of 5% of hedgerow present on site comprises only a small impact on the overall extent of existing hedgerow. There will be some loss of connectivity but this would be reinstated once the works are complete.

Effects on designated or protected features

Veteran Trees

3.10 The proposed development would not result in loss or deterioration of veteran trees.

Habitats of Principal Importance

3.11 Loss of or harm to a Habitat of Principal Importance, without mitigation, constitutes an adverse effect that is likely to be regarded by the consenting authority as contrary to its duty to conserve biodiversity.

Broadleaved, Mixed and Yew Woodland

3.12 The proposed development would not result in loss or harm of Broadleaved, Mixed and Yew Woodland.

Hedgerow

3.13 The proposed development would result in loss of 198m of Hedgerow.

3.14 The proposed development would not result in harm to remaining Hedgerow, all retained parts can be protected during the construction and commissioning process.

Protected Species

- 3.15 The effects of the proposed development on protected species and significance thereof is considered by the relevant ecology reports.

4.0 Mitigation

4.1 This section describes opportunities to mitigate or offset adverse effects described by the previous section. It summarises measures that are part of the proposed development and which are relied upon by this report, and measures that are not proposed but could be secured by planning condition or agreement. Conclusions are drawn regarding overall effects, and the requirements that should be imposed in order to secure the outcomes described.

4.2 The table below provides an overview of effects on the receptors described in the preceding sections. Within it, Column (1) describes the outcome for each receptor without mitigation; Column (2) reflects whether any mitigation would be secured by the current application; Column (3) represents whether predicted effects are (or could be rendered) neutral or positive; and Column (4) defines the outcome in simple terms.

Table 6 Summary of effects and mitigation

Receptor	(1) Adverse effect*	(2) Mitigation proposed	(3) Mitigation possible	(4) Residual effect
Tree cover	No	N/A	N/A	Neutral
Tree condition ³⁰	Yes	Yes	Yes	Neutral
Ancient Woodland	N/A	N/A	N/A	Neutral
Veteran Trees	No	N/A	N/A	Neutral
Deciduous Woodland	No	N/A	N/A	Neutral
Wood Pasture and Parkland	N/A	N/A	N/A	Neutral
Traditional Orchard	N/A	N/A	N/A	Neutral
Hedgerow	Yes	Yes	Yes	Neutral

**Without mitigation*

4.3 **Positive** residual effects represent benefits that would be delivered by the proposed development.

4.4 **Neutral**³¹ residual effects are those that should have no weight in decision making.

³⁰ In this context, whether there would be a risk of harm to existing trees during development (without protection)

³¹ Including negligible and non-material effects

4.5 **Negative** residual effects cannot be mitigated or offset and represent adverse effects of the proposed development. They may be acceptable in the planning balance on consideration of other benefits delivered by the proposed development.

4.6 **Pending** residual effects are those for which mitigation or offsetting can be secured after consent has been granted, typically by planning condition. It is assumed by this report that they would be.

Proposed measures

4.7 The following measures are proposed and would be secured by a planning permission referencing and requiring compliance with this report:

Layout

4.8 The retention of trees and hedgerow that has been assessed as possible within the proposed layout would be observed by the developer and all appointed contractors; tree and hedgerow removal would be limited to that illustrated on Drawing Set 2.

Tree Protection

4.9 A Tree Protection Plan is provided at Drawing Set 3. It shows the arrangement of temporary protection measures that would be installed prior to the commencement of any works, including ground investigation, setting out, compound establishment or delivery of any plant or materials.

4.10 The majority of the site will not require protection measures; these have only been provided where trees or hedgerows are present within or in close proximity to the proposed working areas.

4.11 Tree protection measures will follow the specification provided at Drawing 4.

4.12 Temporary protection measures would be maintained as shown during the entire construction process and would not be removed or realigned until all buildings, structures, hard surfaces, utilities, drainage, demolition and the removal of scaffolding, plant, compounds and surplus material has been completed.

Recommended measures

4.13 The following measures should be secured by planning condition or other agreement:

Planting

4.14 A scheme of hedgerow planting should be produced and implemented to replace that which is lost. It will be possible to reinstate the hedgerows in-situ following completion of the works to ensure connectivity of the network in the medium to long term.

4.15 Provision should be made for the maintenance of new planting in accordance with British Standard 8545:2014 Trees: from nursery to independence in the landscape - Recommendations, and replacement of failures for a period of at least 5 years.

APPENDIX A: Arboricultural Survey Data

APPENDIX A: Arboricultural Survey Data Sheets



Surveyor Heather Eilbeck/Angus Blankenstein
 Survey Date 27.06.2023
 Site Bodelwyddan Substation
 Drawing Ref D9037.01.001

*Italicised Feature Ref: Inspection of this feature was restricted
 Italicised Values: Feature value was estimated*

Ref	Species	Height	Canopy Ground Clearance	Stem Diameter (or range)	No. of stems/ individuals	Crown Spread North	Crown Spread South	Crown Spread East	Crown Spread West	Lowest Branch Height	Lowest Branch Direction	Maturity	Condition	Comments on form, condition, health and significant defects	Management recommendations in current context	BS 5837 Quality Category	Estimated Remaining Contribution
		(m)	(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	(N,S,E,W)	Young, Middle Age, Mature	Good, Fair, Poor, Veteran			A,B,C,U (1,2,3)	Long, Medium, Short, Very Short
Trees																	
T1	Pedunculate oak	7.0	2.0	550	1	5.5	3.5	3.5	7.0	3.0	S	Middle Age	Fair	Tree at edge of ditch and field and at end of boundary hedge. Growth bias to north with stem lean in this direction until it rights itself at c. 2.5m. Bifurcated at 2.5m with wide union and further bifurcation immediately above. Poor pruning cuts evident with some flush cuts and remnant stubs. Growing beneath powerlines with some limitations on future growth potential. Squat.		B ,1	Long
T2	Pedunculate oak	11.0	4.0	760	1	5.0	3.5	8.0	7.0	4.0	NE	Mature	Fair	Tree at edge of ditch and field. Growing adjacent to but not under powerlines. Slight lean to north-east. Canopy bias to south-east. Bifurcated at c. 4m. Large deadwood branches. Dieback of branches. Soil and bank erosion evident with gaps under tree and buttress roots evident. Previous branch failures.		B ,1, 3	Long
T3	Pedunculate oak	10.0	2.0	990	1	7.5	6.0	8.0	6.0	2.0	N	Mature	Fair	Large boundary tree with significant amount of dead wood in crown, some pieces over 200mm. Slight lean to east. Ditch <0.5m to east. Branch failures and stubs. Somewhat sparse stag-headed canopy. Cavities and decay pockets.		B ,1, 3	Long
T4	Pedunculate oak	13.0	1.0	1390	1	5.5	8.0	7.5	6.0	1.0	N	Mature	Fair	Large tree at edge of field and within pylon compound. Dense epicormic growth around base and located on slight slope with stem lean to north. Diameter measured at c. 1.5m at lowest ground point but at c. 1m at highest ground point due to large stem burr. Canopy bias to south. Dieback of upper branches forming stag heading and leaving remnant large dead branches. Previous branch failures. Some early veteran characteristics but tree condition but not considered to be a veteran at present.	Biodiversity metric - 1. No. 2. No. 3. Yes, 4. No. 5. None visible	A ,1, 2	Long
T5	Pedunculate oak	8.0	1.5	580	1	3.0	5.5	6.0	5.0	2.0	S	Mature	Good	Boundary tree next to ditch. Reduced crown to north with some large pruning wounds. Dead wood throughout, most pieces well decayed. Some early signs of stag-heading.		B ,1, 2	Long
T6	Pedunculate oak	11.0	3.0	798	4	7.5	6.0	10.0	5.0	2.5	W	Mature	Fair	Basally multi-stemmed tree at edge of ditch and field. Growing at edge of pylon compound. Canopy bias to east. Moderate deadwood branches. Previous branch failures and remnant pruning stubs.		B ,1	Long
T7	Pedunculate oak	8.0	2.0	800	1	5.5	6.0	6.0	5.0	2.5	W	Mature	Poor	Large moribund tree with small Lower crown still alive. Good habitat		C ,3	Short
T8	Pedunculate oak	8.0	2.5	850	1	5.0	7.5	6.0	4.0	2.5	SW	Mature	Dead	Large standing dead tree. Decay throughout. Pseudoinonotus dryadeus fruiting bodies at base.	Acceptable risk in current context	U	Very Short
T9	Pedunculate oak	8.0	3.5	573	2	5.0	5.0	5.5	5.0	4.0	W	Middle Age	Good	Open grown tree with upright form and high crown, raised. Twin stemmed with slightly tight union but no inclusion. Small ditch excavated 1m to north. Minor dead wood in crown. Some broken branches and small stubs.		B ,1	Long
T10	Pedunculate oak	15.0	2.0	1060	1	10.0	9.0	10.0	9.5	3.0	N	Mature	Good	Very large tree on edge of woodland. Tall and broad. Some large dead limbs. Occasional limb failures. Some small cavities. 3 large limbs removed to east. Good tree with no major defects		A ,1, 2	Long
T11	Pedunculate oak	3.0	2.5	80	1	1.0	1.0	1.5	1.0	2.5	E	Middle Age	Good	Small self-set tree at field edge.		C ,1	Medium
T12	Pedunculate oak	14.0	2.5	1020	1	9.0	7.5	7.5	8.0	3.0	SE	Mature	Poor	Large moribund tree at field edge in hedgerow gap. Poached ground around base. Some limited live foliage, but predominantly dead. Pseudoinonotus dryadeus fungal fruiting bodies evident between buttress roots on south-west and south-east sides at base. Habitat value.		U	Very Short
T13	Pedunculate oak	8.0	3.5	450	1	3.5	3.5	4.0	3.5	3.5	SW	Middle Age	Dead	Standing dead tree within field boundary hedge.		U	Very Short
T14	Pedunculate oak	9.0	2.5	700	1	2.5	6.0	7.5	3.5	3.0	E	Mature	Fair	Field boundary tree within hedgerow gap. Canopy heavily suppressed to north and west by proximity of adjacent tree; branch death; and large branch removal on west side. Pruning wounds with some occlusion but also decay. Moderate and large deadwood branches. Bifurcate at c. 3m. Squat.		B ,2, 3	Long
T15	Pedunculate oak	10.0	2.5	830	1	6.5	6.0	6.0	6.0	2.5	S	Mature	Fair	Field boundary tree within hedgerow gap. Suppressing adjacent oak. Moderate deadwood in canopy. Small previous branch failures. Squat.		B ,1, 2, 3	Long

APPENDIX A: Arboricultural Survey Data Sheets



Surveyor Heather Eilbeck/Angus Blankenstein
 Survey Date 27.06.2023
 Site Bodelwyddan Substation
 Drawing Ref D9037.01.001

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 Italicised Values: Feature value was estimated*

Ref	Species	Height	Canopy Ground Clearance	Stem Diameter (or range)	No. of stems/ individuals	Crown Spread North	Crown Spread South	Crown Spread East	Crown Spread West	Lowest Branch Height	Lowest Branch Direction	Maturity	Condition	Comments on form, condition, health and significant defects	Management recommendations in current context	BS 5837 Quality Category	Estimated Remaining Contribution
		(m)	(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	(N,S,E,W)	Young, Middle Age, Mature	Good, Fair, Poor, Veteran			A,B,C,U (1,2,3)	Long, Medium, Short, Very Short
T16	Pedunculate oak	11.0	2.0	850	1	3.5	4.5	5.0	4.5	2.0	S	Middle Age	Good	Tree located within field boundary hedge in small gap. 2 pruned branches west side of lower canopy with remnant stubs evident. Canopy biased to east. Squat.		B ,1	Medium
T17	Pedunculate oak	9.0	2.0	620	1	7.5	5.5	6.5	6.5	2.0	NW	Middle Age	Good	Large boundary tree within hedge. Ditch to east. Leaning north-east. Small basal cavity to west with some minor decay. Historical hazard beam failure to south with dry decay. Minor dead wood throughout crown.		B ,1, 2, 3	Long
T18	Pedunculate oak	12.0	2.5	850	1	2.5	7.5	8.0	7.0	2.5	N	Mature	Fair	Tree located within gap in field boundary hedgerow. Canopy heavily suppressed to north by proximity of adjacent tree. Biased canopy growth to east. Failed moderate and major branches evident, also some pruning wounds and stubs. Crevice in western failure stub that may have some bat potential. Moderate deadwood. Tree tag on stem, number 0243.		B ,1, 2, 3	Long
T19	Pedunculate oak	12.0	2.5	860	1	6.5	7.5	8.0	5.5	2.5	N	Mature	Fair	Tree located within gap in field boundary hedgerow. Canopy suppressing adjacent tree to south. Biased canopy growth to east. Pruning wounds and stubs, some with bark tearing evident. Small amount of deadwood. Appears to be a small cavity at end of pruned branch in north-west side and an occluding cavity on west side of stem, both have bat potential. Tree tag on stem, number 0244.		B ,1, 2, 3	Long
T20	Pedunculate oak	11.0	2.5	890	1	7.0	7.0	8.0	3.0	3.5	E	Mature	Fair	Tree located within gap in field boundary hedgerow. Large branches previously removed leaving large wounds. Small amount of moderate deadwood. No major defects noted. Tree tag on stem, number 0245.		B ,1, 2	Long
T21	Pedunculate oak	10.0	2.5	1020	1	5.0	7.0	8.0	3.0	2.5	S	Mature	Fair	Tree located within gap in field boundary hedgerow. Large deadwood branches evident. Slight lean to east. Previous large branch failures evident. Dense retrenchment of canopy internally. Some upper canopy tip dieback.		B ,1, 2, 3	Long
T22	Pedunculate oak	7.0	2.0	370	1	5.5	3.5	5.0	4.0	3.0	N	Middle Age	Fair	Curved stem, likely regrowth after basal failure. Old decay to root buttresses. Crude pruning wounds and stubs. Minor dead wood in crown		B ,3	Long
T23	Pedunculate oak	10.0	2.0	780	1	6.5	10.0	6.5	7.5	2.5	S	Middle Age	Good	Large hedgerow tree. Broad spreading crown, biased to south. Some large pruning wounds, occluding well. Broken branches and stubs, some well decayed. Minor dead wood in canopy.		B ,1, 2, 3	Long
T24	Pedunculate oak	8.0	2.5	280	1	2.5	3.0	3.0	2.5	4.0	N	Middle Age	Good	Tree within hedgerow at corner of field. Reasonably rounded canopy. No major defects noted.		B ,1	Long
T25	Pedunculate oak	15.0	2.0	970	1	7.5	8.0	7.5	7.5	2.5	W	Mature	Fair	Large tree at field edge. Multi-stemmed between 3.5m and 5m. Small amount of moderate deadwood. 1 moderate branch in mid-southern canopy cracking. Occluding pruning wound on southern side of stem. Large occluding tearing wound on north-west side of stem from 1m up to c. 5m.		A ,2	Long
T26	Pedunculate oak	13.0	2.5	1030	1	7.5	8.0	8.0	7.5	3.0	NE	Mature	Fair	Large tree at field edge. Small amount of moderate and major deadwood. Large lower branches to south and east poorly pruned, leaving large wounds with bark tearing and long remnant stubs. Tree is otherwise in good health and condition.		A ,2	Long
T27	Pedunculate oak	8.0	2.5	950	1	6.0	6.0	7.5	5.0	4.0	E	Mature	Fair	Large hedgerow tree. Decay column to eastern side of main stem from ground level to 3m. Further stem cavities present. Large dead limb from 4m north. Other smaller dead limbs also present. Large cavity at 6m with decay extending into main stem. Good habitat		B ,3	Long
T28	Pedunculate oak	10.0	3.0	230	1	2.5	2.5	2.5	2.5	3.0	SW	Middle Age	Fair	Tree within linear boundary group. Leans to west due to proximity of adjacent and now dead ash tree. Lower branch pruned leaving remnant stub with epicormic growth. Upper and main canopy rounded.		C ,1	Long
T29	Common ash	7.0	3.5	474	10	4.5	4.0	5.0	5.5	1.0	E	Middle Age	Dead	Standing dead tree that is basally multi-stemmed.		U	Very Short
T30	Pedunculate oak	7.0	3.0	690	1	5.0	5.5	10.0	6.0	2.5	E	Middle Age	Good	Broad squat tree with canopy biased to east. Large western limb pruned half way back to stem. Minor dead wood in crown. Ivy obscures union.		B ,1, 2	Long

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		(m)	(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	(N,S,E,W)	Young, Middle Age, Mature	Good, Fair, Poor, Veteran			A,B,C,U (1,2,3)	Long, Medium, Short, Very Short
T31	Pedunculate oak	12.0	2.0	940	1	6.0	6.0	9.5	5.0	4.0	E	Mature	Good	Large field boundary tree. Slightly sparse and with some early stag heading. Pruning wounds and some large stubs. Minor dead wood throughout. Exposed roots and poached ground to east. Decay and small cavity on burred stem to east		B ,1, 2, 3	Long
T32	Pedunculate oak	11.0	2.0	820	1	7.0	8.0	8.5	7.0	2.5	N	Mature	Good	Field boundary tree at edge of hedge. Domed and reasonably rounded canopy, typical of species. Leans to south-east. Occasional minor and moderate branch failure. Multi-stemmed at 3.5m. Small deadwood. No major defects noted.		A ,1, 2	Long
T33	Pedunculate oak	8.0	2.0	610	1	5.0	5.5	5.5	4.5	2.5	NW	Middle Age	Good	Field boundary tree within hedge. Domed and reasonably rounded canopy, typical of species. Occasional minor and moderate branch failure. Bifurcate at 3.5m. Small deadwood. 1 occluding cavity with bat potential on east side. No major defects noted.		A ,1, 2	Long
T34	Pedunculate oak	12.0	2.0	730	1	7.5	5.0	6.0	6.5	2.5	SW	Mature	Fair	Field boundary tree within hedge. Bifurcate at c. 3m with wide union and further bifurcation above. Part of central stem is dying and decaying, leaving canopy gap in middle of crown. Pruned lower branches with remnant stubs. Moderate and major deadwood in canopy.		B ,1, 2	Long
T35	Pedunculate oak	10.0	2.0	940	1	7.0	8.5	6.0	6.0	2.5	W	Mature	Fair	Large boundary tree, part of linear group. Slightly sparse with some early stag-heading. Large pruning wound and stubs to south and south-east with splits to cut faces. We'll decayed torn stub in union. Large pieces of dead wood in crown		B ,1, 2, 3	Long
T36	Pedunculate oak	710.0	2.0	710	1	4.0	4.5	7.0	4.5	2.0	S	Mature	Fair	Field boundary tree located within hedge. Pruned lower branches. Stem leans, and canopy biased, to east. Foliage appears quite small and parts of canopy a little sparse which may be indicative of stress.		B ,1, 2	Long
T37	Pedunculate oak	8.0	2.0	1000	1	6.0	6.0	6.0	6.0	2.0	E	Mature	Fair	Squat tree within hedgerow, part of linear group. Heavily burred stem. Bifurcated at 2m. Large pieces of dead wood in crown. Lower canopy flailed with split and torn branches. Some minor cavities. Pruning wounds and stubs		B ,1, 2, 3	Long
T38	Elm species	5.0	2.0	180	1	1.0	1.0	1.5	2.0	1.5	E	Middle Age	Dead	Standing dead tree at end of hedge.		U	Very Short
T39	Pedunculate oak	6.0	2.5	700	1	4.5	4.5	2.0	4.0	3.0	NW	Mature	Fair	Tree located within field boundary hedge. Top of crown has died back leaving canopy gap and dead upper stem. Canopy comprises foliage from side branches. Pruned branches evident.		C ,1, 3	Short
T40	Pedunculate oak	8.0	1.5	1390	1	5.0	6.0	8.0	6.5	2.0	W	Mature	Fair	Broad squat tree in hedgerow, part of linear group. Huge burred stem. Erosion around root buttresses. Some pruning wounds with retained stubs. Large dead limbs with some well decayed pieces. Some cavity formation		B ,1, 2, 3	Long
T41	Pedunculate oak	6.0	2.5	780	1	3.5	5.0	4.0	3.5	2.5	NE	Mature	Poor	Tree located within field boundary hedge. Largely moribund with live foliage comprising internal crown epicormic growth mostly. Bifurcate mid-stem. Heavily ivy clad stem.		U	Very Short
T42	Pedunculate oak	14.0	2.5	1030	1	5.0	5.0	7.5	6.0	3.5	NW	Mature	Fair	Large tree growing in field boundary hedge. Mid-stem is ivy clad. Slight stem kink to north-east in upper canopy. Bifurcate at c. 6m, union appears to be included from ground level inspection. Pruned branches and occasional failed limbs, leaving large deadwood stubs. Slight dieback of southern upper crown resulting in moderate deadwood.		B ,1, 2	Long
T43	Pedunculate oak	8.0	2.0	931	3	6.5	6.0	7.0	5.5	4.0	W	Mature	Fair	Broad squat tree, part of linear group. 3 main stems. Dead upright stem. Large pieces of dead wood throughout crown with some well decayed pieces. Numerous small cavities.		B ,1, 2, 3	Long
T44	Pedunculate oak	12.0	2.5	1470	1	8.5	6.5	7.5	7.0	2.5	NE	Mature	Veteran	Large veteran oak tree growing on field boundary that is partially suppressing adjacent oak's canopy to south. Large branch failures evident with some occlusion. Upper canopy retrenching with prominent stag heading. Secondary stem appears to have been cut/pollarded previously and is hollowing from cutting point. Fluting of lower stem. Multi-stemmed in upper canopy. Large deadwood over 150mm diameter present. Some small cavities on secondary stem.	1. Yes, 2. Yes, 3. Yes, 4. ; 5. Not visible at present	A ,1, 2, 3	Long



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		(m)	(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	(N,S,E,W)	Young, Middle Age, Mature	Good, Fair, Poor, Veteran			A,B,C,U (1,2,3)	Long, Medium, Short, Very Short
T45	Pedunculate oak	10.0	2.0	1010	1	3.5	7.0	7.5	6.5	2.0	SW	Mature	Fair	Large field boundary tree. Forms mutual canopy with adjacent huge tree. Stem angled 20 degrees to south. Decay pocket to main stem buttresses south. Burr on main stem with further epicormic growth. Large dead limbs in southern part of crown. Further dead wood throughout.		B ,1, 2, 3	Long
T46	Pedunculate oak	7.0	1.5	910	1	5.5	6.0	6.0	5.5	2.0	W	Mature	Fair	Broad squat tree, part of linear group. Burred stem. Rather sparse. Some large dead branches. Dense secondary crown that has been flailed. Various cavities and decay pockets		B ,2, 3	Long
T47	Pedunculate oak	7.0	2.0	800	1	6.5	4.5	3.0	10.0	2.0	W	Mature	Fair	Large roadside tree. Large amount of root damage to north side with torn and decayed roots. Leaning south over road. Canopy bias to east. Dead wood throughout including retrenchment and stag heading. Vertical cavity to western side of main stem. Remaining canopy has good vigour		B ,2, 3	Medium
T48	Pedunculate oak	10.0	2.5	986	2	4.5	4.5	4.5	5.0	2.5	W	Mature	Poor	Large, basally bifurcate tree located within roadside boundary hedge. Heavily ivy clad and located within hedge restricting inspection. Major dieback in canopy, leaving large remnant deadwood. Canopy is biased to south-west and is overhanging road, with branch socket cavities and moderate deadwood evident on this large branch.	Remove south-western branch overhanging road. Remove deadwood 100mm diameter and above where in reaching distance of road.	U	Very Short
T49	Pedunculate oak	11.0	1.0	1070	1	6.0	8.0	9.0	4.0	3.0	E	Mature	Fair	Large roadside tree growing in bank 2m above road. Retrenchment with significant stag-heading. Large dead stems with decay and hollowing. Numerous dead limbs with some well decayed. Ivy on main stem. Fungal fruiting body, possibly Ganoderma sp. Unable access base or south side due to very steep bank. Good habitat tree		B ,3	Medium
T50	Pedunculate oak	8.0	2.0	900	1	4.0	3.5	6.5	3.0	1.5	W	Middle Age	Fair	Roadside tree in hedge. Small dense crown. Some early stag-heading. Some longitudinal wounds to upper branches but occluding well. Minor dead wood throughout crown. Unable to access north side		B ,1, 2	Long
T51	Pedunculate oak	6.0	2.0	550	1	2.0	3.0	3.0	3.5	2.5	W	Middle Age	Poor	Retrenching and dying back tree overhanging road within field boundary hedge. Trifurcate mid-stem. Heavily ivy clad. Moderate deadwood. Previously failed branches. Canopy biased to south-west over road.	Remove south-western branch overhanging road.	U	Very Short
T52	Pedunculate oak	10.0	3.0	1110	1	6.5	9.0	12.0	5.0	3.5	SW	Mature	Good	Large mature oak tree growing immediately adjacent to road and field gate at end of hedge. Heavily ivy clad lower to mid-stem. Canopy heavily biased to south-east. Occasional moderate deadwood and branch failures. Multi-stemmed at c. 3m. Excellent tree in good health, condition and vigour.	Crown lift to 5m where canopy overhangs road.	A ,1, 2	Long
T53	Pedunculate oak	10.0	1.5	860	1	4.0	2.5	3.5	2.0	1.5	E	Mature	Fair	Roadside tree within hedge. Significantly retrenched with compact secondary crown. Large dead stems and limbs. Small wound with decay to southern side.		C ,1, 2, 3	Medium
T54	Pedunculate oak	13.0	2.0	870	1	5.0	3.0	3.5	3.0	2.5	N	Mature	Fair	Mature tree growing from within field boundary hedge adjacent to road. Lower to mid-canopy flailed resulting in dense epicormic growth on lower stem. Large branches in lower to mid-stem removed previously with poor pruning cuts evident, including some flush cuts. Stem leans to south. Tree in close proximity to overhead powerlines, although manageable due to previous pruning and age of tree. Moderate deadwood.		B ,2	Medium



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		(m)	(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	(N,S,E,W)	Young, Middle Age, Mature	Good, Fair, Poor, Veteran			A,B,C,U (1,2,3)	Long, Medium, Short, Very Short
T55	Pedunculate oak	11.0	2.0	810	1	6.0	5.5	6.5	4.5	4.0	E	Mature	Poor	Large roadside tree. Approximately 50% canopy dead with major dead limbs and stems. Large heavy limb with end weighting over road to east. Decay and cavities. Good habitat potential	Reduce end weighted limb to east	C ,2, 3	Medium
T56	Pedunculate oak	11.0	2.5	940	1	8.0	9.0	8.5	7.0	4.5	E	Mature	Fair	Large roadside tree. Some retrenchment and stag-heading. Other dead wood present throughout canopy. Old fungal fruiting bodies at base, possibly G lucidum. Large tearout wound with decay to south-west limb. Longitudinal cavity to western stem. Good habitat tree.		B ,1, 2, 3	Long
T57	Pedunculate oak	11.0	2.5	765	2	5.0	7.0	7.5	6.0	3.0	W	Mature	Fair	Tree located in field boundary hedge adjacent to ditch. Bifurcate at 1.5m. Slight lean to south. Occluded and occluding pruning wounds. Flailed lower branches. Moderate deadwood. Remnant dead stub of previously failed branch at northern base that is decaying significantly.		B ,1, 2	Long
T58	Pedunculate oak	10.0	2.0	820	1	5.0	3.5	5.0	7.0	3.0	N	Mature	Good	Large roadside tree. Some early retrenchment and stag-heading but generally good vigour. Some dead wood and decay pockets. Large hazard beam failure to east hung up on BT cable.	Remove hung up limb	B ,1, 2, 3	Long
T59	Pedunculate oak	11.0	3.5	550	1	6.0	8.0	6.5	5.0	3.5	S	Middle Age	Fair	Tree within field boundary hedge. Minor ivy growth on stem. Small amount of moderate deadwood. Canopy biased to south. Close to overhead powerlines but can likely be managed with pruning in future. Some upper canopy dieback evident.		B ,1	Long
T60	Pedunculate oak	13.0	2.0	810	1	4.5	5.0	5.0	4.0	3.5	E	Mature	Fair	Large roadside tree. Suppressed to north by tree on other side of road. Very large dead stem, estimated 300mm, at 3.5m. Various other pieces of dead wood. Generally good vigour		B ,1, 2, 3	Long
T61	Common ash	7.0	2.5	323	2	2.0	5.5	4.0	4.0	2.5	N	Middle Age	Fair	Tree growing in corner of field at edge of boundary hedge. Growth biased heavily to south due to suppression from adjacent oak trees. No significant ash dieback symptoms present.		C ,1	Medium
T62	Pedunculate oak	9.0	2.0	570	1	4.5	4.0	2.5	5.5	2.5	E	Middle Age	Fair	Tree growing in corner of field within boundary hedge. Growth biased heavily to west due to suppression from adjacent oak tree. Previous failed branches evident. Minor to moderate deadwood.		B ,1	Medium

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		(m)	(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	(N,S,E,W)	Young, Middle Age, Mature	Good, Fair, Poor, Veteran			A,B,C,U (1,2,3)	Long, Medium, Short, Very Short
T63	Pedunculate oak	11.0	2.5	1020	1	8.0	5.0	10.0	5.5	3.5	E	Mature	Fair	Large mature tree growing in field boundary hedge adjacent to road. Multi-stemmed at c. 3.5m, unions and lower stem heavily ivy clad restricting inspection. Stag heading and significant dieback of upper canopy evident, leaving large deadwood branches. Some large branches pruned fieldside. Canopy biased to east and north. Some branch socket cavities with bat potential.		B ,1, 2, 3	Medium
T64	Pedunculate oak	13.0	2.0	940	1	6.0	9.5	11.0	8.5	2.0	W	Mature	Good	Large roadside tree with broad spreading crown. Some dead wood in crown. Some broken branches and stubs. Damage to surface roots and buttresses to north. Good vigour and no major defects noted		A ,1	Long
T65	Common hawthorn	4.0	3.0	250	1	2.0	1.5	2.0	1.0	2.0	E	Middle Age	Fair	Tree growing from within boundary hedge that is likely a lapsed tree from hedge. Leans to north. Heavily ivy clad. Suppressed by adjacent larger trees.		C ,1	Medium
T66	Pedunculate oak	10.0	3.0	800	1	5.5	7.0	3.5	7.0	2.5	W	Mature	Poor	Tree within field boundary hedge adjacent to road. Prolific stag heading and tip dieback evident. Multi-stemmed mid-canopy. Previous limb failures and moderate to major deadwood throughout. Live foliage appears healthy.	Remove deadwood 100mm diameter and above where it is within reaching distance of road.	C ,1, 3	Short
T67	Pedunculate oak	12.0	2.0	1628	2	10.0	10.0	13.0	8.0	4.0	S	Mature	Good	Huge boundary tree. Twin stemmed form with bulbous buttresses to west starting to split. Large cavity on northern stem with brown rot. Numerous wounds to lower stem with poached ground. Dead wood throughout canopy with many large pieces. Pruning wounds and stubs. Numerous smaller cavities in crown. Potential future veteran		A ,1, 2, 3	Long
T68	Pedunculate oak	7.0	2.0	890	1	7.5	8.0	7.5	6.0	2.0	W	Mature	Good	Squat broad tree on edge of field. Poached ground at base. Heavily burred stem. Dead wood throughout canopy. Good vigour		B ,1, 2, 3	Long
T69	Pedunculate oak	11.0	1.5	1100	1	7.0	8.0	6.0	5.5	2.0	E	Mature	Good	Very large tree in hedgerow. Poached ground at base. Erosion around buttresses to west. Large pruning wounds and stubs. Some large historic wounds. Large failed limb in crown. Numerous other wounds. Dense vigorous crown.		A ,1, 2, 3	Long
T70	Common ash	14.0	1.5	990	1	6.5	9.0	7.0	8.0	2.0	SE	Mature	Fair	Large boundary tree. Large wound to east at 2.5m. Various other cavities. Large basal suckers. Dead wood throughout canopy. Some dieback in upper crown but seems to be for other reasons than chalarra.		B ,2, 3	Medium
T71	Common ash	8.0	1.5	464	3	6.0	6.0	4.5	5.5	1.0	N	Mature	Fair	Large hedgerow tree. Unusual form at base with horizontal stem or surface roots. Multistemmed form. Occasional small cavities. Reasonable vigour. Ash dieback seems minimal		B ,3	Medium

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Groups																	
G1	Common hawthorn, Blackthorn	2 to 4	0.5	75 to 200	20							Middle Age	Fair	Sections of former hedgerow that have now lapsed out of management.		C ,2	Long
G2	Silver birch, Common hawthorn, Common ash, Pedunculate oak, Goat willow, Wych elm	3 to 7	0.0	50 to 220	70							Middle Age	Mixed	Linear group of trees along boundary fence in pylon compound. Some trees on northern side and at western end planted. Parts densely overgrown by undergrowth. Mostly in good or fair condition, occasional ash tree with dieback in poor condition.		C ,2	Medium
G3	Common hawthorn, Common ash, Blackthorn, Pedunculate oak, Elm species	1.5 to 6	0.5	50 to 280	20							Middle Age	Fair	Outgrown hedgerow and larger trees forming linear group along ditch. Some multistemmed forms. Minor dead wood throughout		B ,2	Long
G4	Common hawthorn, Pedunculate oak	9 to 15	2.0	360 to 800	100							Middle Age to Mature	Good	Area of continuous tree cover with minimal understorey or ground cover. Signs of heavy grazing. Some standing dead trees. Aerial and terrestrial dead wood including old decayed stumps. Cavities and decay pockets. Bat/bird boxes throughout.		B ,1, 2, 3	Long
G5	Common hawthorn, Blackthorn, Elm species	1.5 to 5	0.0	50 to 190	30							Middle Age	Fair	Outgrown former hedgerow. Somewhat fragmentary. Cluster of larger stems between T17 and T22. Multistemmed forms. Minor or dead wood throughout		C ,2	Long
G6	Common hawthorn, Blackthorn, Pedunculate oak	2 to 5	0.0	40 to 170	40							Middle Age	Fair	Linear boundary group of predominantly thorn. Reasonably dense feature.		C ,2	Long
G7	Common hawthorn	3 to 5	1.0	75 to 130	6							Middle Age	Fair	Small sporadic hawthorn trees that were potentially part of now gone hedge.		C ,1	Medium
G8	Common hazel, Common hawthorn, Common ash	2.5 to 6	0.5	90 to 220	35							Middle Age	Fair	Linear group formed from outgrown and fragmentary hedgerow. Multistemmed forms showing signs of past management. Occasional standing dead trees. Aerial dead wood throughout		C ,2, 3	Medium
G9	Common hazel, Common hawthorn, English holly, Blackthorn, Pedunculate oak	2.5 to 5	0.0	50 to 240	30							Middle Age	Fair	Unmanaged outgrown former hedgerow. Multistemmed hazel and blackthorn. Minor dead wood throughout. Waterlogged in places		C ,2	Long
Woodlands																	
W1	Silver birch, Common hawthorn, Common ash, English holly, Norway spruce, Scots pine, Blackthorn, Pedunculate oak, Elder	3 to 15	1.0	50 to 760	500							Mixed Age	Good	Large area of mixed woodland. Younger plantation trees with some large mature oaks. Good age and size structure with regeneration throughout. Some failed trees. Aerial and terrestrial dead wood. Dense undergrowth in places		B ,1, 2, 3	Long

APPENDIX A: Arboricultural Survey Data Sheets



Surveyor Heather Eilbeck/Angus Blankenstein
 Survey Date 27.06.2023
 Site Bodelwyddan Substation
 Drawing Ref D9037.01.001

Italicised Feature Ref: Inspection of this feature was restricted
Italicised Values: Feature value was estimated

Ref	Species	Height	Canopy Ground Clearance	Stem Diameter (or range)	No. of stems/ individuals	Crown Spread North	Crown Spread South	Crown Spread East	Crown Spread West	Lowest Branch Height	Lowest Branch Direction	Maturity	Condition	Comments on form, condition, health and significant defects	Management recommendations in current context	BS 5837 Quality Category	Estimated Remaining Contribution	
		(m)	(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	(N,S,E,W)	Young, Middle Age, Mature	Good, Fair, Poor, Veteran			A,B,C,U (1,2,3)	Long, Medium, Short, Very Short	
Hedges																		
H1	Blackthorn, Elder, Elm species	1.5 to 1.5		n/a	n/a							Middle Age	Good	Maintained field boundary hedge.		n/a	n/a	
H2	Common hazel, Common hawthorn, Common ash, Blackthorn, Goat willow, Wych elm	1.8 to 2	0.5	n/a	n/a							Mature	Fair	Established hedgerow. Gappy in places. Some large stems		n/a	n/a	
H3	Common hawthorn, Common ash, Blackthorn, Goat willow	1.5 to 2		n/a	n/a							Middle Age	Fair	Irregularly managed boundary hedge. Outgrown in places. Some sparse areas and gaps		n/a	n/a	
H4	Common hawthorn	3 to 3		n/a	n/a							Middle Age	Good	Maintained field boundary hedge around pylon compound.		n/a	n/a	
H5	Common hawthorn, Blackthorn	1 to 1.5		n/a	n/a							Mature	Fair	Partially managed hedgerow along ditch. Spans ditch in places. Some large stems		n/a	n/a	
H6	Sycamore, Common hawthorn, Blackthorn, Pedunculate oak, Dog rose, Wych elm	2 to 4		n/a	n/a							Middle Age	Fair	Lapsing hedgerow with some self-set trees within. Could be brought back into hedgerow management.		n/a	n/a	
H7	Common hawthorn	1.5 to 1.5		n/a	n/a							Young to Middle Age	Good	Hedgerow that has been planted in recent years but foliage forming cohesive canopy. Some spiral guards still around tree bases.		n/a	n/a	
H8	Sycamore, Common hawthorn, Common ash, Blackthorn	2 to 5		n/a	n/a							Middle Age	Fair	Lapsing hedgerow with some self-set trees within. Could be brought back into hedgerow management.		n/a	n/a	
H9	Common hawthorn, Common ash, Blackthorn, Dog rose	2 to 2.5		n/a	n/a							Mature	Good	Maintained field boundary hedge.		n/a	n/a	
H10	Common hawthorn, Blackthorn, Dog rose	1.5 to 2		n/a	n/a							Middle Age	Fair	Variably managed boundary hedge		n/a	n/a	
H11	Common hawthorn, Blackthorn, Pedunculate oak, Dog rose	2 to 2.5		n/a	n/a							Mature	Good	Maintained field boundary hedge.		n/a	n/a	
H12	Common hazel, Common hawthorn, English holly, Blackthorn	1.5 to 1.5		n/a	n/a							Middle Age	Fair	Irregularly managed boundary hedge. Some parts closely flailed, others outgrown		n/a	n/a	
H13	Common hawthorn, Blackthorn	2 to 4		n/a	n/a							Middle Age	Fair	Partially managed boundary hedge. Quite outgrown between larger trees		n/a	n/a	
H14	Common hawthorn, Common ash, Blackthorn, Pedunculate oak, Wych elm	1.5 to 2		n/a	n/a							Mature	Good	Maintained field boundary hedge.		n/a	n/a	
H15	Sycamore, Common hawthorn, Common ash, Blackthorn, Wych elm	1.5 to 1.5		n/a	n/a							Middle Age	Fair	Managed boundary hedge. Ditch to west		n/a	n/a	
H16	Common hawthorn, Blackthorn, Dog rose	2 to 3		n/a	n/a							Mature	Good	Maintained field boundary hedge. Some large dead remnant tree stumps in hedge, however these are low lying and do not form structural parts of hedge.		n/a	n/a	
H17	Common hazel, Common hawthorn, Common ash, Blackthorn, Pedunculate oak, Dog rose	2 to 2.5		n/a	n/a							Mature	Good	Maintained field boundary hedge adjacent to road.		n/a	n/a	
H18	Common hawthorn, English holly, Blackthorn, Pedunculate oak, Dog rose	2 to 2		n/a	n/a							Mature	Good	Maintained field boundary hedge adjacent to road.		n/a	n/a	
H19	Common hawthorn, Blackthorn, Dog rose	2 to 2		n/a	n/a							Mature	Good	Maintained field boundary hedge. Some occasional large dead remnant tree stumps in hedge, however these are low lying and do not form structural parts of hedge.		n/a	n/a	

APPENDIX A: Arboricultural Survey Data Sheets



Surveyor Heather Eilbeck/Angus Blankenstein
 Survey Date 27.06.2023
 Site Bodelwyddan Substation
 Drawing Ref D9037.01.001

Italicised Feature Ref: Inspection of this feature was restricted
Italicised Values: Feature value was estimated

Ref	Species	Height	Canopy Ground Clearance	Stem Diameter (or range)	No. of stems/ individuals	Crown Spread North	Crown Spread South	Crown Spread East	Crown Spread West	Lowest Branch Height	Lowest Branch Direction	Maturity	Condition	Comments on form, condition, health and significant defects	Management recommendations in current context	BS 5837 Quality Category	Estimated Remaining Contribution
		(m)	(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	(N,S,E,W)	Young, Middle Age, Mature	Good, Fair, Poor, Veteran			A,B,C,U (1,2,3)	Long, Medium, Short, Very Short
H20	Sycamore, Common hazel, Common hawthorn, Blackthorn, Pedunculate oak, Dog rose, Elder	2 to 3		n/a	n/a							Mature	Good	Maintained field boundary hedge.		n/a	n/a
H21	Common hazel, Common hawthorn, Blackthorn	1 to 2		n/a	n/a							Middle Age	Fair	Partially managed roadside hedge on top of bank		n/a	n/a
H22	Common hazel, Common hawthorn, English holly, Blackthorn, Dog rose, Wych elm	0.5 to 1.5		n/a	n/a							Middle Age	Fair	Variably managed roadside hedge. Very short in sections. On top of bank		n/a	n/a
H23	Common hazel, Common hawthorn, English holly, Blackthorn, Dog rose	1 to 2		n/a	n/a							Middle Age	Fair	Irregularly managed roadside hedge. On bank		n/a	n/a
H24	Common hazel, Common hawthorn, English holly, Blackthorn	1 to 1.5		n/a	n/a							Middle Age	Fair	Well-managed boundary hedge. Some larger stems		n/a	n/a
H25	Common hawthorn, English holly, Blackthorn	1 to 1.5		n/a	n/a							Middle Age	Good	Well-managed boundary hedge		n/a	n/a
H26	Common hawthorn, English holly, Blackthorn	1.5 to 1.5		n/a	n/a							Middle Age	Good	Closely manage boundary hedge next to road		n/a	n/a
H27	Common hazel, Common hawthorn, Common ash, English holly, Blackthorn, Pedunculate oak	1.5 to 2		n/a	n/a							Middle Age	Good	Closely managed boundary hedge next to road		n/a	n/a
H28	Common hazel, Common hawthorn, Blackthorn	1.5 to 3		n/a	n/a							Middle Age	Good	Variable managed boundary hedge. Outgrown in places		n/a	n/a
H29	Common hazel, Common hawthorn, English holly, Blackthorn	1.5 to 2		n/a	n/a							Middle Age	Fair	Irregularly managed boundary hedge. Outgrown in places		n/a	n/a
H30	Common hazel, Common hawthorn, English holly, Blackthorn	1.5 to 2		n/a	n/a							Middle Age	Fair	Irregularly managed boundary hedge. Outgrown in places		n/a	n/a
H31	Common hazel, Common hawthorn	1 to 3		n/a	n/a							Middle Age	Fair	Irregularly managed boundary hedge. Outgrown in places. Some larger hazels to southern end.		n/a	n/a
H32	Common hawthorn, Pedunculate oak	1.5 to 1.5		n/a	n/a							Mature	Fair	Irregularly managed boundary hedge. Somewhat fragmentary towards western end. Larger oak stumps present		n/a	n/a
H33	Sycamore, Common hazel, Common hawthorn, Common ash, Blackthorn, Elm species	2.5 to 4	0.5	n/a	n/a							Middle Age	Fair	Unmanaged and heavily outgrown boundary hedge. Some larger laid forms.		n/a	n/a
H34	Common hazel, Common hawthorn, English holly, Blackthorn	1 to 1		n/a	n/a							Middle Age	Fair	Low, fragmentary boundary hedge		n/a	n/a
H35	Common hawthorn, English holly, Blackthorn, Elm species	1.5 to 1.5		n/a	n/a							Middle Age	Fair	Broad and low boundary hedge. Raised above road		n/a	n/a
H36	Sycamore, Common hawthorn, English holly, Blackthorn, Elm species	2 to 2		n/a	n/a							Middle Age	Fair	Closely managed hedgerow on roadside bank		n/a	n/a

APPENDIX B: Survey Method

Limitation

Trees are dynamic living organisms with a constantly changing structure; even healthy trees can change or decline. Survey information is presented as being correct at the time of survey. Limitations to the reliability of the survey data are noted within Appendix A and the main report text.

Scope

All woody vegetation with a stem diameter exceeding 75mm is recorded. Below this threshold, vegetation may also be recorded at the discretion of the surveyor. The survey includes woody vegetation within a defined boundary, and on adjacent land where the characteristics, location or context of the tree mean that activity within the boundary could affect the tree, or be influenced by it. This is typically up to 15m outside the boundary.

Resolution

Vegetation is recorded as either an individual *Tree*, *Group* of trees, *Woodland*, or *Hedgerow*. This is done at the discretion of the surveyor to provide a useful resolution to the survey data, to differentiate between features with varying attributes and group those with common attributes, and collective value or function.

Typically, *Trees* are recorded where they are arranged separately; different from adjacent trees; or where the assessment would benefit from greater detail. *Groups* are coherent arboricultural features comprising trees with a collective form, function, history or management opportunities. *Woodland* is recorded where areas of tree cover have the qualities of a woodland habitat, including age and species structure, natural regeneration, and associated non-arboreal features. *Hedgerow* describes linear features largely comprising woody vegetation that are under, or could be returned to, regular hedgerow management. It should be noted that these terms are also used in other assessment types, sometimes with different definitions.

Tree locations

The location of trees is based on stem locations and canopy spreads taken from a topographical survey, where available. Where this information is not available, this is noted in Appendix A and locations should be regarded as approximate. Approximate locations are based on one or more of: GPS data captured during the survey; aerial photographs; and measurement from known points of reference. Approximate stem locations are typically accurate to within a few metres. Stem locations are shown for all *Trees*.

Groups, *Woodland* and *Hedges* are principally described in terms of their canopy outline, although stem locations may also be shown. Individual tree canopy outlines are projected on Drawings based on measurements taken as described below (see Crown Spread). *Groups*, *Woodland* and *Hedges* canopy outlines are projected based on the same hierarchy of source data as stem locations.

Tree survey

The survey is conducted from ground level by an arboriculturist, taking account of the tree, and its context. The nature of the soil is not assessed. Non-invasive assessment tools may be used as appropriate, including hypsometer, measuring tape, probe and nylon mallet.

The following attributes are recorded for each feature (see Arboricultural Survey Data Sheets at Appendix A):

Reference Number	A unique code per feature, typically but not necessarily a chronological sequence, in the form <i>Tn</i> for <i>Trees</i> ; <i>Gn</i> for <i>Groups</i> ; <i>Wn</i> for <i>Woodlands</i> ; and <i>Hn</i> for <i>Hedgerows</i>
Species	The common name is given. All species are listed for <i>Groups</i> , <i>Woodland</i> and <i>Hedgerows</i> . The Latin name may also be given if further clarification is required.
Height	Top height recorded in metres, or the range for <i>Groups</i> , <i>Woodland</i> and <i>Hedgerows</i>
Canopy Ground Clearance	The height of the canopy above ground level in metres
Stem Diameter	A measurement taken at 1.5 metres above ground level, or the nearest representative point below, in millimetres. For multi-stemmed trees a single figure is calculated according to BS5837 4.6. For <i>Groups</i> , <i>Woodland</i> and <i>Hedgerows</i> , the range of diameters

No. of Stems / Individuals	The number of stems arising below a height of 1.5 metres, or for <i>Groups</i> , <i>Woodland</i> and <i>Hedgerows</i> an estimate or count of the number of trees
Crown Spread	Radial branch spread in metres at cardinal points (N, S, E, W) from the location of the <i>Tree</i> stem at ground level (for <i>Groups</i> , <i>Woodland</i> and <i>Hedgerows</i> , see <i>Tree Locations</i>)
Lowest Branch Height	The height of the first significant branch at the point of attachment (<i>Trees</i> only)
Lowest Branch Direction	The direction of growth of the first significant branch from the point of attachment (<i>Trees</i> only)
Maturity	<p>Classification describing age relative to the species, and size and growth potential, in order to inform management decisions</p> <ul style="list-style-type: none"> • Young means small and/or recently planted and could be relocated, or replaced on a like for like basis • Middle Age means established and independent, within the growth stage of life, and with potential to continue increasing in height and/or spread • Mature means having reached ultimate height and/or spread, given the location and surroundings; further increases will be slow or limited • Mixed Age (<i>Groups</i>, <i>Woodland</i> and <i>Hedgerows</i> only) means comprising all three maturity classes
Condition	<p>An overall assessment of a feature's physiological and structural state, informing longevity and quality categorisation, and supported by <i>Comments</i></p> <ul style="list-style-type: none"> • Good condition means with vitality and resilience commensurate with species and age, and without significant defects or pathogens • Fair condition means with tolerable reduction of vitality and resilience, and/or remediable or tolerable defects and/or pathogens • Poor condition means with declining or significant loss of vitality and resilience, and/or significant and irreparable defects and/or pathogens • Dead condition means without photosynthetic or metabolic capacity, or moribund and in imminent terminal decline • Mixed (<i>Groups</i> and <i>Woodland</i>) means comprising more than one condition class • Veteran means trees of exceptional value, meeting recognised criteria including age, size and characteristics. Classification is partly informed by the sustained presence of structural defects, physiological decline, and pathogens, and their contribution to biodiversity. Undesirable characteristics in ordinary trees may be desirable in veteran trees, therefore <i>Veteran</i> can be understood as a superlative <i>Condition</i> that supersedes other categories (excluding <i>Dead</i>).
Comments	A description of all significant characteristics of the feature and its context that are not described by other attribute fields; including observations to support the classification of <i>Condition</i> , <i>Quality Category</i> and <i>Estimated Remaining Contribution</i> as appropriate
Management Recommendations	Recommendations for arboricultural works based on the current land use, in the interests of good arboricultural practice. These are incidental to the primary survey purpose, and not a comprehensive schedule in pursuit of any particular objective.
BS 5837 Quality Category	Tree quality assessment based on Table 1 of BS 5837:2012 (see below) comprising quality categories A , B , C and U and sub-categories 1 , 2 and 3
Estimated Remaining Contribution	<p>A forecast of the durability of the feature in its current form and context, and therefore the reliance that can be placed on any benefits or functions it provides. This is influenced by <i>Species</i> and <i>Condition</i>, and is not necessarily a forecast of life expectancy.</p> <ul style="list-style-type: none"> • Long means more than 40 years • Medium means 20 to 40 years • Short means 10 to 20 years • Very Short means less than 10 years

Table 1 Cascade chart for tree quality assessment

Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	<ul style="list-style-type: none"> Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality <p><i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</i></p>			See Table 2
	1 Mainly arboricultural qualities	2 Mainly landscape qualities	3 Mainly cultural values, including conservation	
Trees to be considered for retention				
Category A Trees of high quality with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	See Table 2
Category B Trees of moderate quality with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	See Table 2
Category C Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	See Table 2

Table 1: Extract from **British Standards Institution (2012) BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations**, page 9

Note on Root Protection Areas:

Data is captured during the survey to inform the design of Root Protection Areas (RPA). These are a design tool, representing the area around a tree in which restrictions to some activities may be required to avoid significant harm, particularly to roots and soil. The RPA is a function of *Stem Diameter*, and additional considerations including management history, barriers to root growth, topography, ground conditions and tree characteristics. These factors are combined by an arboriculturist to produce a buffer zone for each feature from which the exclusion of construction activities would ensure the continued reliability of the survey data at Appendix A, including *Condition*, *BS 5837 Quality Category* and *Estimated Remaining Contribution*.

For *Trees*, RPA is defined as a circle with a radius 12 times the *Stem Diameter*, which may be modified to reflect the considerations above.

For *Groups* and *Woodland* RPA is based on the size and location of peripheral constituent trees, and presented as an offset from the canopy edge giving equivalent or greater protection to all trees of any size, or modified to reflect significant variation in constituent tree sizes and/or the considerations above.

For *Hedgerow*, no RPA is shown. Typically, hedgerow requires a smaller stand-off than trees due to reduced crown dimensions. Any stand-off should include sufficient space for access and ongoing management and should therefore normally be based on the canopy spread rather than root spread.

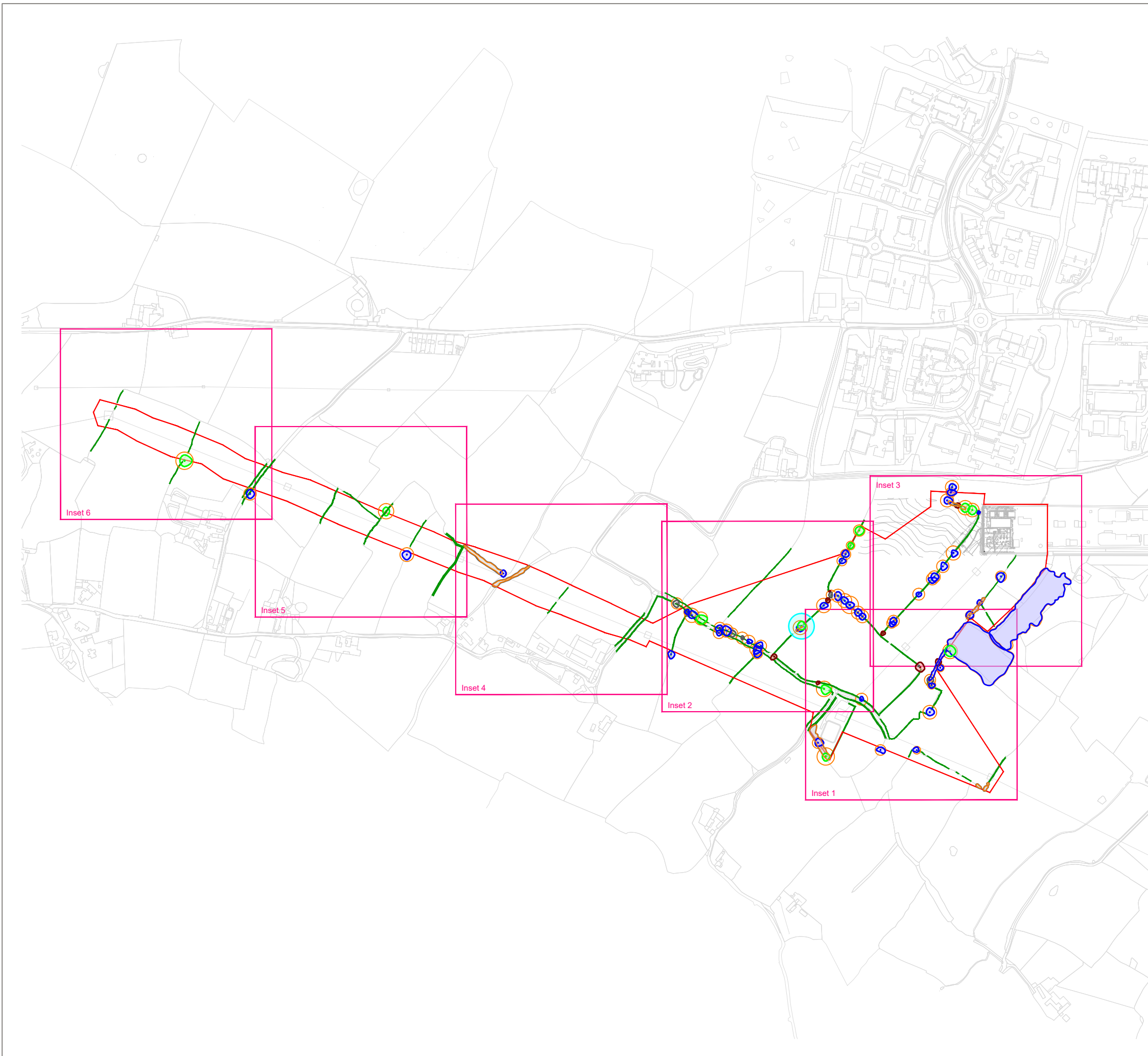
DRAWINGS

Drawing Set 1 - Tree Constraints Plan

Drawing Set 2 - Tree Works Plan






Drawing Set 3 - Tree Protection Plan

Drawing 4 - Tree Protection Fencing Specification




KEY

[This drawing must be reproduced in colour]

-  T1/G1/W1 Trees
-  H1 Hedgerow
-  Root Protection Area (RPA)
-  Veteran Tree Buffer Zone (T44)
Insets 1 and 2 only
-  Survey Boundary

Tree Quality Categorisation

(Based on BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations)

-  Category A
(High quality)
-  Category B
(Moderate quality)
-  Category C
(Low quality)
-  Category U
(Unsuitable for retention)
-  Hedgerow
(Not categorised)

NOTES:

This drawing should be read in conjunction with the respective Arboricultural Survey Data (Appendix A).

All feature locations should be considered estimated due to the lack of topographic information available when producing this drawing.



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Rev	Description	Drawn	Approved	Date



THE ENVIRONMENT PARTNERSHIP

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Project

**Bodelwyddan Overhead Lines
Arboricultural Impact Assessment**

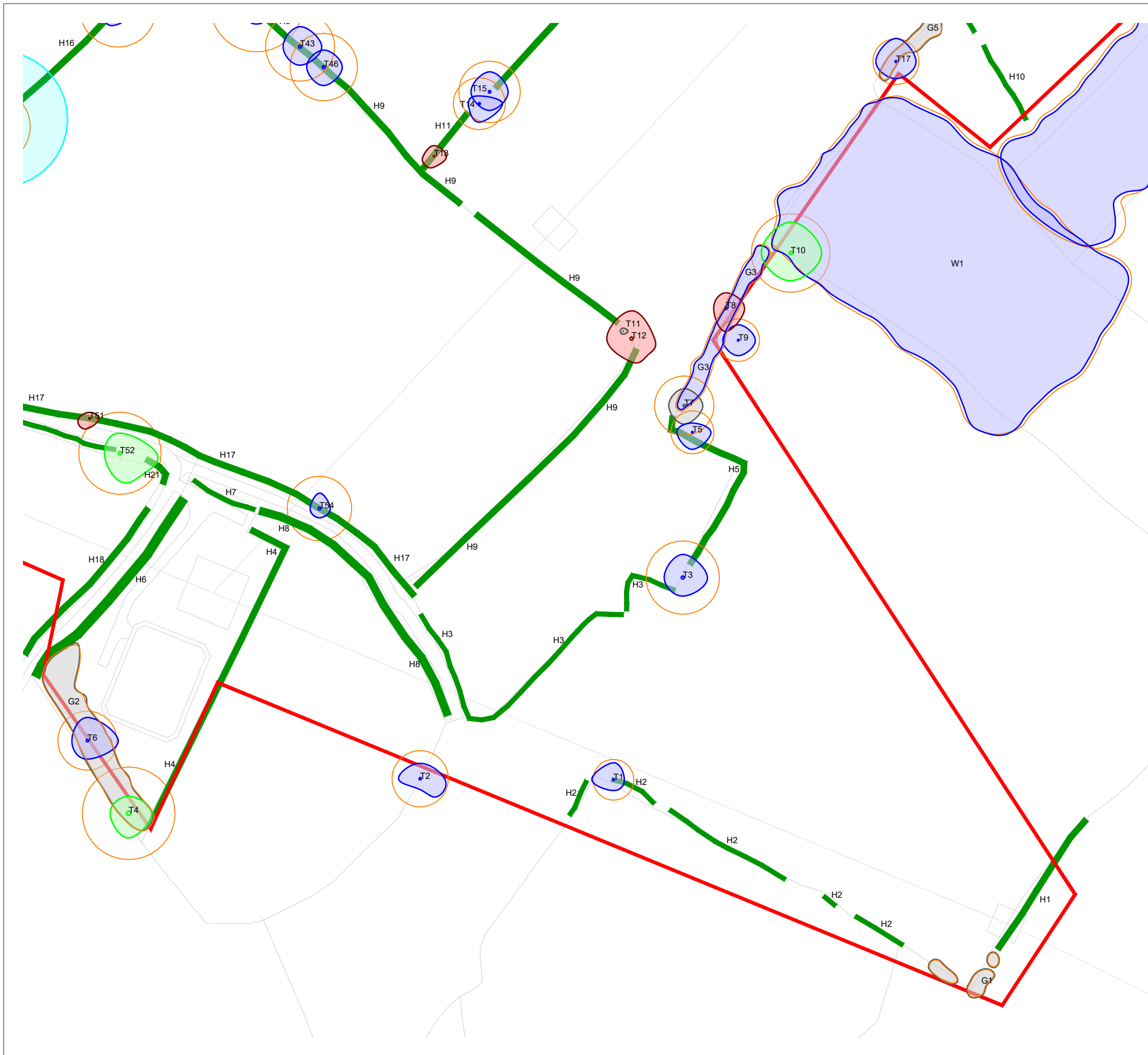
Title

Drawing 1: Tree Constraints Plan Overview [BASELINE]

Drawing Number

D9037.01.101

Drawn	Checked	Approved	Scale	Date
AAB	HEE	JGS	NTS @ A3	11/12/2023



KEY
 [This drawing must be reproduced in colour]

- T1/G1/W1 Trees
- H1 Hedgerow
- Root Protection Area (RPA)
- Veteran Tree Buffer Zone (T44)
- Survey Boundary
- Application Boundary

Tree Quality Categorisation
 (Based on BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations)

- Category A (High quality)
- Category B (Moderate quality)
- Category C (Low quality)
- Category U (Unsuitable for retention)
- Hedgerow (Not categorised)

NOTES:

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Rev	Description	Drawn	Approved	Date

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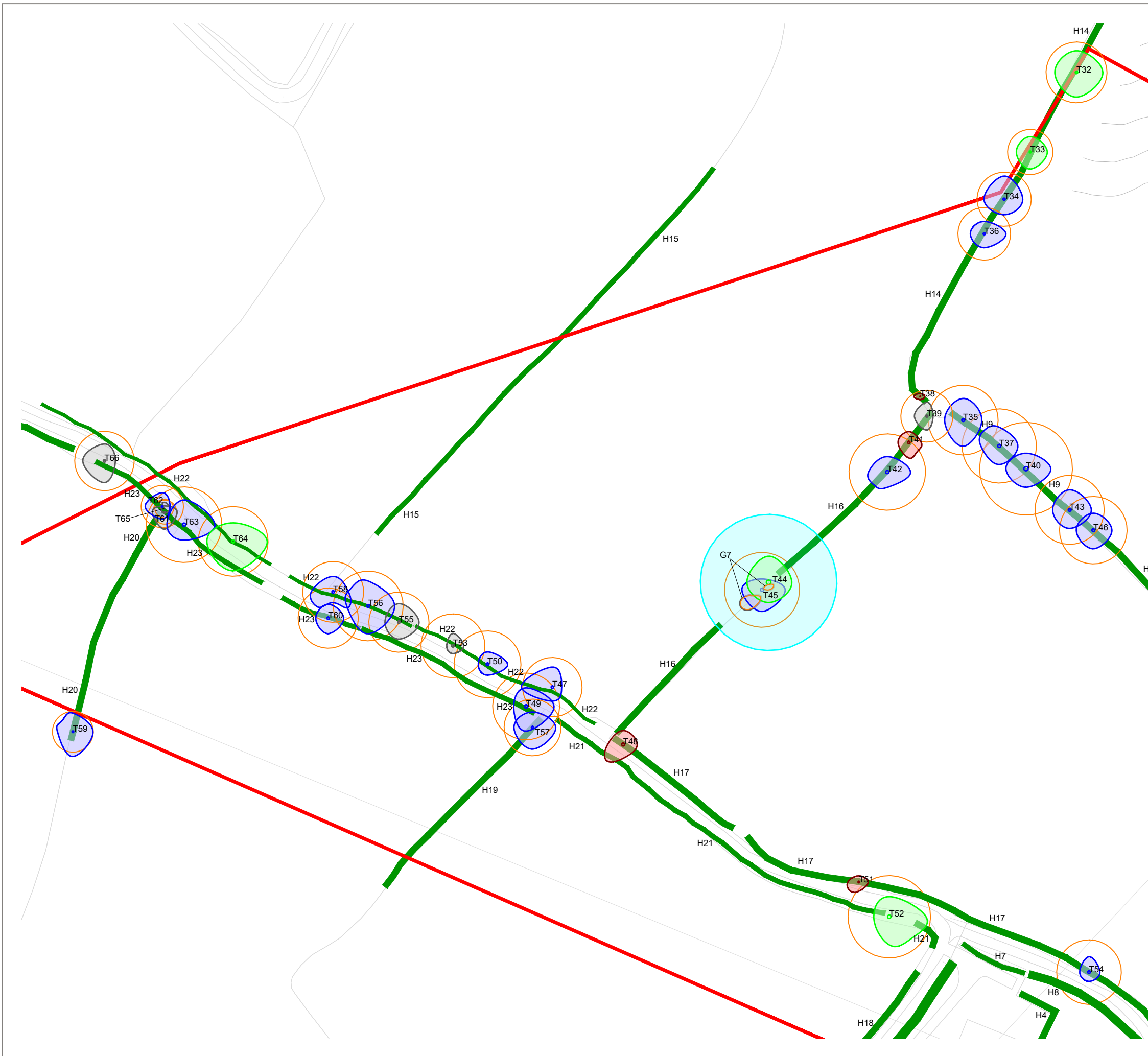
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Project
Bodelwyddan Overhead Lines
 Arboricultural Impact Assessment

Title
Drawing 1: Tree Constraints Plan [BASELINE] Inset 1 of 6

Drawing Number
D9037.01.102

Drawn	Checked	Approved	Scale	Date
AAB	HEE	JGS	1:1,250 @ A3	11/12/2023



KEY

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- T1/G1/W1 Trees
- H1 Hedgerow
- Root Protection Area (RPA)
- Veteran Tree Buffer Zone (T44)
Insets 1 and 2 only
- Survey Boundary

Tree Quality Categorisation

(Based on BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations)

- Category A
(High quality)
- Category B
(Moderate quality)
- Category C
(Low quality)
- Category U
(Unsuitable for retention)
- Hedgerow
(Not categorised)

NOTES:

This drawing should be read in conjunction with the respective Arboricultural Survey Data (Appendix A).

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THE ENVIRONMENT PARTNERSHIP

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Project

**Bodelwyddan Overhead Lines
Arboricultural Impact Assessment**

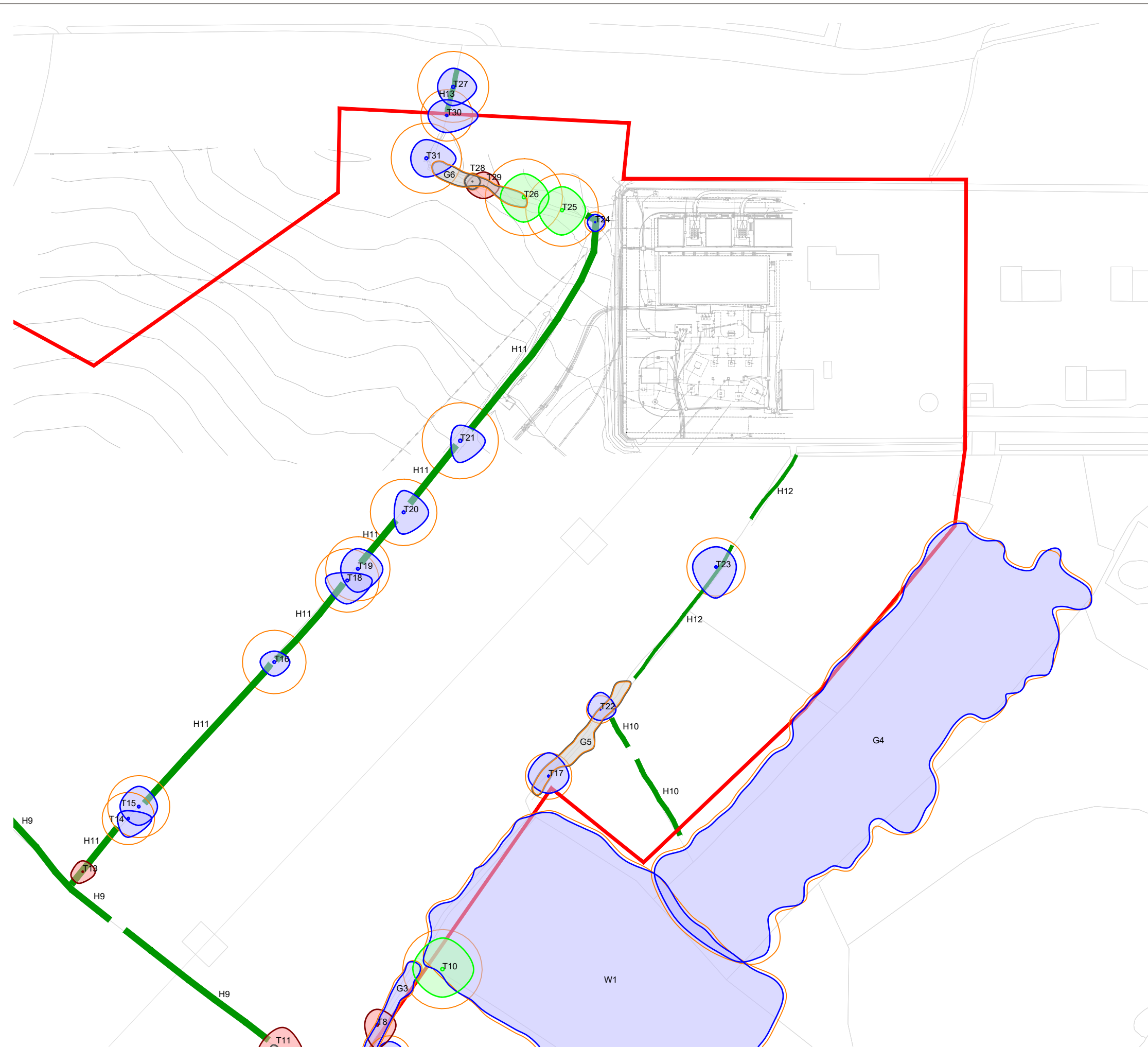
Title

Drawing 1: Tree Constraints Plan [BASELINE] Inset 2 of 6

Drawing Number

D9037.01.103

Drawn	Checked	Approved	Scale	Date
AAB	HEE	JGS	1:1,250 @ A3	11/12/2023



KEY

[This drawing must be reproduced in colour]

- T1/G1/W1 Trees
- H1 Hedgerow
- Root Protection Area (RPA)
- Veteran Tree Buffer Zone (T44)
Insets 1 and 2 only
- Survey Boundary

Tree Quality Categorisation

(Based on BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations)

- Category A (High quality)
- Category B (Moderate quality)
- Category C (Low quality)
- Category U (Unsuitable for retention)
- Hedgerow (Not categorised)

NOTES:

This drawing should be read in conjunction with the respective Arboricultural Survey Data (Appendix A).

All feature locations should be considered estimated due to the lack of topographic information available when producing this drawing.



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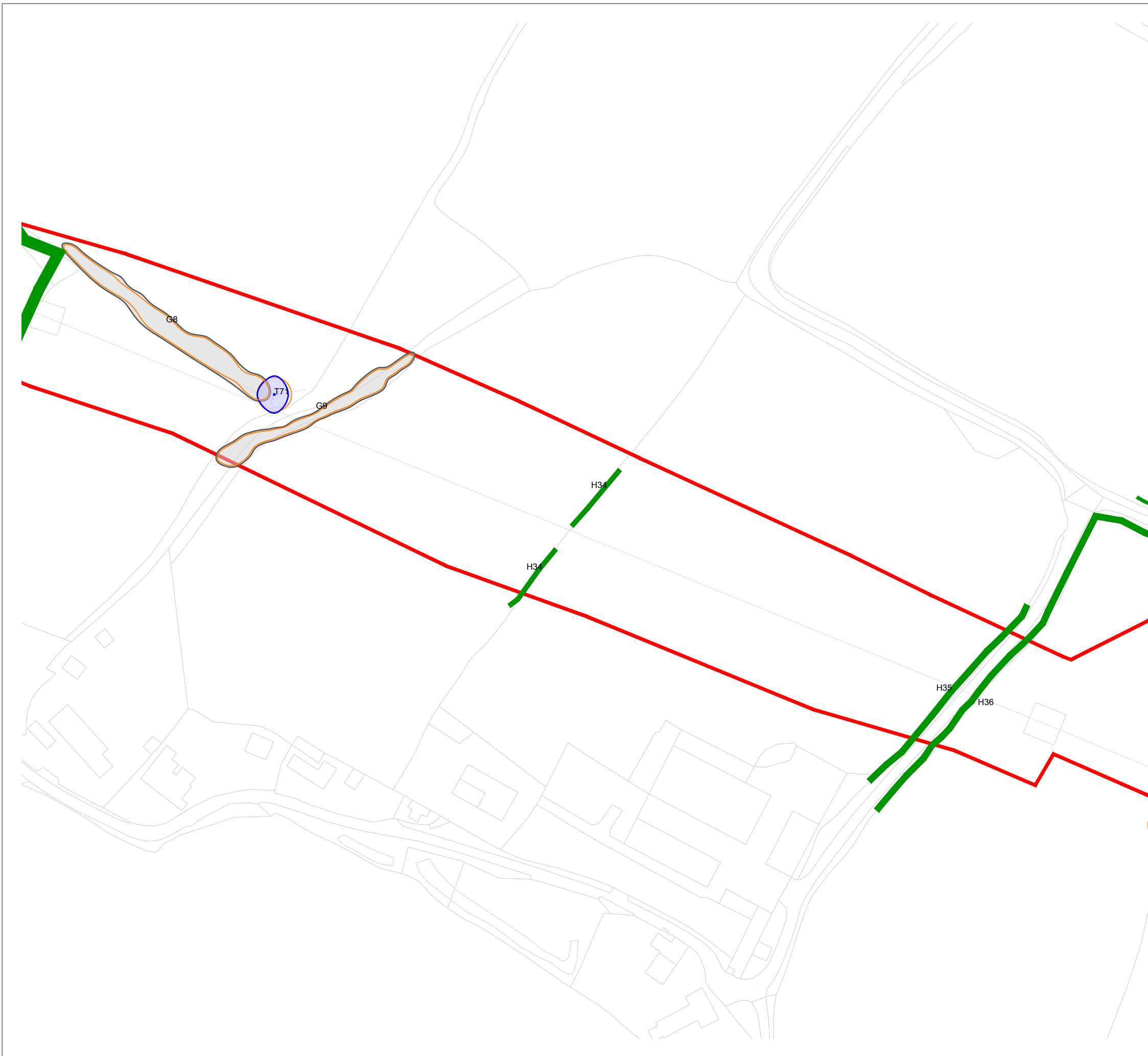
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Project
**Bodelwyddan Overhead Lines
Arboricultural Impact Assessment**

Title
Drawing 1: Tree Constraints Plan [BASELINE] Inset 3 of 6






Drawing Number
D9037.01.104

Drawn	Checked	Approved	Scale	Date
AAB	HEE	JGS	1:1,250 @ A3	11/12/2023








KEY

[This drawing must be reproduced in colour]

-  T1/G1/W1 Trees
-  H1 Hedgerow
-  Root Protection Area (RPA)
-  Veteran Tree Buffer Zone (T44)
Insets 1 and 2 only
-  Survey Boundary

Tree Quality Categorisation
(Based on BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations)

-  Category A
(High quality)
-  Category B
(Moderate quality)
-  Category C
(Low quality)
-  Category U
(Unsuitable for retention)
-  Hedgerow
(Not categorised)

NOTES:

This drawing should be read in conjunction with the respective Arboricultural Survey Data (Appendix A).

All feature locations should be considered estimated due to the lack of topographic information available when producing this drawing.



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Project

**Bodelwyddan Overhead Lines
Arboricultural Impact Assessment**

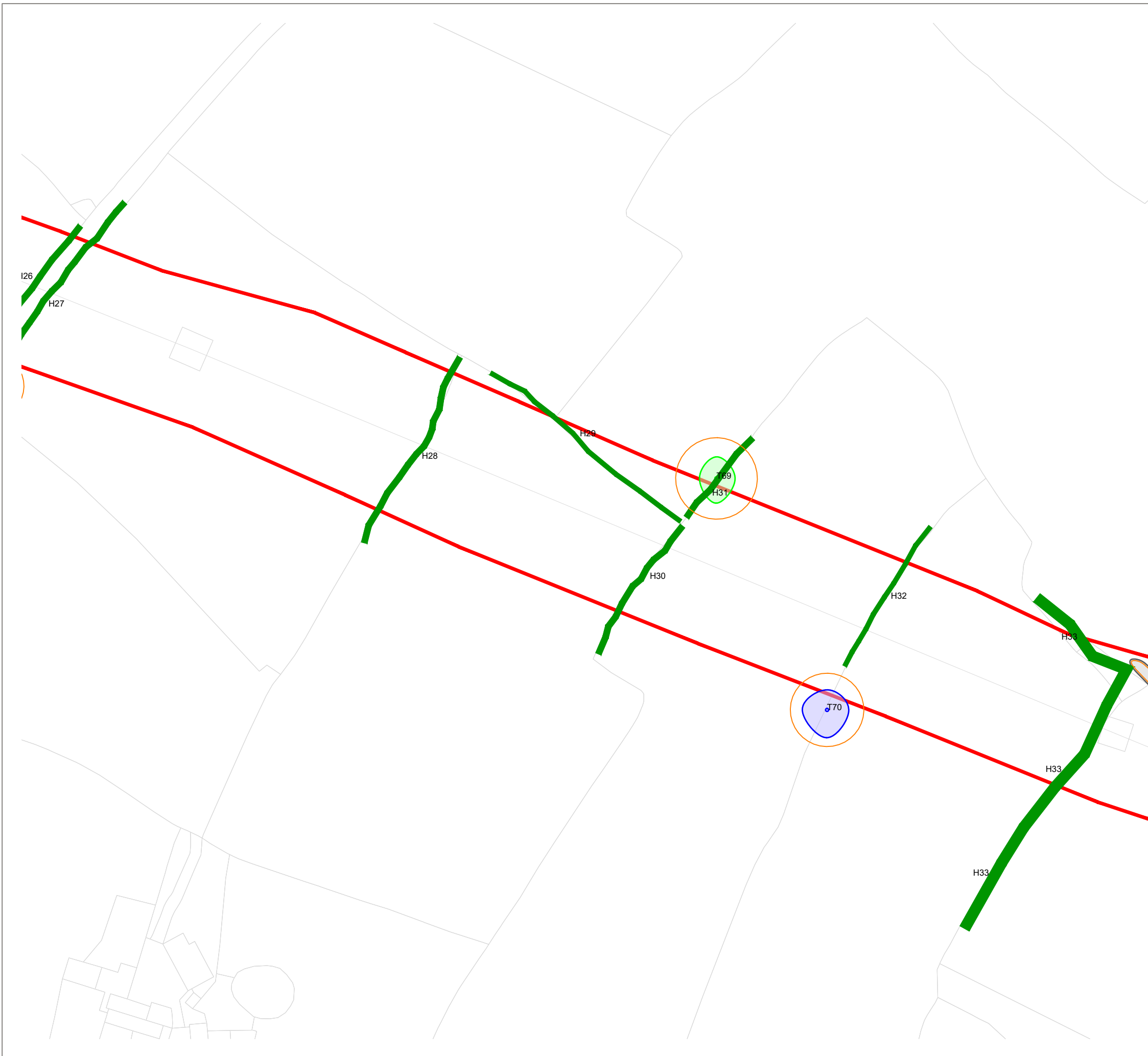
Title

Drawing 1: Tree Constraints Plan [BASELINE] Inset 4 of 6

Drawing Number






D9037.01.105

Drawn	Checked	Approved	Scale	Date
AAB	HEE	JGS	1:1,250 @ A3	11/12/2023








KEY

[This drawing must be reproduced in colour]

-  T1/G1/W1 Trees
-  H1 Hedgerow
-  Root Protection Area (RPA)
-  Veteran Tree Buffer Zone (T44)
Insets 1 and 2 only
-  Survey Boundary

Tree Quality Categorisation

(Based on BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations)

-  Category A
(High quality)
-  Category B
(Moderate quality)
-  Category C
(Low quality)
-  Category U
(Unsuitable for retention)
-  Hedgerow
(Not categorised)

NOTES:

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All feature locations should be considered estimated due to the lack of topographic information available when producing this drawing.



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Project

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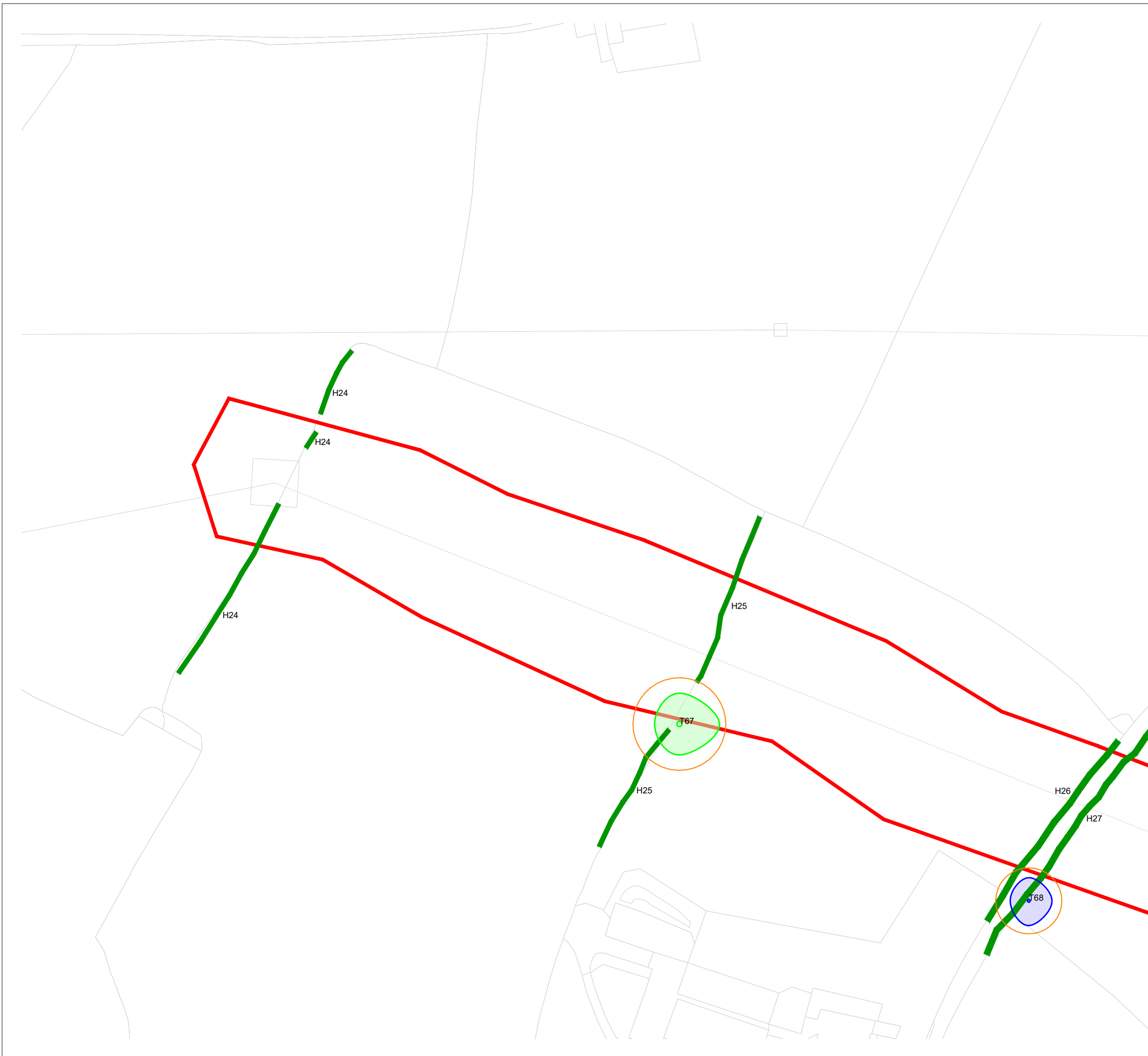
Title

Drawing 1: Tree Constraints Plan [BASELINE] Inset 5 of 6

Drawing Number






D9037.01.106

Drawn	Checked	Approved	Scale	Date
AAB	HEE	JGS	1:1,250 @ A3	11/12/2023




KEY

[This drawing must be reproduced in colour]

-  T1/G1/W1 Trees
-  H1 Hedgerow
-  Root Protection Area (RPA)
-  Veteran Tree Buffer Zone (T44)
Insets 1 and 2 only
-  Survey Boundary

Tree Quality Categorisation

(Based on BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations)

-  Category A
(High quality)
-  Category B
(Moderate quality)
-  Category C
(Low quality)
-  Category U
(Unsuitable for retention)
-  Hedgerow
(Not categorised)

NOTES:

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All feature locations should be considered estimated due to the lack of topographic information available when producing this drawing.



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Project

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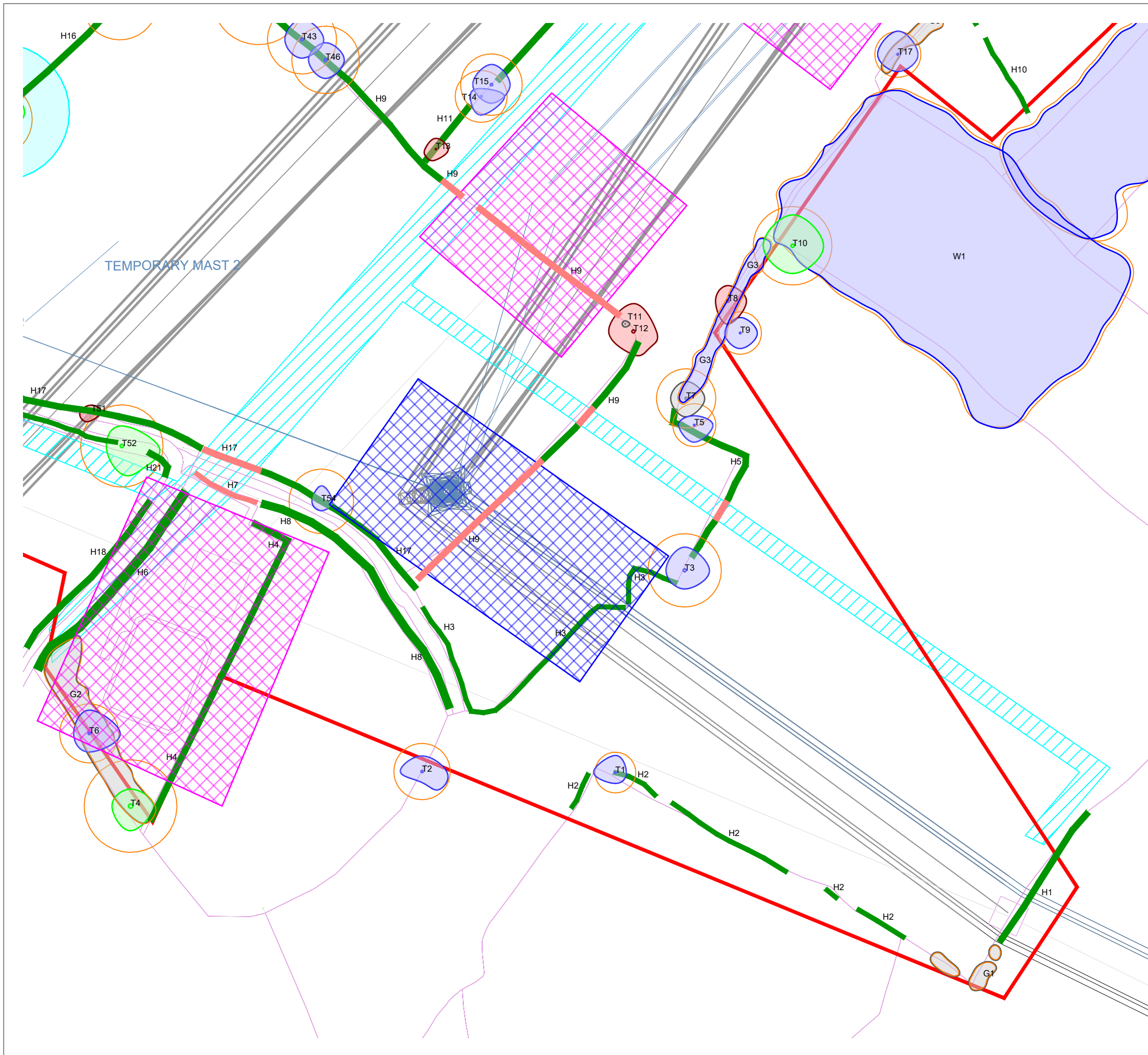
Title

Drawing 1: Tree Constraints Plan [BASELINE] Inset 6 of 6

Drawing Number

D9037.01.107

Drawn	Checked	Approved	Scale	Date
AAB	HEE	JGS	1:1,250 @ A3	11/12/2023



KEY

[This drawing must be reproduced in colour]

- T1/G1/W1 Trees
- H1 Hedgerow
- Root Protection Area (RPA)
- Veteran Tree Buffer Zone (T44)
Insets 1 and 2 only
- Survey Boundary
- Dismantling Zones
- Temporary Towers
- Construction and Pulling Zones

Trees and hedgerow to be retained and protected

- Category A
(High quality)
- Category B
(Moderate quality)
- Category C
(Low quality)
- Category U
(May be retained for habitat value)
- Hedgerow
(Not categorised)

Proposed tree and hedgerow works

- Trees to be removed
(Canopy outline denotes tree quality category)
- Hedgerow to be removed
- Trees removed as part of substation application
Inset 2 only (Canopy outline denotes tree quality category)
- Hedgerow removed as part of substation application

NOTES:

This drawing should be read in conjunction with the respective Arboricultural Survey Data (Appendix A).

All feature locations should be considered estimated due to the lack of topographic information available when producing this drawing.



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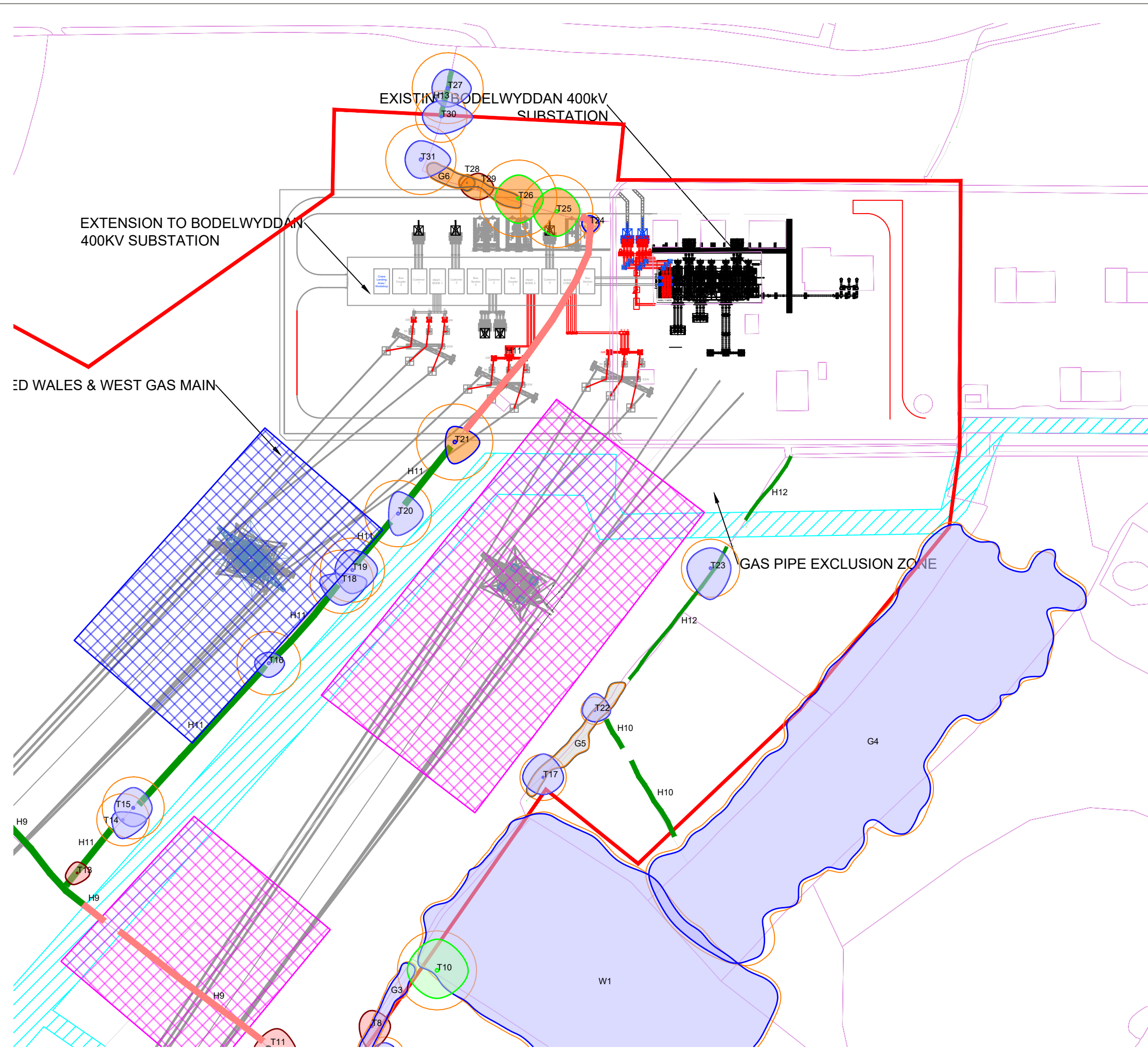


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Project
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Title
Drawing 2: Tree Works Plan [EFFECTS] (Inset 1 of 6)

Drawing Number
D9037.01.108

Drawn	Checked	Approved	Scale	Date
AAB	HEE	JGS	1:1,250 @ A3	11/12/2023



KEY

[This drawing must be reproduced in colour]

- T1/G1/W1 Trees
- H1 Hedgerow
- Root Protection Area (RPA)
- Veteran Tree Buffer Zone (T44)
Insets 1 and 2 only
- Survey Boundary
- Dismantling Zones
- Temporary Towers
- Construction and Pulling Zones

Trees and hedgerow to be retained and protected

- Category A (High quality)
- Category B (Moderate quality)
- Category C (Low quality)
- Category U (May be retained for habitat value)
- Hedgerow (Not categorised)

Proposed tree and hedgerow works

- Trees to be removed (Canopy outline denotes tree quality category)
- Hedgerow to be removed
- Trees removed as part of substation application
Inset 2 only (Canopy outline denotes tree quality category)
- Hedgerow removed as part of substation application

NOTES:

This drawing should be read in conjunction with the respective Arboricultural Survey Data (Appendix A).

All feature locations should be considered estimated due to the lack of topographic information available when producing this drawing.



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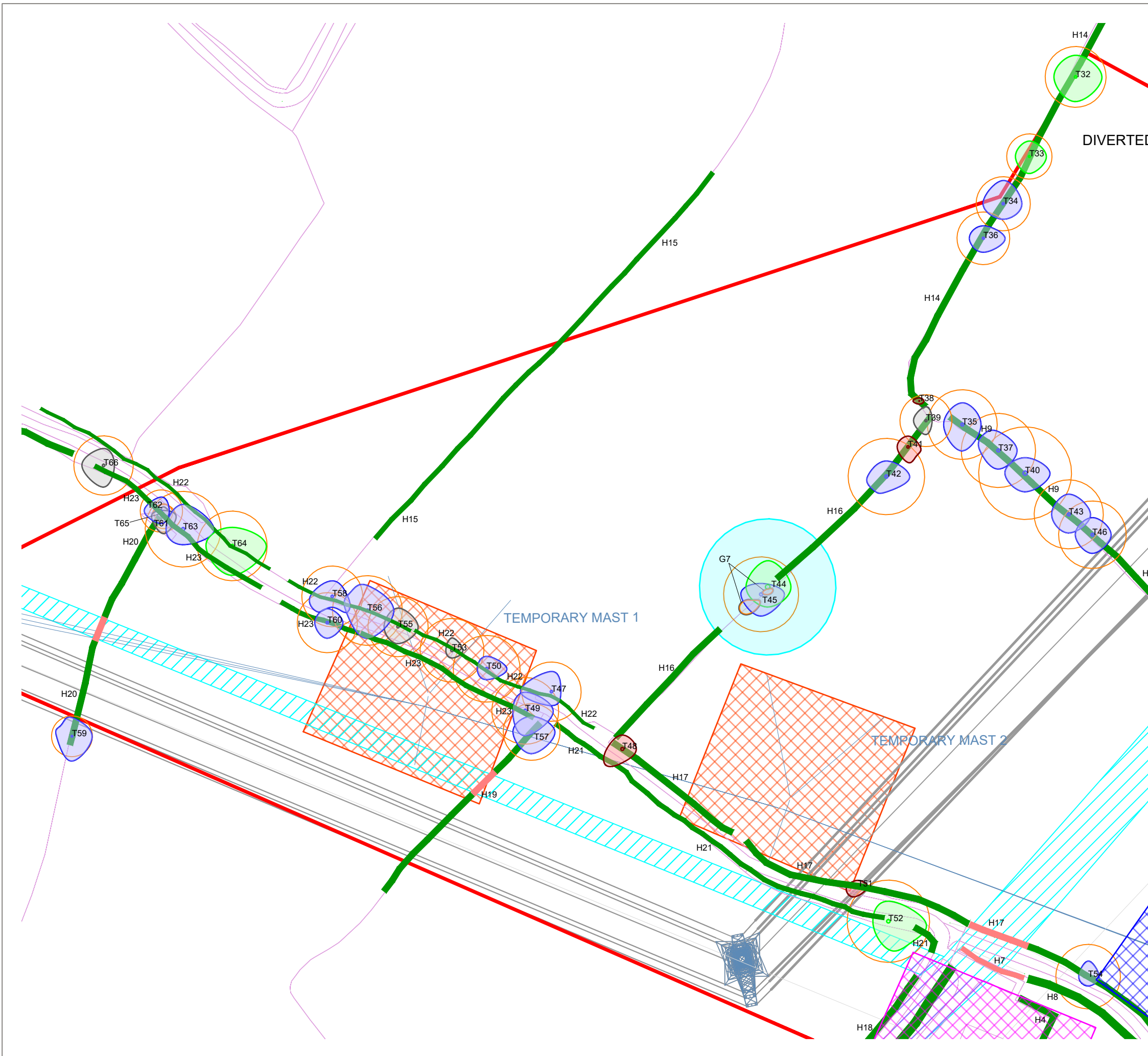
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Project
**Bodelwyddan Overhead Lines
Arboricultural Impact Assessment**

Title
Drawing 2: Tree Works Plan [EFFECTS] (Inset 2 of 6)

Drawing Number D9037.01.109				
Drawn AAB	Checked HEE	Approved JGS	Scale 1:1,250 @ A3	Date 11/12/2023



KEY

[This drawing must be reproduced in colour]

- T1/G1/W1 Trees
- H1 Hedgerow
- Root Protection Area (RPA)
- Veteran Tree Buffer Zone (T44)
Insets 1 and 2 only
- Survey Boundary
- Dismantling Zones
- Temporary Towers
- Construction and Pulling Zones

Trees and hedgerow to be retained and protected

- Category A
(High quality)
- Category B
(Moderate quality)
- Category C
(Low quality)
- Category U
(May be retained for habitat value)
- Hedgerow
(Not categorised)

Proposed tree and hedgerow works

- Trees to be removed
(Canopy outline denotes tree quality category)
- Hedgerow to be removed
- Trees removed as part of substation application
Inset 2 only (Canopy outline denotes tree quality category)
- Hedgerow removed as part of substation application

NOTES:

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All feature locations should be considered estimated due to the lack of topographic information available when producing this drawing.



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Title
Drawing 2: Tree Works Plan [EFFECTS] (Inset 3 of 6)

Drawing Number
D9037.01.110

Drawn	Checked	Approved	Scale	Date
AAB	HEE	JGS	1:1,250 @ A3	11/12/2023



KEY

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- T1/G1/W1 Trees
- H1 Hedgerow
- Root Protection Area (RPA)
- Veteran Tree Buffer Zone (T44)
Insets 1 and 2 only
- Survey Boundary
- Dismantling Zones
- Temporary Towers
- Construction and Pulling Zones

Trees and hedgerow to be retained and protected

- Category A
(High quality)
- Category B
(Moderate quality)
- Category C
(Low quality)
- Category U
(May be retained for habitat value)
- Hedgerow
(Not categorised)

Proposed tree and hedgerow works

- Trees to be removed
(Canopy outline denotes tree quality category)
- Hedgerow to be removed
- Trees removed as part of substation application
Inset 2 only (Canopy outline denotes tree quality category)
- Hedgerow removed as part of substation application

NOTES:

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All feature locations should be considered estimated due to the lack of topographic information available when producing this drawing.



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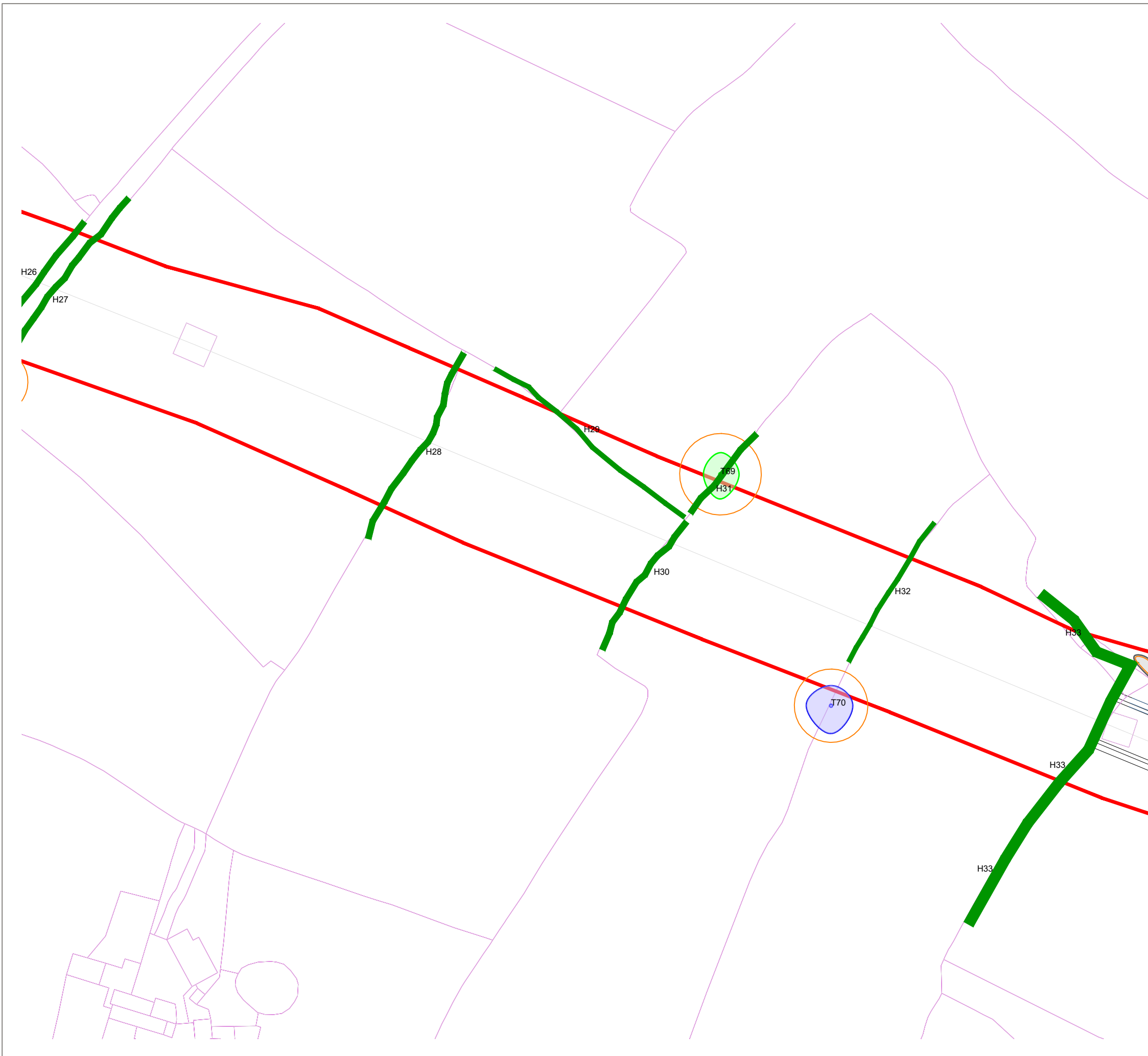
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Title
Drawing 2: Tree Works Plan [EFFECTS] (Inset 4 of 6)










Drawing Number
D9037.01.111

Drawn	Checked	Approved	Scale	Date
AAB	HEE	JGS	1:1,250 @ A3	11/12/2023







KEY







[This drawing must be reproduced in colour]

-   T1/G1/W1 Trees
-  H1 Hedgerow
-  Root Protection Area (RPA)
-  Veteran Tree Buffer Zone (T44)
Insets 1 and 2 only
-  Survey Boundary
-  Dismantling Zones
-  Temporary Towers
-  Construction and Pulling Zones

Trees and hedgerow to be retained and protected

-   Category A
(High quality)
-   Category B
(Moderate quality)
-   Category C
(Low quality)
-   Category U
(May be retained for habitat value)
-  Hedgerow
(Not categorised)

Proposed tree and hedgerow works

-   Trees to be removed
(Canopy outline denotes tree quality category)
-  Hedgerow to be removed
-   Trees removed as part of substation application
Inset 2 only (Canopy outline denotes tree quality category)
-  Hedgerow removed as part
of substation application

NOTES:

This drawing should be read in conjunction with the respective Arboricultural Survey Data (Appendix A).

All feature locations should be considered estimated due to the lack of topographic information available when producing this drawing.



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Project

**Bodelwyddan Overhead Lines
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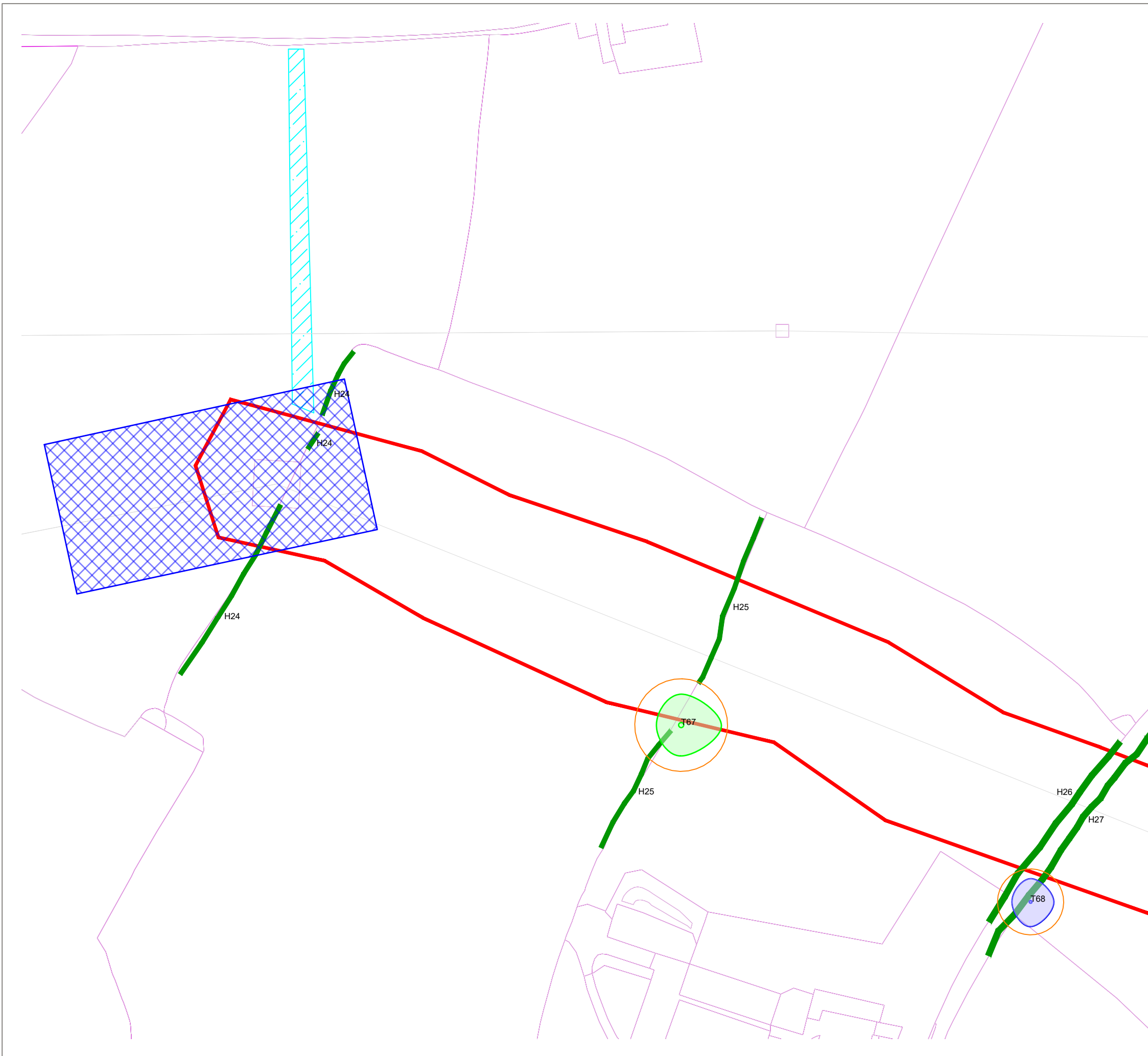
Title

Drawing 2: Tree Works Plan [EFFECTS] (Inset 5 of 6)

Drawing Number

D9037.01.112

Drawn	Checked	Approved	Scale	Date
AAB	HEE	JGS	1:1,250 @ A3	11/12/2023



KEY

[This drawing must be reproduced in colour]

- T1/G1/W1 Trees
- H1 Hedgerow
- Root Protection Area (RPA)
- Veteran Tree Buffer Zone (T44)
Insets 1 and 2 only
- Survey Boundary
- Dismantling Zones
- Temporary Towers
- Construction and Pulling Zones

Trees and hedgerow to be retained and protected

- Category A (High quality)
- Category B (Moderate quality)
- Category C (Low quality)
- Category U (May be retained for habitat value)
- Hedgerow (Not categorised)

Proposed tree and hedgerow works

- Trees to be removed (Canopy outline denotes tree quality category)
- Hedgerow to be removed
- Trees removed as part of substation application
Inset 2 only (Canopy outline denotes tree quality category)
- Hedgerow removed as part of substation application

NOTES:

This drawing should be read in conjunction with the respective Arboricultural Survey Data (Appendix A).

All feature locations should be considered estimated due to the lack of topographic information available when producing this drawing.



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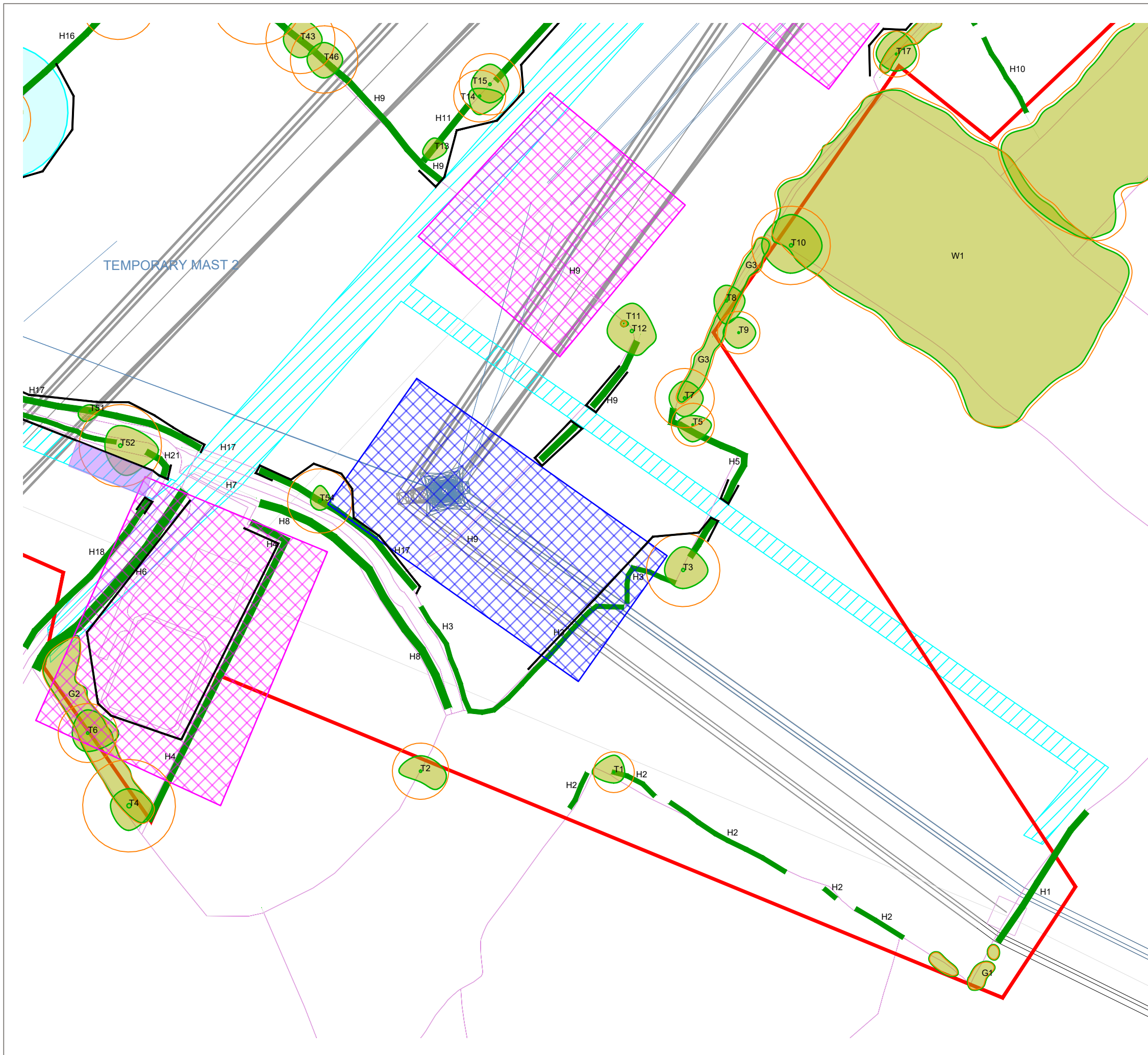
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Project
**Bodelwyddan Overhead Lines
Arboricultural Impact Assessment**

Title
Drawing 2: Tree Works Plan [EFFECTS] (Inset 6 of 6)

Drawing Number
D9037.01.113

Drawn	Checked	Approved	Scale	Date
AAB	HEE	JGS	1:1,250 @ A3	11/12/2023



KEY

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-  T1/G1/W1 Retained trees, groups and woodland
-  H1 Retained hedgerow
-  Root Protection Area (RPA)
-  Veteran Tree Buffer Zone (T44)
Insets 1 and 2 only
-  Survey Boundary
-  Dismantling Zones
-  Temporary Towers
-  Construction and Pulling Zones
-  Tree Protection Fencing
(Must be installed prior to works commencement)
-  Temporary Ground Protection
Insets 1, 2 and 3 only (Must be installed prior to works commencement)



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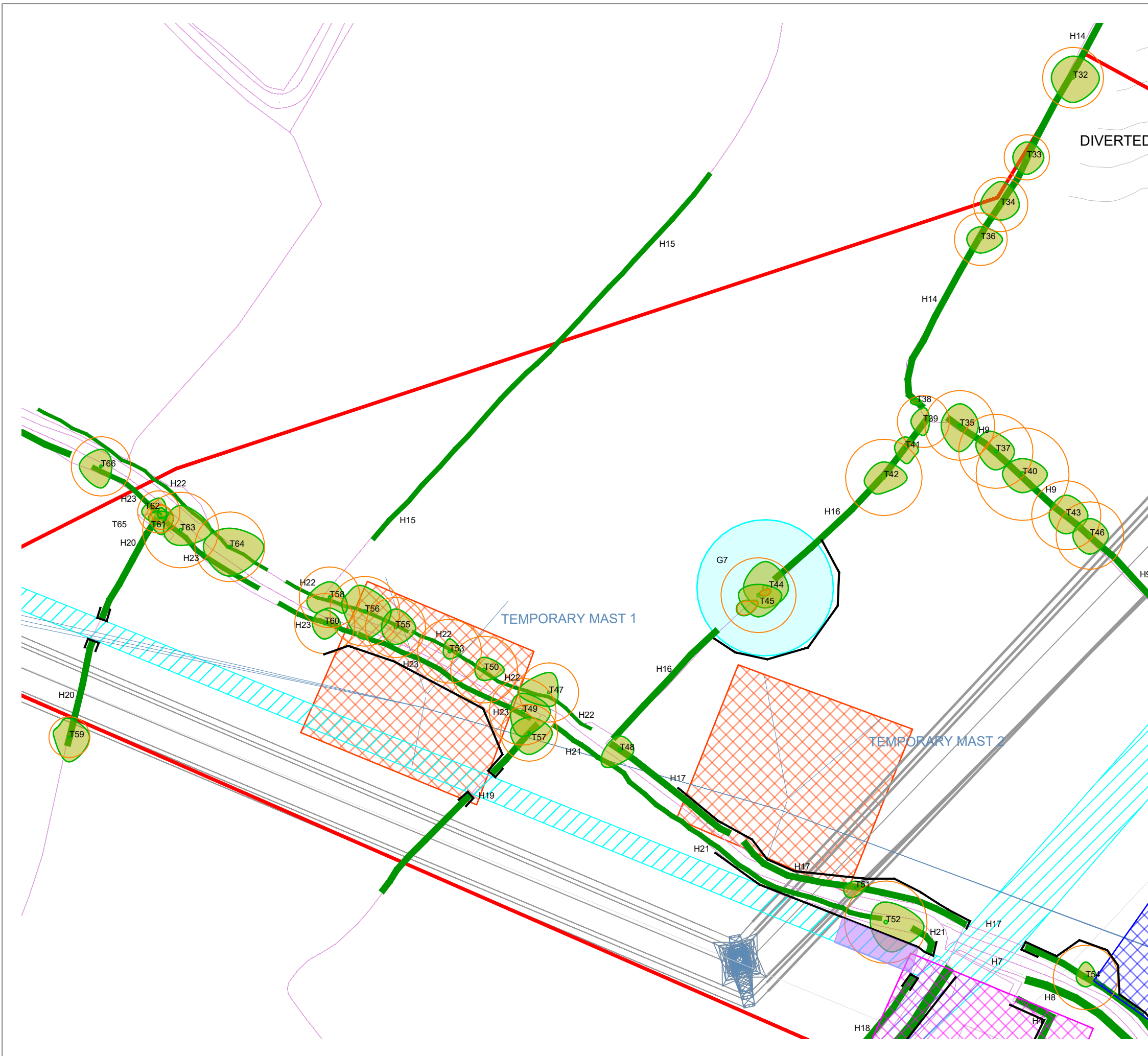
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Project
**Bodelwyddan Overhead Lines
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Title
Drawing 3: Tree Protection Plan [EFFECTS] (Inset 1 of 6)

Drawing Number
D9037.01.114

Drawn	Checked	Approved	Scale	Date
AAB	HEE	JGS	1:1,250 @ A3	11/12/2023



KEY
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- T1/G1/W1 Retained trees, groups and woodland
- H1 Retained hedgerow
- Root Protection Area (RPA)
- Veteran Tree Buffer Zone (T44)
Insets 1 and 2 only
- Survey Boundary
- Dismantling Zones
- Temporary Towers
- Construction and Pulling Zones
- Tree Protection Fencing
(Must be installed prior to works commencement)
- Temporary Ground Protection
Insets 1, 2 and 3 only (Must be installed prior to works commencement)

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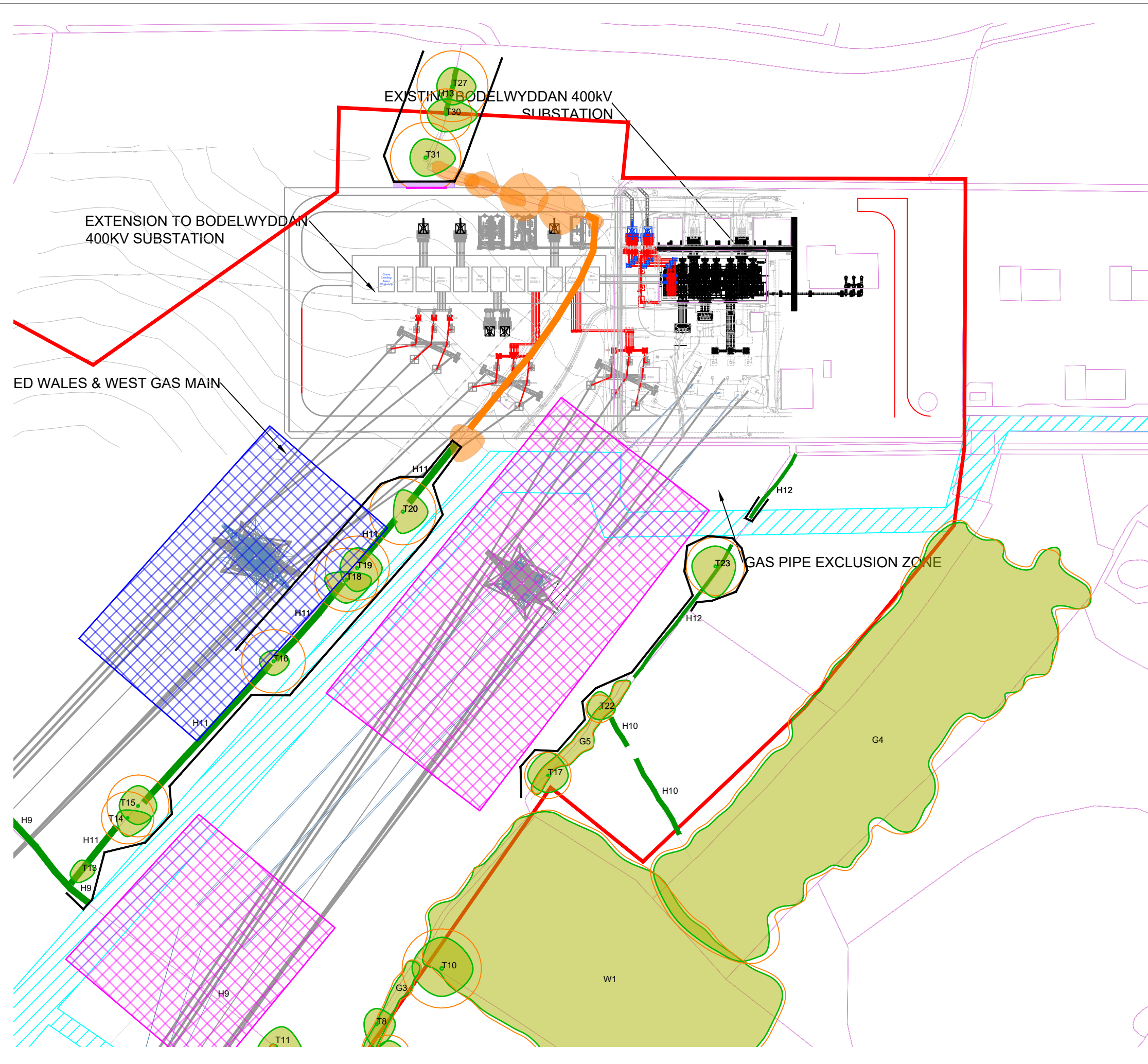
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Project
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Title
Drawing 3: Tree Protection Plan [EFFECTS] (Inset 2 of 6)

Drawing Number
D9037.01.115

Drawn	Checked	Approved	Scale	Date
AAB	HEE	JGS	1:1,250 @ A3	11/12/2023



KEY

[This drawing must be reproduced in colour]

- T1/G1/W1 Retained trees, groups and woodland
- H1 Retained hedgerow
- Root Protection Area (RPA)
- Veteran Tree Buffer Zone (T44)
Insets 1 and 2 only
- Survey Boundary
- Dismantling Zones
- Temporary Towers
- Construction and Pulling Zones
- Tree Protection Fencing
(Must be installed prior to works commencement)
- Temporary Ground Protection
Insets 1, 2 and 3 only (Must be installed prior to works commencement)



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Title
Drawing 3: Tree Protection Plan [EFFECTS] (Inset 3 of 6)











Drawing Number
D9037.01.116

Drawn	Checked	Approved	Scale	Date
AAB	HEE	JGS	1:1,250 @ A3	11/12/2023



KEY

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-  T1/G1/W1 Retained trees, groups and woodland
-  H1 Retained hedgerow
-  Root Protection Area (RPA)
-  Veteran Tree Buffer Zone (T44)
Insets 1 and 2 only
-  Survey Boundary
-  Dismantling Zones
-  Temporary Towers
-  Construction and Pulling Zones
-  Tree Protection Fencing
(Must be installed prior to works commencement)
-  Temporary Ground Protection
Insets 1, 2 and 3 only (Must be installed prior to works commencement)



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**Bodelwyddan Overhead Lines
Arboricultural Impact Assessment**

Title
Drawing 3: Tree Protection Plan [EFFECTS] (Inset 4 of 6)











Drawing Number
D9037.01.117

Drawn	Checked	Approved	Scale	Date
AAB	HEE	JGS	1:1,250 @ A3	11/12/2023



KEY

[This drawing must be reproduced in colour]

-  T1/G1/W1 Retained trees, groups and woodland
-  H1 Retained hedgerow
-  Root Protection Area (RPA)
-  Veteran Tree Buffer Zone (T44)
Insets 1 and 2 only
-  Survey Boundary
-  Dismantling Zones
-  Temporary Towers
-  Construction and Pulling Zones
-  Tree Protection Fencing
(Must be installed prior to works commencement)
-  Temporary Ground Protection
Insets 1, 2 and 3 only (Must be installed prior to works commencement)



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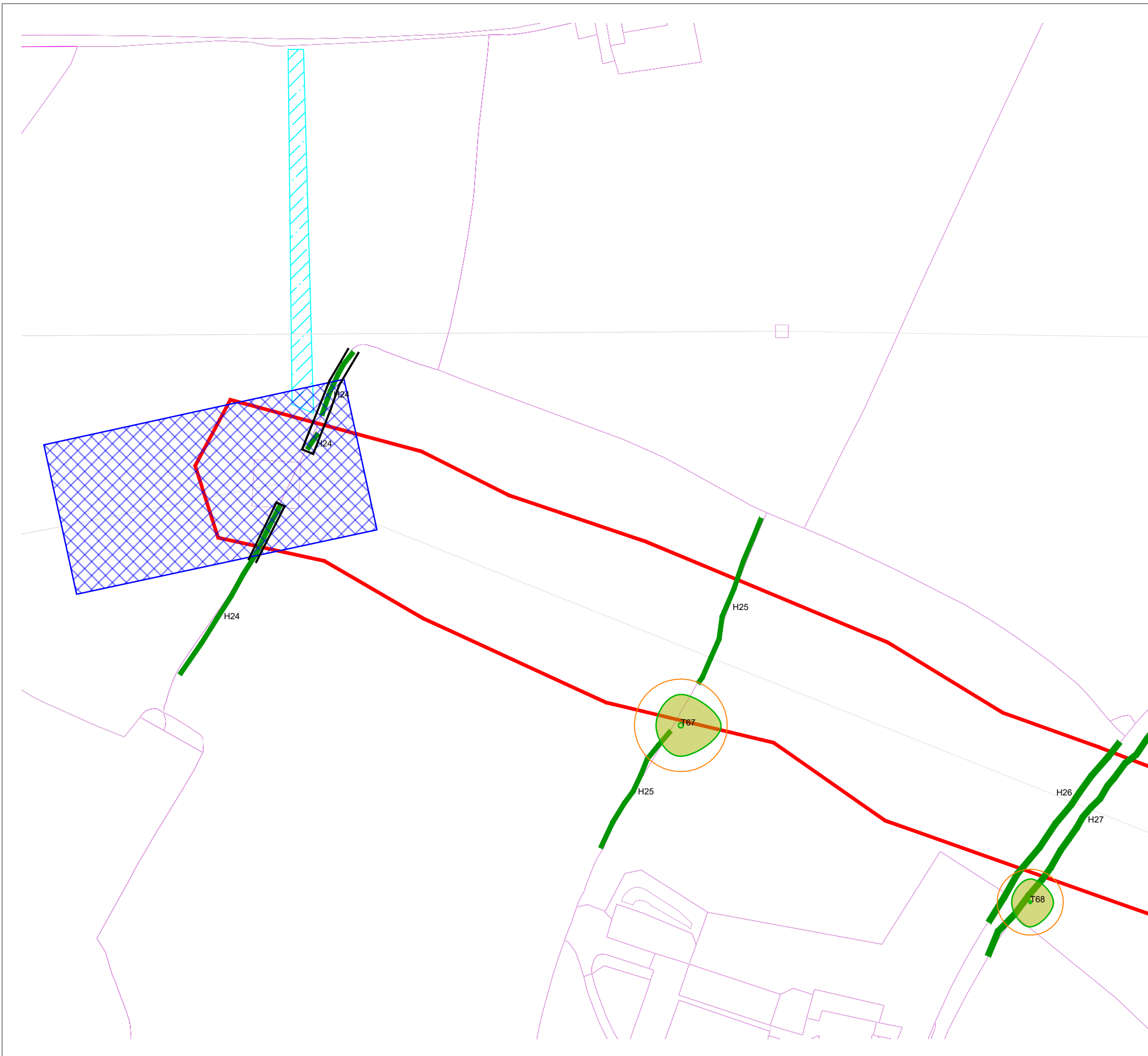
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Project
**Bodelwyddan Overhead Lines
Arboricultural Impact Assessment**

Title
Drawing 3: Tree Protection Plan [EFFECTS] (Inset 5 of 6)









Drawing Number
D9037.01.118

Drawn	Checked	Approved	Scale	Date
AAB	HEE	JGS	1:1,250 @ A3	11/12/2023



KEY

[This drawing must be reproduced in colour]

-  T1/G1/W1 Retained trees, groups and woodland
-  H1 Retained hedgerow
-  Root Protection Area (RPA)
-  Veteran Tree Buffer Zone (T44)
Insets 1 and 2 only
-  Survey Boundary
-  Dismantling Zones
-  Temporary Towers
-  Construction and Pulling Zones
-  Tree Protection Fencing
(Must be installed prior to works commencement)
-  Temporary Ground Protection
Insets 1, 2 and 3 only (Must be installed prior to works commencement)



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**Bodelwyddan Overhead Lines
Arboricultural Impact Assessment**

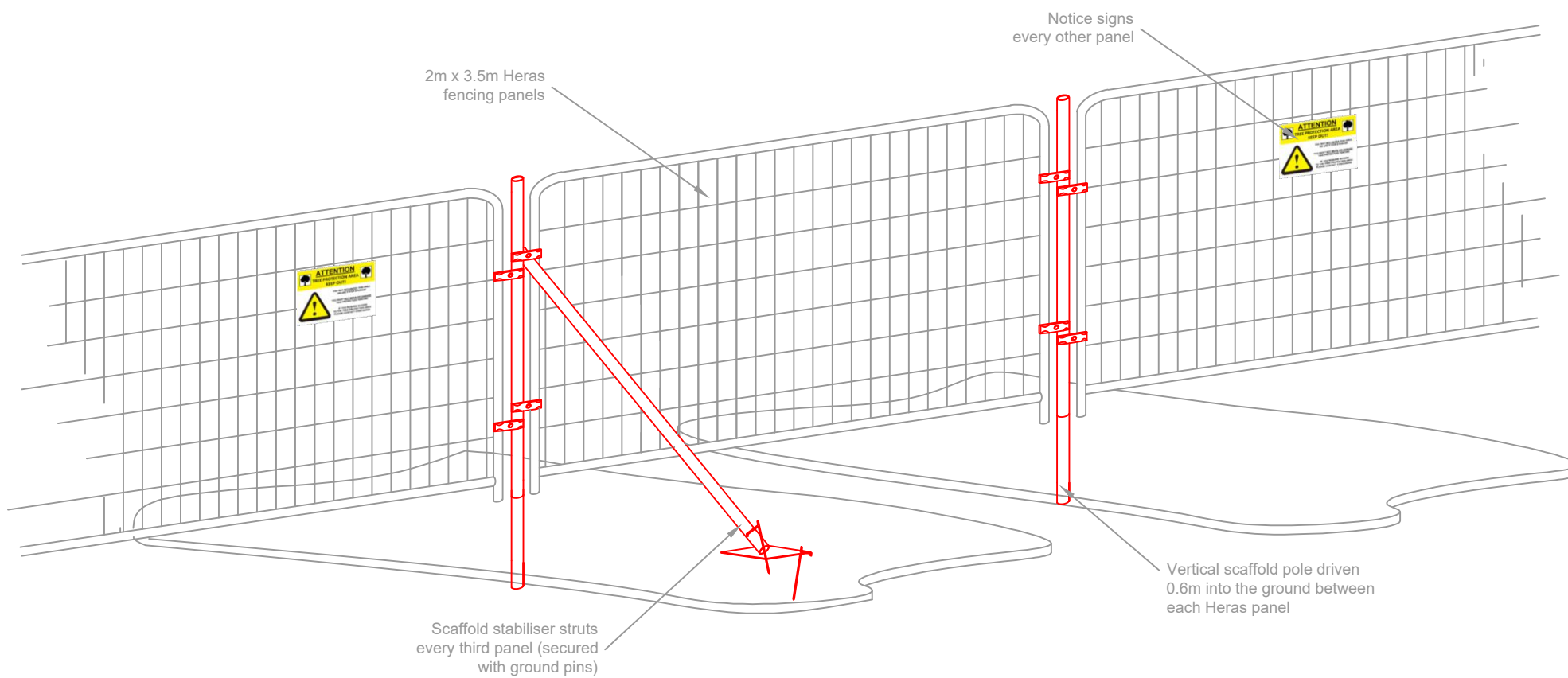
Title

Drawing 3: Tree Protection Plan [EFFECTS] (Inset 6 of 6)

Drawing Number

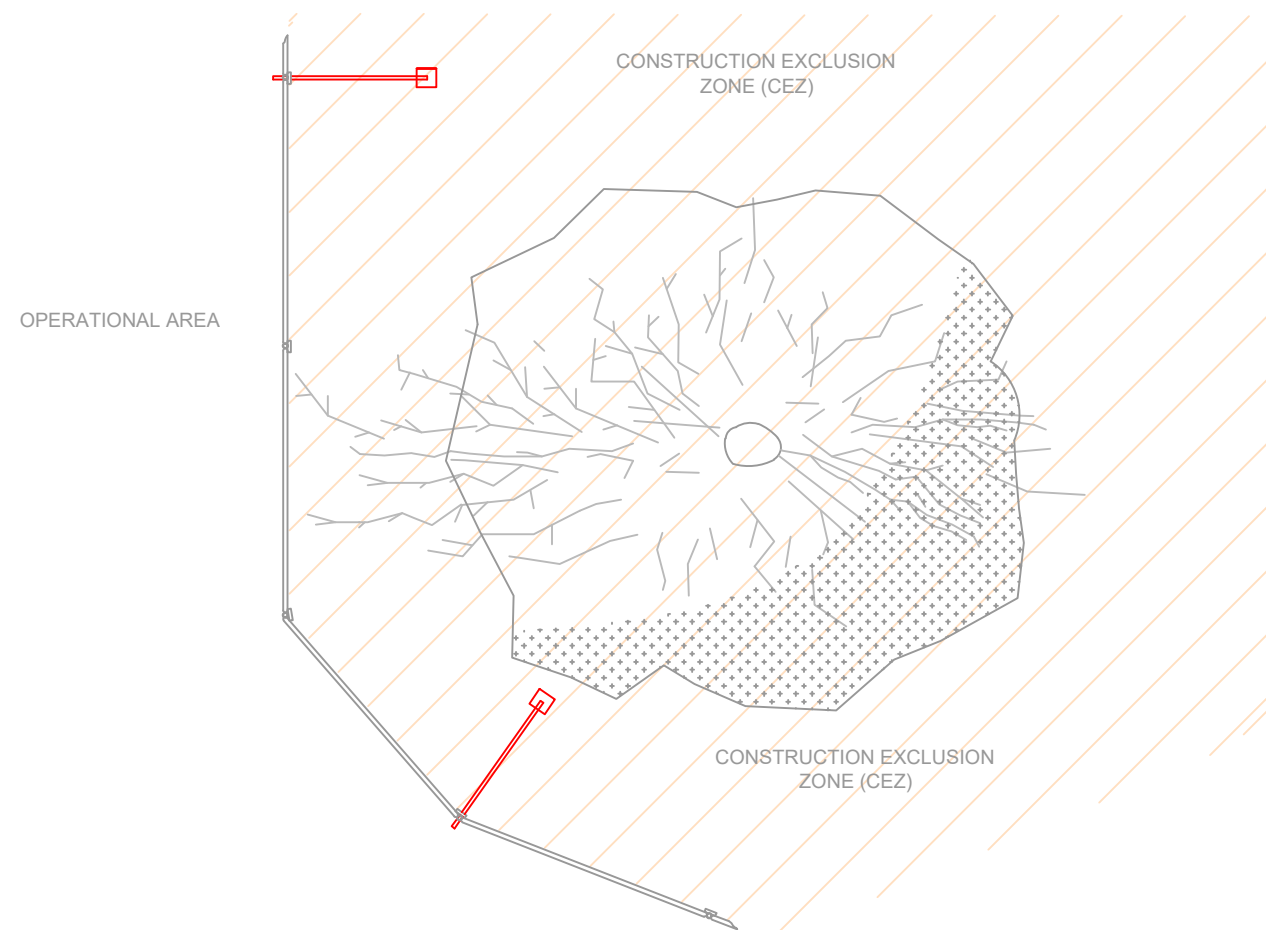
D9037.01.119

Drawn	Checked	Approved	Scale	Date
AAB	HEE	JGS	1:1,250 @ A3	11/12/2023



Per 3No. Heras panels (10.5m)	
Component	Quantity
2m x 3.5m Standard Heras panels	3
3m Galvanised steel scaffold pole	3
Heras security fence clip	12
Heras stabilising support bar	1
Stabilising pin	2
Tree protection notice	2

Notes:



Rev	Description	Drawn	Approved	Date

TEP | **THE ENVIRONMENT PARTNERSHIP**
 401 Faraday Street, Birchwood Park, Warrington WA3 6GA
 Tel 01925 844004 e-mail tep@tep.uk.com www.tep.uk.com

Project

Title
Temporary tree protection fencing for use on soft surfaces

Drawing Number
TEP.ARB.FEN.001

Drawn	Checked	Approved	Scale	Date
TDP	RMG	JGS	(not to scale) @ A3	08/07/2019



HEAD OFFICE

Genesis Centre,
Birchwood Science Park,
Warrington
WA3 7BH

Tel: 01925 844004
E-mail: tep@tep.uk.com

**MARKET
HARBOROUGH**

No. 1 The Chambers,
Bowden Business Village,
Market Harborough,
Leicestershire,
LE16 7SA

Tel: 01858 383120
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GATESHEAD

Office 26, Gateshead
International Business
Centre,
Mulgrave Terrace,
Gateshead
NE8 1AN

Tel: 0191 605 3340
E-mail: gateshead@tep.uk.com

LONDON

8 Trinity Street,
London,
SE1 1DB

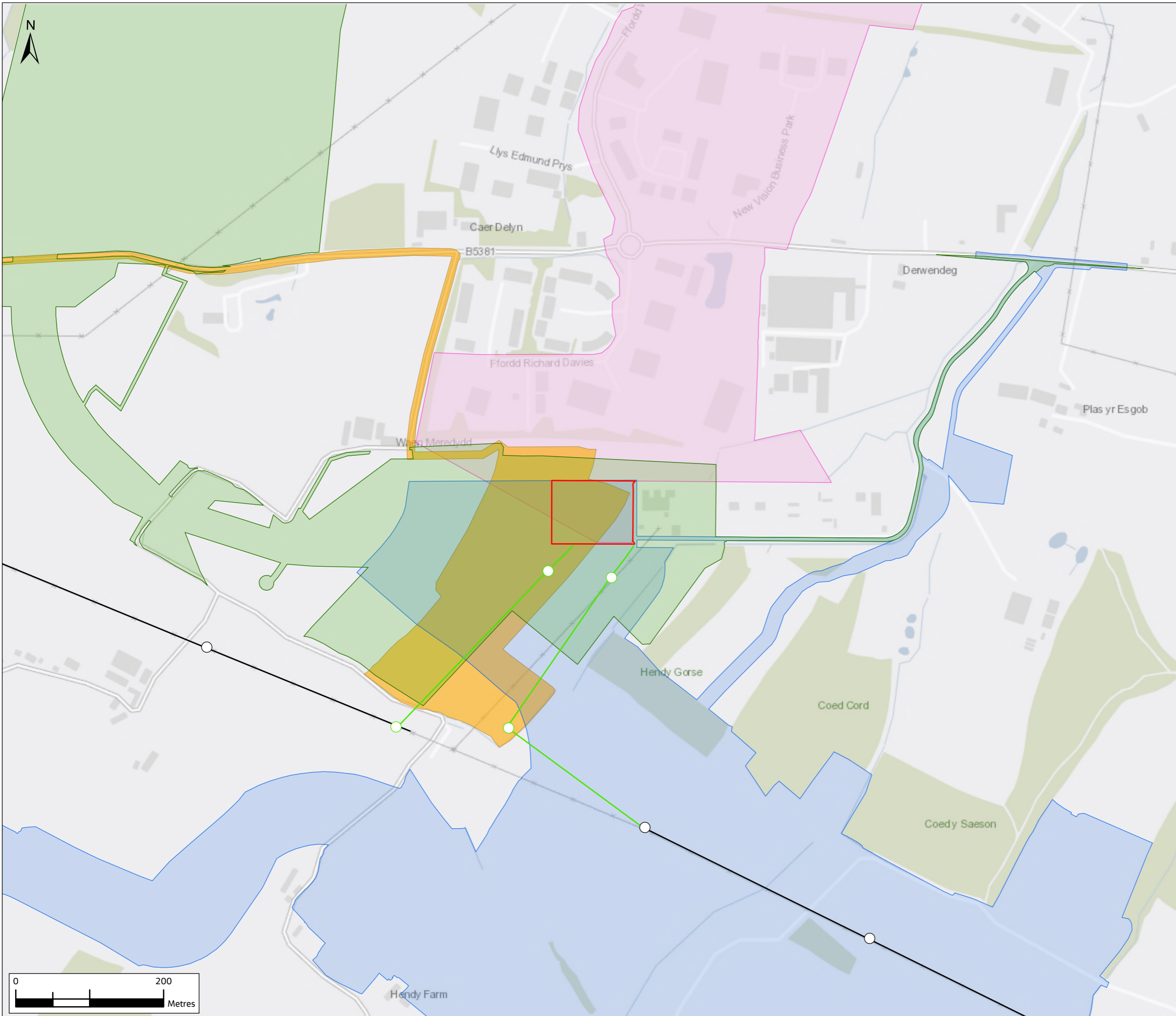
Tel: 020 3096 6050
E-mail: london@tep.uk.com

CORNWALL

4 Park Noweth,
Churchtown,
Cury,
Helston
Cornwall
TR12 7BW

Tel: 01326 240081
E-mail: cornwall@tep.uk.com

Appendix E. Land Limitations Plan



Legend

- Substation Extension
- Existing Overhead Line and Towers – Retained
- New Overhead Lines and Towers
- Awel-y-Môr Offshore Wind Farm Order Limits
- Mona Offshore Wind Farm Order Limits
- IGP Solar Farm Order Limits
- Bodelwyddan BESS and Solar Farm Planning Casework Order Limits



Source:
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03	6/17/2025	FINAL	WW	TW	TW	KW
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
Scale @ A3		Scale: 1:5,000	DO NOT SCALE			

Jacobs No. B2416603

Jacobs

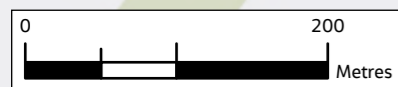
Client
nationalgrid

Project
 BODELWYDDAN OVERHEAD LINES

Drawing Title
 BODELWYDDAN LAND LIMITATION PLAN

Drawing No. B2416603/BODEL/LLP/001	Drawing Status FINAL
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APPENDIX E



Appendix F. Consultation

F.1 Denbighshire County Council

F.1.1 Landscape and visual assessment proposals

From: [REDACTED]
Sent: 23 June 2022 13:17
To: planning@denbighshire.gov.uk
Cc: [REDACTED]
Subject: Bodelwyddan Connections: Landscape Scope & Surveys

Good afternoon,

On behalf of National Grid, Jacobs have been instructed to provide environmental and planning services for the Bodelwyddan Connections project near St Asaph, Denbighshire in North Wales. We're therefore writing to you to seek comments on our initial landscape assessment proposals prior to our summer site surveys over the coming weeks, and I would be grateful if you could forward on this request to whom it may concern (e.g. Denbighshire County Council's Landscape Officer). In particular, we would welcome feedback on our overall approach to the landscape surveys, search/study area, methodology and identified visual and landscape receptors.

Project Description

The proposed works would create a new overhead line from Connah's Quay to Bodelwyddan and Bodelwyddan to Pentir. Each double circuit line would be approximately 400m in length, approaching the substation from the existing overhead line to the south-west.

The proposals would involve the following scheme components with consent sought under two separate planning routes:

1. Extension of the existing Bodelwyddan substation, which lies approximately 2 km west of St. Asaph in Denbighshire, and 1.3 km south of Junction 26 of the North Wales A55 Expressway. This would be sought under a Town & Country Planning Act application to Denbighshire County Council
2. The reconfiguration of the current double T arrangement between the 4ZB circuit and the Bodelwyddan substation, to a double turn-in configuration comprising two additional circuits between the T-point and the substation. This would be sought via a Section 37 Electricity Act application to the Secretary of State for Business, Energy and Industrial Strategy (BEIS).

It is anticipated that the proposals would also require the diversion of an existing gas pipeline and the removal of an existing cable sealing end compound, which connects the existing northern circuit to the substation by underground cables.

Search Area/Study Area

The overall approach to determining the search and study areas has been informed by *Using LANDMAP in Landscape and Visual Impact Assessments GN46*. The two tallest proposed structures are estimated to be 55m high and therefore it is proposed that a search area of 8km is used to help inform the extent of the study area for the assessment. It is anticipated that the study area will be approx. 5km, which will be confirmed after the production of Zone of Theoretical Visibility and site walkover. These distances have been based on the typical extent of search and study areas for tall structures (see below) and are towards the lower end of the scale due to the height of the proposed towers and the presence of existing electrical infrastructure at the site (e.g. substations, towers, overhead lines etc.). As such, there is a limited likelihood of a higher magnitude of effect being experienced by more distant receptors.

Height structure (metres)	<25	26 to 49	50 to 79	80 to 108	109 to 145	146 to 175	176 to 225	226+
Search area (km)	3	4 to 8	8 to 12	12 to 17	17 to 23	23 to 26	26 to 33	34+
Study area (km)	2	2 to 5	5 to 8	8 to 11	11 to 20	20 to 24	26 to 28	32+

General Approach/Methodology

A proposed Landscape and Visual Appraisal (LVA) or statutory Landscape and Visual Impact assessment (LVIA) methodology (incl. assessment criteria) will be presented to Denbighshire County Council following receipt of the screening opinion/decision. If the development is considered non-EIA, the submission of the Landscape and Visual Appraisal (LVA) would be based on a receptor-led assessment with accompanying representative

photographs illustrating the visual context and impacts on identified receptors. The approach to the assessment and mitigation would be based on the following guidance:

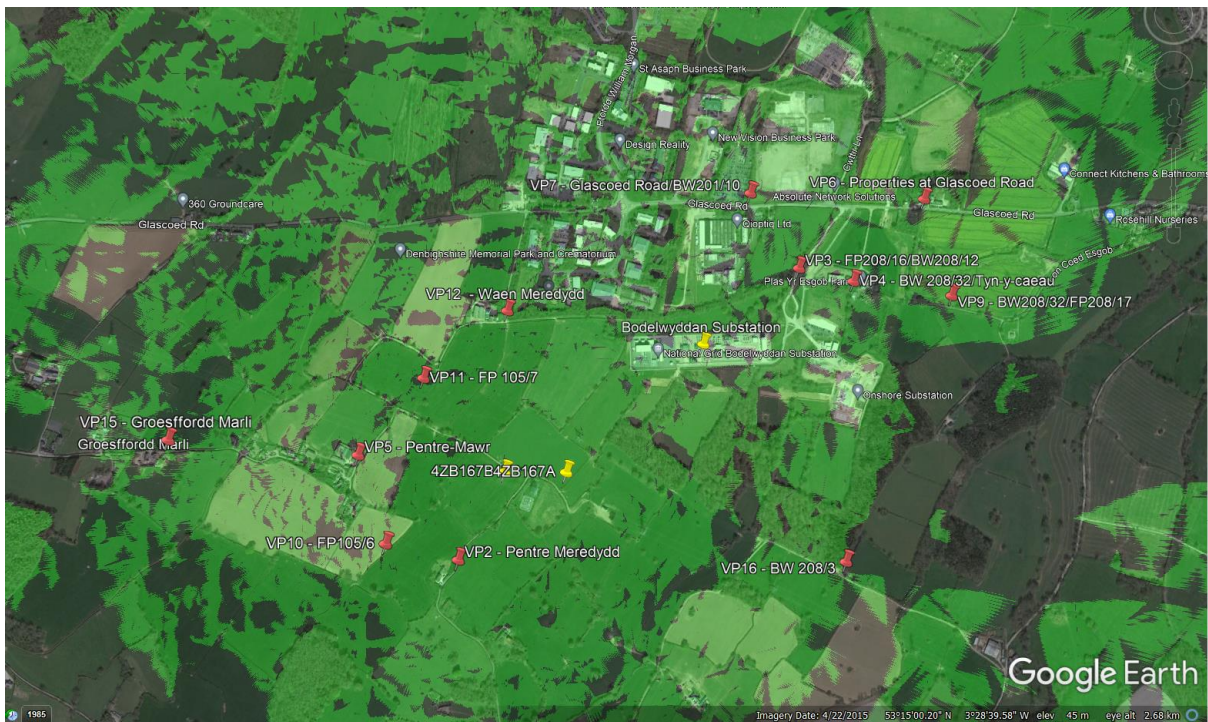
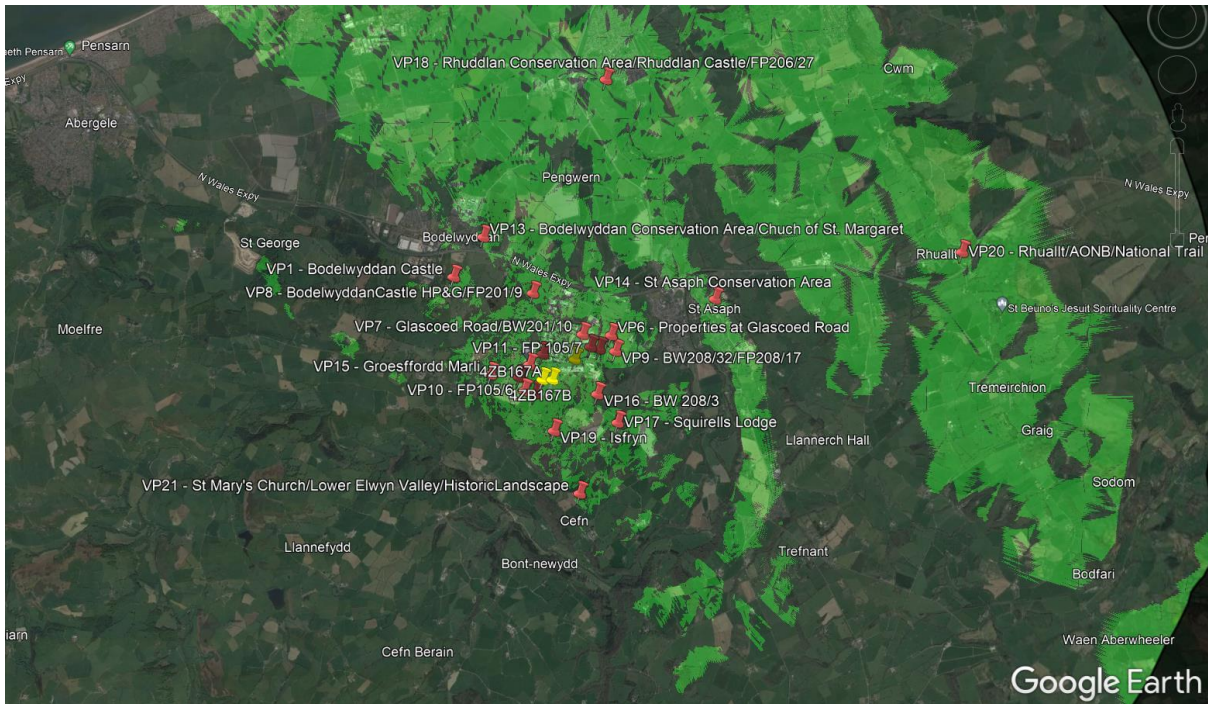
- *Guidelines for Landscape and Visual Impact Assessment 3*
- *Using LANDMAP in Landscape and Visual Impact Assessments (GN46)*
- *The Horlock Rules*
- *The Holford Rules.*

Accompanying photography would be for context purposes only and therefore not presented in accordance with *LI TGN 06/19*. All photography would be undertaken in the summer period and assumptions would be made on the winter impact based on professional judgement and past project experience. Photomontages would not be included as part of the submission.

Visual Receptors

Only visual receptors likely to experience significant visual effects during construction or operation would be included within the assessment of visual effects. The identification and selection of visual receptors would be based on site survey knowledge and a desk-top study. For the purposes of the site walkovers, the receptors/locations listed below would be visited to determine the likelihood of significant effects. The locations and an initial viewshed (based on a 55m high transmission tower) are shown on Figure 1 and 2 below.

- Recreational users of the nearby local PRow network (BW201/10, FP208/16, BW208/12, BW208/32, FP208/17, BW208/3, FP105/6, FP105/7)
- Visitors to Bodelwyddan Castle and Bodelwyddan Castle Historic Park and Garden
- Residents at nearby properties (Grade II Listed Pentre Meredydd, Waen Meredydd, Pentre-Mawr, Glascoed Road, Isfryn, Squirrels Lodge)
- Residents and visitors of surrounding Conservation Areas (Rhuddlan, Bodelwyddan, St. Asaph)
- Transient users of Glascoed Road and the surrounding local road network
- Settlement views from the wider settlements of Groesffordd Marli, Rhuddlan, Bodelwyddan, St Asaph and Rhuallt
- Recreational users of the Bryniau Clwyd A Dyffryn Dyfrdwy/Clwydian Range And Dee Valley AONB and Offas Dyke National Trail
- Visitors to the Lower Elwyn Valley Historic Landscape.



Figures 1 & 2: Proposed survey locations and initial viewedshed

Landscape Receptors

A review of published national and local landscape character assessments would be undertaken and, where appropriate, included within the assessment to determine the extent of landscape effects. Relevant landscape units from the following sources would be considered as landscape receptors:

- *National Landscape Character Areas*
- *LANDMAP*

- *Conwy and Denbighshire Landscape Sensitivity and Capacity Assessment for Wind Energy Development 2013*

Townscapes are unlikely to experience significant effects and these would therefore be omitted from the assessment.

As per *GLVIA3* and *LI TGN 01/20* , it is generally considered best practice to agree the scope and methodology with the determining authority before the assessment work is undertaken. Therefore, I would be grateful if you could provide us with feedback on the initial proposals before our summer site surveys are due to begin (w/c 04/07/2022). I appreciate that this is a limited timeframe; however, due to the tight project programme and access requirements, we must commence the surveys at the earliest opportunity. Unless we hear to the contrary, we'll assume that this approach is acceptable to the Council. I am of course happy to discuss and queries that you may have in the meantime.

Kind regards,

A large black rectangular redaction box covering the signature and name of the sender.

From: [REDACTED]
Sent: 22 July 2022 13:39
To: [REDACTED]
Subject: [EXTERNAL] RE: Bodelwyddan Connections: Landscape Scope & Surveys

Dear [REDACTED]

I write in response to your enquiry regarding the Bodelwyddan Connections Landscape Surveys.

I would have to advise that the Council cannot provide much input into this project at this stage as the Council does not employ a Landscape Officer, and we have limited capacity to provide pre-application advice outside of a formal pre-application enquiry.

In general terms it is noted that the application would be supported by a Landscape and Visual Impact Assessment (LVIA). The LVIA should be carried out by a Chartered Landscape Architect in accordance with the Guidelines for Landscape and Visual Assessment (Third Edition). It is also noted that you intend to draw upon Welsh Government LANDMAP data. This is an important tool in assessment of the landscape and which sets out the regional landscape context, and therefore its use is supported.

Whilst not of direct relevance to electricity transmission infrastructure, the Council has published the 'Conwy and Denbighshire Landscape Sensitivity and Capacity Assessment For Wind Energy Development' which may provide useful information for the baseline landscape assessment. A copy of this assessment can be found here:

<https://www.denbighshire.gov.uk/en/planning-and-building-regulations/local-development-plan/evidence-monitoring-and-information.aspx>

In terms of receptors, standard advice is that receptors should be selected to represent a range of sensitive receptors from within the study area, and should also include view points from within the Clwydian Range and Dee Valley AONB.

It is noted that photography would be taken during the summer months, and therefore would not illustrate the worse case scenario. The proposal to undertake photographic surveys in the summer months whilst trees are in full leaf would need to be fully justified to demonstrate the assessment is robust.

The LVIA should also include a cumulative assessment to assess the impact of the proposal in combination with existing and planned energy and electrical infrastructure in the vicinity of the site.

Existing energy infrastructure in the vicinity of the site includes high voltage overhead lines; existing substations to south of Glascoed Road (National Grid Bodelwyddan substation, Gwynt y Mor offshore windfarm substation and Burbo Bank Extension offshore windfarm substation respectively); the Scottish Power Distribution Network substation on land to the east of St. Asaph Business Park; and the flexible gas fired power station at TRB Drive on the St. Asaph business park.

Proposed major energy developments in the planning system include the Elwy solar farm at Gwernigron Farm which is currently subject of a DNS application before Welsh Ministers (PEDW Ref: DNS/3247619); and the proposed Awel y Mor Offshore windfarm Nationally Significant Infrastructure Project which is proposing a new substation on land to the west of St. Asaph business park approximately 1.3km to the north-west of the site and which is currently subject of a DCO application which has been submitted to the Planning Inspectorate (PINS National Infrastructure Planning ref: EN010112).

There is a further solar farm development proposed in St. Asaph on land close to the National Grid Bodelwyddan substation which is in the pre-application stage. Please See the EIA screening opinion request submitted to PEDW for further information (PEDW ref: CAS-01392-D2TSF3

There are also further proposed offshore windfarm developments which are likely to have onshore works in Denbighshire. These are the Mona and Morgan offshore windfarms which are both in the early pre-application planning stages and which have been offered grid connection points at the National Grid Bodelwyddan Substation, and will likely include new substation development on a site close to the national grid substation.

The Mona offshore windfarm is at the EIA Scoping Stage and an EIA Scoping Opinion was submitted to PINS in May 2022, and PINS issues a scoping opinion response on 15 June 2022. The EIA Scoping Report confirms the grid connection point that has been offered to serve the windfarm is at the Bodelwyddan National Grid Substation, and the area of search for the substation includes land around St Asaph / Bodelwyddan (PINS National Infrastructure Planning ref: EN010137).

Please note, this response is made at Officer level and is given without prejudice; it is not to be held as binding on the Local Planning Authority or any of its elected members, and the Council reserves the right to make comment on the proposal at a later stage.

Should you wish to obtain further, detailed site specific advice, I must advise that the Local Planning Authority operates a formal enquiry system, and as such we are not able to provide site specific advice outside of a formal pre-application enquiry. Further information can be found on the following webpage:

<https://www.denbighshire.gov.uk/en/resident/planning-and-building-regulations/planning/planning-advice.aspx>

Please be advised that a statutory fee will apply to obtain pre-application planning advice from the Council.

Kind Regards

[REDACTED]

Gwasanaethau Cynllunio, Gwarchod y Cyhoedd a Chefn Gwlad

Cyngor Sir Ddinbych

Caledfryn, Ffordd y Ffair, Dinbych LL16 3RJ

Ffôn : 01824 706727 Ffacs : 01824 706709

E-bost: cynllunio@sirddinbych.gov.uk

Gwefan: www.sirddinbych.gov.uk

Rydym yn croesawu gohebiaeth yn Gymraeg a ni fydd unrhyw oedi wrth ymateb i ohebiaeth a dderbyniwyd yn Gymraeg.

We welcome correspondence in Welsh and there will be no delay in responding to correspondence received in Welsh.

Planning, Public Protection and Countryside Services

Denbighshire County Council

Caledfryn, Smithfield Road, Denbigh, LL16 3RJ

Phone : 01824 706727 Fax : 01824 706709

E-mail planning@denbighshire.gov.uk

Web Site: www.denbighshire.gov.uk

Rydym yn croesawu gohebiaeth yn Gymraeg a ni fydd unrhyw oedi wrth ymateb i ohebiaeth a dderbyniwyd yn Gymraeg.

We welcome correspondence in Welsh and there will be no delay in responding to correspondence received in Welsh.

From: [REDACTED]

Sent: 27 July 2022 12:51

To: planning@denbighshire.gov.uk

Cc: [REDACTED]

Subject: RE: [EXTERNAL] RE: Bodelwyddan Connections: Landscape Scope & Surveys

Dear [REDACTED],

Thank you for your email. We will review and get back to you with any queries or in relation to pre-application advice.

Best regards,
Adam

[REDACTED]

Jacobs Challenging today.
Reinventing tomorrow.

*Due to my flexible working pattern, I may send emails outside of normal working hours.
Please don't reply outside your working day. Be safe and healthy.*

F.1.2 Permitted Development letter

22nd February 2023

Our Ref: 9037.007



[REDACTED] is dealing with this matter

Direct Dial:
email:

[REDACTED]

Genesis Centre
Birchwood Science Park
Warrington
WA3 7BH

Tel: 01925 844004
Fax: 01925 844002
tep@tep.uk.com
www.tep.uk.com

Other Offices:

Market Harborough | Gateshead | London | Cornwall

Planning Office
Denbighshire District Council
Wynnstay Rd
Ruthin
LL15 1YN

PLANNING | DESIGN | ENVIRONMENT

Dear Sir or Madam

**NATIONAL GRID PERMITTED DEVELOPMENT AT BODELWYDDAN SUBSTATION,
GLASCOED RD, SAINT ASAPH LL17 0LJ**

I am writing on behalf of National Grid Electricity Transmission (NGET) to confirm that it intends to undertake works at its Bodelwyddan Substation at the address shown above.

The works comprise a single bay extension to the existing National Grid substation to accommodate a new connection from the proposed Awel-y-Môr offshore wind farm.

The works are shown on the attached drawings:

- Drawing B31000G6-JAC-ZZ-XX-DR-E-0022_01
- Drawing B31000G6-JAC-ZZ-XX-DR-E-0023_02

The works comprise an extension to the existing substation building and fitting of new equipment. The works will take place entirely within the existing substation operational area enclosed by security fencing and gates.

The building extension will match the profile of the existing substation main building (see elevation C-C at Drawing B31000G6-JAC-ZZ-XX-DR-E-0023). Its maximum height will be 11.9m falling to a height of 10.73m. The extension will be the same width as the existing substation main building at 15.5m. The extension will be 6.225m long whereas the existing substation main building is 35m long.

The extension will enclose a volume of 1,092m³ and the new floorspace will be 96.5m². The existing substation main building encloses a volume of 6,139m³ and has a footprint of 542.5m².

The extension will be clad in similar material and finish to the existing substation main building.

There will be outdoor equipment comprising gas insulated bars and disconnectors as shown on the drawings with a height of 7.85m. These comprise similar equipment to that already at the substation.



The General Permitted Development Order (GPDO) 1995 sets out activities that comprise permitted development in Wales. The part relevant to National Grid's activities is in Schedule 2 Part 17 Class G Electricity undertakings.

Section G sets out activities which comprise permitted development and includes G(d) the extension or alteration of buildings on operational land.

The existing substation at Bodelwyddan comprises operational land because in accordance with 263(1) of the Planning Act 1990 it comprises land which is used for the purpose of carrying on their undertaking and land in which an interest is held for that purpose. It does not fall in the exclusion from operational land otherwise applied by 264(1)(a) as having been acquired on or after 6th December 1968 because, consistent with 264(3)(a) and (b), it comprises land where *'there is, or at some time has been, in force with respect to it a specific planning permission for its development;...and that development, if carried out, would involve or have involved its use for the purpose of the carrying on of the statutory undertakers' undertaking*.

The land is held on the balance of a 99 years' lease and has the benefit of planning permission 31/2008/1123/PF for the existing National Grid Bodelwyddan substation.

GPDO 1995 Schedule 2 Part 17 G(1) sets out restrictions that apply to development permitted under G(d). These include that development is not permitted where the height of the original building would be exceeded; the cubic content of the original building would be exceeded by more than 25%; and where the floor space of the original building would be exceeded by more than 1,000 square metres. (Greater restrictions apply in National Parks, Areas of Outstanding Natural Beauty and other designations but these do not apply at the Bodelwyddan substation site.)

The dimensions of the proposed substation building extension do not exceed these parameters.

GPDO 1995 Schedule 2 Part 17 G(1) (f) states that permitted development includes *any other development carried out in, on, over or under the operational land of the undertaking*.

There are restrictions on the application of this clause and GPDO 1995 Schedule 2 Part 17 G(1) (e) (ii) states that development is not permitted if it would consist of or include *'the installation or erection by way of addition or replacement of any plant or machinery exceeding 15 metres in height or the height of any plant or machinery replaced, whichever is the greater'*.

The above confirms that the proposed works shown on the attached drawings comprise permitted development under the GPDO 1995.

Work is anticipated to commence during autumn 2023.

Due to other projects requiring connection at the Bodelwyddan substation, NGET is investigating further works that will be required in the locale. These works would be outside the existing substation's operational land and so would require planning permission.

NGET will contact you separately about these other works in due course.

Yours sincerely

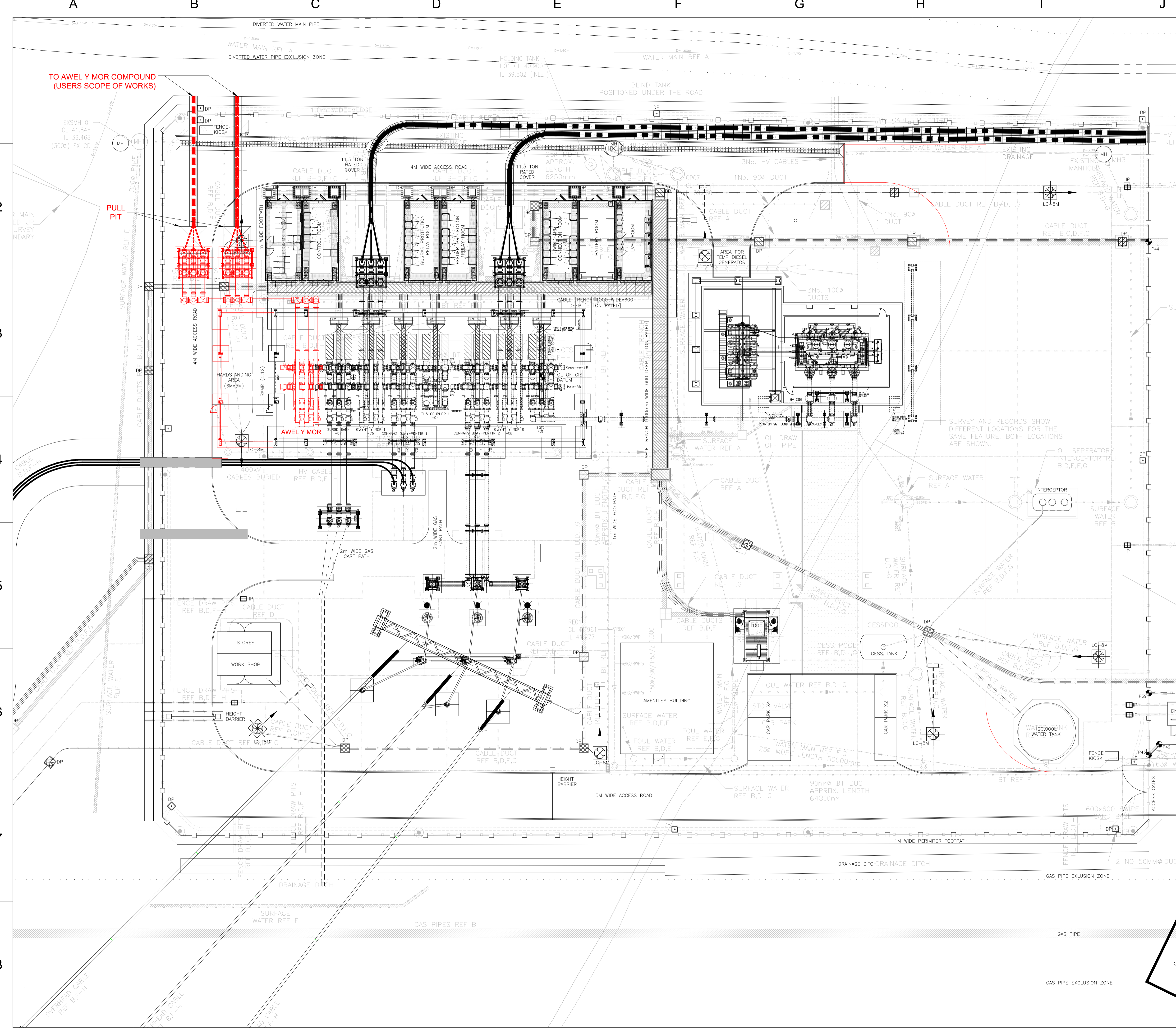


Consultant Consents Officer

Encs

Drawing B31000G6-JAC-ZZ-XX-DR-E-0022_01

Drawing B31000G6-JAC-ZZ-XX-DR-E-0023_02



NOTES

- THIS IS A 4.214.3 DRAWING AND IS FOR DEVELOPMENT PURPOSES ONLY
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
- EXISTING BACKGROUND TAKEN FROM DRG 21/CEA0217.
- ALL NEW WORKS AND EXTENSION TO BUILDING TO MATCH EXISTING AESTHETICAL APPEARANCE AND FINISH.

LEGEND

- EXISTING EQUIPMENT
- NEW NATIONAL GRID EQUIPMENT (LICENSED WORKS)

REFERENCE

SUBSTATION MINIMUM ELECTRICAL CLEARANCES IN ACCORDANCE WITH NGTS 2.1

NOMINAL SYSTEM VOLTAGE (rms)	400kV
PHASE TO EARTH CLEARANCE (PE)	2.8m
PHASE TO PHASE CLEARANCE (PP)	3.6m
DESIGN CLEARANCE FOR SAFETY (HORIZONTAL) DSH	4.6m
DESIGN CLEARANCE FOR SAFETY (VERTICAL) DS	5.5m
INSULATION HEIGHT (PEDESTRIAN ACCESS)	2.4m
SAFETY DISTANCE - SD (FROM NGC SAFETY RULES)	3.1m

01	Issued for information	PS	DA	CT	17/02/23
Rev	Description	Cre'd	Chk'd	App'd	Date

nationalgrid

Master Scheme No: 32281 Sub-Scheme No: B31000G6 Site: BODELWYDDAN 400kV SUBSTATION

Scheme Name: **Awel-y-Mor 574MW Gen Con 4.2**

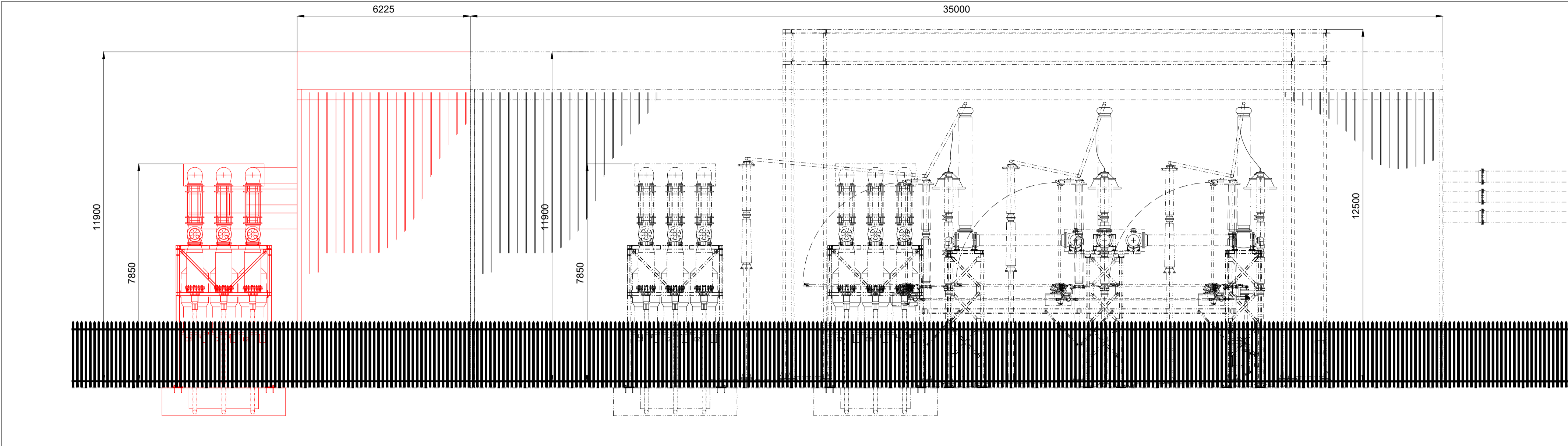
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AWEL-Y-MOR BAY INSTALLATION
BODELWYDDAN 400kV SUBSTATION**

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Development Eng: M.DAVIES	Document Type: DWG	Scale: 1:200	Format: A1	Sheet(s): 1 OF 1	Rev: 01

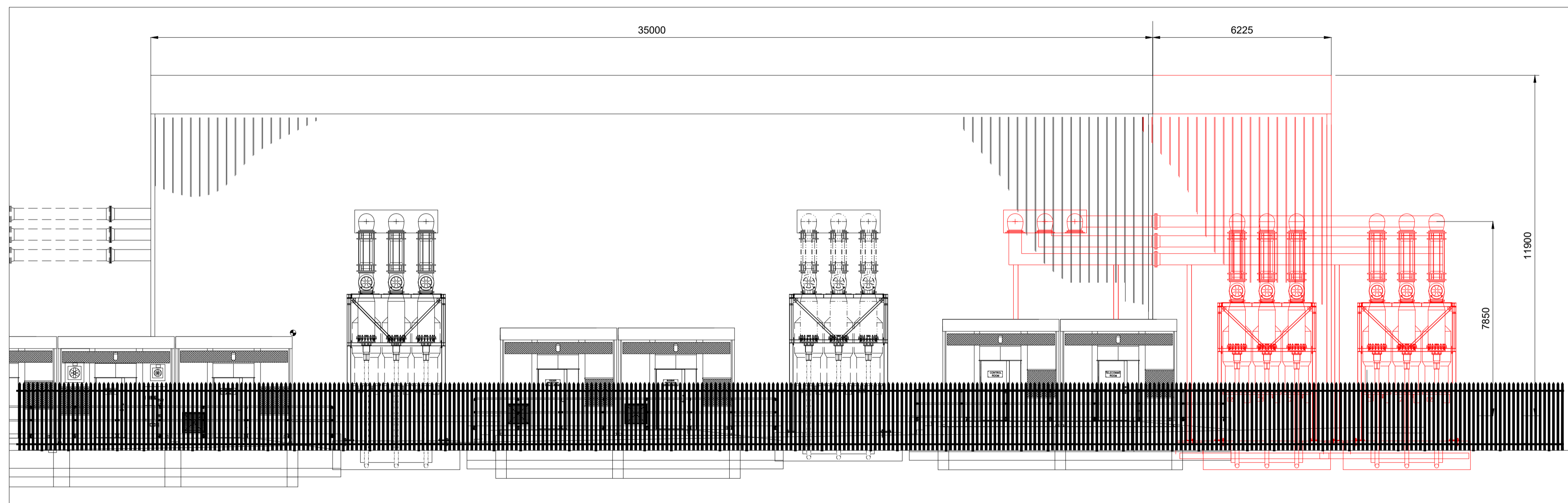
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Originator Drawing Number: **B31000G6-JAC-ZZ-XX-DR-E-0022**

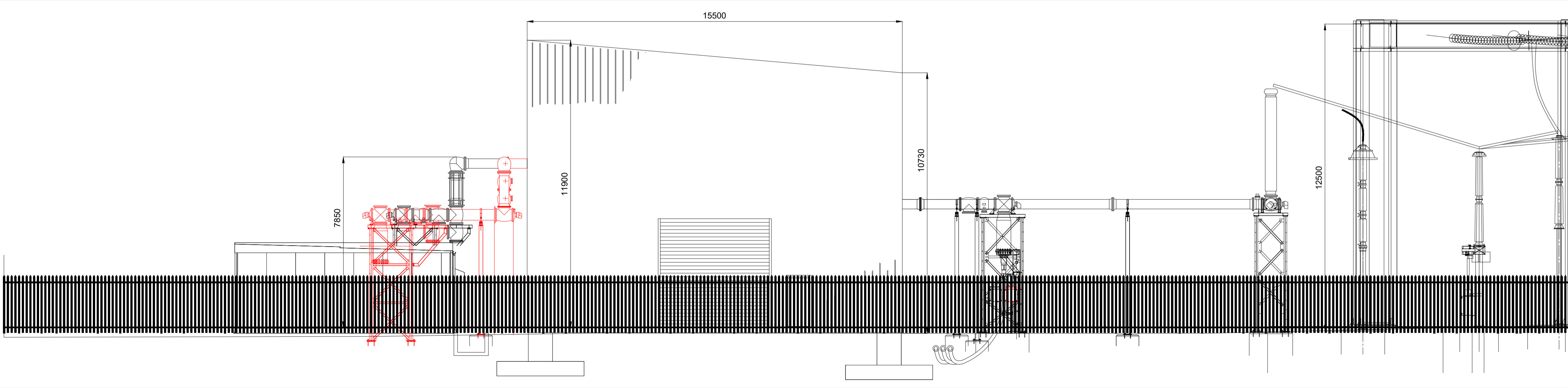
A B C D E F G H I J K L



SECTION A-A



SECTION B-B



SECTION C-C

A B C D E F G H I J K L

NOTES

1. THIS IS A 4.2/4.3 DRAWING AND IS FOR DEVELOPMENT PURPOSES ONLY
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
3. EXISTING BACKGROUND TAKEN FROM DRG 21/CEA/0217.
4. ALL NEW WORKS AND EXTENSION TO BUILDING TO MATCH EXISTING AESTHETICAL APPEARANCE AND FINISH.

LEGEND

- EXISTING EQUIPMENT
- NEW NATIONAL GRID EQUIPMENT (LICENSED WORKS)

REFERENCE

SUBSTATION MINIMUM ELECTRICAL CLEARANCES IN ACCORDANCE WITH NGTS 2.1

NOMINAL SYSTEM VOLTAGE (rms)	400kV
PHASE TO EARTH CLEARANCE (PE)	2.8m
PHASE TO PHASE CLEARANCE (PP)	3.6m
DESIGN CLEARANCE FOR SAFETY (HORIZONTAL) DSH	4.6m
DESIGN CLEARANCE FOR SAFETY (VERTICAL) DS	5.5m
INSULATION HEIGHT (PEDESTRIAN ACCESS)	2.4m
SAFETY DISTANCE - SD (FROM NGC SAFETY RULES)	3.1m

02	Additional dimensions added	DA	SA	CT	20/02/23
01	Issued for information	PS	DA	CT	17/02/23
Rev	Description	Cre'd	Chk'd	App'd	Date



Master Scheme No: 32281 Sub-Scheme No: B31000G6 Site: BODELWYDDAN 400kV SUBSTATION

Scheme Name: Awel-y-Mor 574MW Gen Con 4.2

Document Title: PLANNING ELEVATIONS - STAGE 1 WORKS
AWEL-Y-MOR BAY INSTALLATION
BODELWYDDAN 400kV SUBSTATION

Created by:	Date:	Checked by:	Date:	Approved by:	Date:
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Development Eng:	Document Type:	Scale:	Format:	Sheet(s):	Rev:
M. DAVIES	DWG	1:100	A1	1 OF 1	02

National Grid Drawing Number: PDD-32281-ELE-009

Originator Drawing Number: B31000G6-JAC-ZZ-XX-DR-E-0023


F.2 Ministry of Defence

[EXTERNAL] 20231116_MOD_Response_B2416603

[REDACTED]

Thu 16/11/2023 13:51

To: [REDACTED]

 1 attachments (109 KB)

20231116_MOD_Response_Letter.pdf;

Good Afternoon

Please see attached the MOD response to the recent consultation

Kind Regards,

[REDACTED]

Skype: [REDACTED]

Mob: [REDACTED]

Email: [REDACTED]

Website: www.gov.uk/dio/

Twitter: @mod_dio

Read DIO's blog <http://insidedio.blog.gov.uk/>



Defence
Infrastructure
Organisation

[REDACTED]
National Grid Electricity Transmission Ltd
Cottons Centre
Cottons Lane
London
SE1 2QG

Your reference: B2416603
Our reference: DIO 10060462

Dear [REDACTED]

MOD Safeguarding – SOSA (Site outside of statutory safeguarding areas)

Proposal: A proposal to replace a short section of existing overhead lines associated with the proposed Bodelwyddan substation extension in the county of Denbighshire County Council. The proposed substation and changes to the overhead lines will accommodate additional capacity on the existing lines between Connah's Quay to the east and Pentir to the north.

Location: Bodelwyddan substation extension in the county of Denbighshire County Council. LL17 0LJ

Grid Ref:	Easting:	Northing:
	301453	373610
	301569	373609
	301569	373530
	301479	373525
	301273	373267
	300991	373386
	301391	373264
	301583	373138

Thank you for consulting the Ministry of Defence (MOD) on the above proposed development. The consultation correspondence was received by this office on 24 July 2023.

The Defence Infrastructure Organisation (DIO) Safeguarding Team represents the Ministry of Defence (MOD) as a consultee in UK planning and energy consenting systems to ensure that development does not compromise or degrade the operation of defence sites such as aerodromes, explosives storage sites, air weapon ranges, and technical sites or training resources such as the Military Low Flying System.

[REDACTED]
Ministry of Defence
Safeguarding Department
St George's House
DIO Headquarters
DMS Whittington
Lichfield
Staffordshire
WS14 9PY

Tel: [REDACTED]
E-mail: [REDACTED]

www.mod.uk/DIO

16 November 2023

This is a scoping proposal to replace a existing overhead lines associated with the proposed Bodelwyddan substation extension. The maximum height of the new proposed towers is a maximum of 57m. The existing towers have a maximum height of 58m.

This application relates to a site outside of Ministry of Defence (MOD) statutory safeguarding areas. We can therefore confirm that the MOD has no safeguarding objections to this proposal.

However, in the interests of air safety, the MOD requests that the structure is fitted with aviation warning lighting. The lattice towers should be fitted with a minimum intensity 25 candela omni directional red flashing light or equivalent infra-red light fitted at the highest practicable point of the structure.

Whilst we have no statutory safeguarding objections to this application, the height of the development will necessitate that aeronautical charts and mapping records are amended. DIO Safeguarding therefore requests that, as a condition of any planning permission granted, the developer must notify UK DVOF & Powerlines at the Defence Geographic Centre with the following information prior to development commencing:

- a. Precise location of development.
- b. Date of commencement of construction.
- c. Date of completion of construction.
- d. The height above ground level of the tallest structure.
- e. The maximum extension height of any construction equipment.
- f. Details of aviation warning lighting fitted to the structure(s)


You may e-mail this information to UK DVOF & Powerlines at: dvofof@mod.gov.uk or post it to:

D-UKDVOF & Power Lines
Air Information Centre
Defence Geographic Centre
DGIA
Elmwood Avenue
Feltham

The MOD must emphasise that the advice provided within this letter is in response to the data and information detailed in the developer's document titled "Towers Plan and Elevation Final Layout", dated May 2022. Any variation of the parameters (which include the location, dimensions, form, and finishing materials) detailed may significantly alter how the development relates to MOD safeguarding requirements and cause adverse impacts to safeguarded defence assets or capabilities. In the event that any amendment, whether considered material or not by the determining authority, is submitted for approval, the MOD should be consulted and provided with adequate time to carry out assessments and provide a formal response.

I trust this is clear however should you have any questions please do not hesitate to contact me.

Yours sincerely



Assistant Safeguarding Manager
DIO safeguarding

F.3 Liverpool John Lennon Airport

[EXTERNAL] RE: Request from National grid

[REDACTED]

Fri 28/07/2023 08:00

To: [REDACTED]
Cc: [REDACTED]

1 attachments (15 MB)

71336-IFP-002-EGGP-OLS_IFP_Safeguarding_Map_Full_V1.0_.pdf;

Hi [REDACTED]

Please find attached a copy of our Safeguarding Map. If you have any further information such as coordinates and height I can check these for you.

Regards

[REDACTED]

Environment & Safeguarding Advisor

Liverpool John Lennon Airport

Tel: [REDACTED] Mobile: [REDACTED]



From: [REDACTED]
Sent: Tuesday, July 25, 2023 12:37 PM
To: [REDACTED]
Cc: [REDACTED]
Subject: Request from National grid

Good afternoon both

I just wanted to share with you a question we have been asked in Zendesk. Is this something that you guys deal with?

many thanks
[REDACTED]

o:

Liverpool John Lennon Airport

Show more

Dear Sir or Madam,

I am working on behalf of National Grid Electricity Transmission Ltd on a proposal to replace a short section of existing overhead lines associated with the proposed Bodelwyddan substation extension in the county of Denbighshire County Council. The proposed substation and changes to the overhead lines will accommodate additional capacity on the existing lines between Connah's Quay to the east and Pentir to the north.

Please find attached a letter outlining the proposal with enclosed drawings of the works.

I have been unable to access and review the Liverpool Airport Limited Safeguarding Map available online, and therefore cannot confirm whether the existing line and new overhead line connections fall within the safeguarded area. Based on The Town and Country Planning (Safeguarded Aerodromes, Technical Sites and Military Explosives Storage Areas) Direction 2002 hazard radii, I do not anticipate the existing line and new overhead line connections fall within the safeguarded area. However I would appreciate your comments on this proposal and look forward to your response.

Kind regards,

[REDACTED]

[REDACTED]
Cottons Centre, Cottons Lane, London, SE1 2QG, UK

[REDACTED]
Operations Standards & Performance Manager
Liverpool John Lennon Airport

Tel: [REDACTED] | Mobile: [REDACTED]

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OSPREY
CONSULTING SERVICES

**AERODROME IFP AND OLS
SAFEGUARDING MAP
LIVERPOOL AIRPORT**

Reference: 71336-IFP-002-EGGP
Version: V1, 01/04/2022








MAP Expiry : 26/02/2026

****MAP expires prior to this date if any IFPs or OLS surfaces are changed.****

See file 71336-IFP-003-EGGP V1 01/04/2022 for details of the IFPs and OLS safeguarded by this Map.

If a proposed development exceeds the permitted height, a more in depth IFP assessment shall be required by Approved Procedure Designers to ascertain which specific procedures and surfaces are affected.

Legend:

-  All developments should be notified.
-  All buildings, structures, erections and works exceeding 10 metres in height (32.8 feet) should be notified.
-  All buildings, structures, erections and works exceeding 15 metres in height (49.2 feet) should be notified.
-  All buildings, structures, erections and works exceeding 45 metres in height (147.6 feet) should be notified.
-  All buildings, structures, erections and works exceeding 90 metres in height (295.3 feet) should be notified.
-  All buildings, structures, erections and works exceeding 150 metres in height (492.2 feet) should be notified.
-  All applications with potential bird attractant developments such as waste disposal sites, reservoirs, sewage works, major landscaping schemes, areas of water and bird sanctuaries.

TOWN AND COUNTRY PLANNING (General Development Procedure) Order 1995

TOWN AND COUNTRY PLANNING (Safeguarded Aerodromes, Technical Sites and Military Explosives Storage Areas) Direction 2002

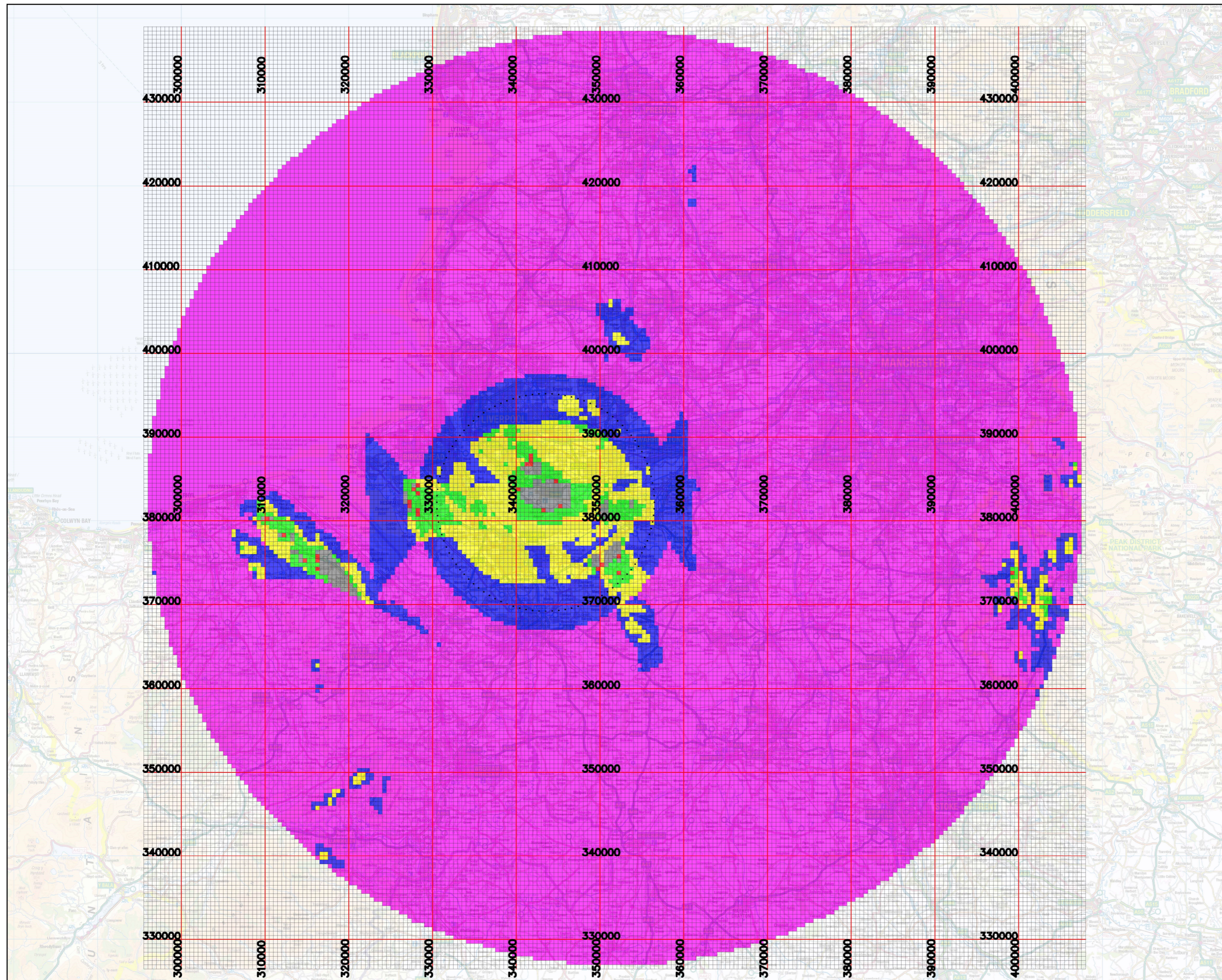
This map is issued in accordance with the above Direction and is the official safeguarding map for Liverpool Airport. Required consultation as indicated by this map shall be addressed to the aerodrome owner or operator as appropriate, who is the statutory consultee for the purposes of the above Direction.

Date:
Signature.....

For the Civil Aviation Authority
The address for all such correspondence is:
The Safeguarding Authority
Liverpool John Lennon Airport
Speke Hall Ave
Speke
Liverpool
L24 1YD
Email: planning@liverpoolairport.com

Datum: OSGB36 National Grid Resolution: 500m grid
Produced by: Osprey CSL
Created by: SJS Reviewed by: LC

CHANGE (04/22) - New chart



F.4 Hawarden Airport

[EXTERNAL] Re: Bodelwyddan Substation Extension - Overhead Line Works - Hawarden Airport Safeguarding Letter

[REDACTED]
on behalf of

[REDACTED] >
Mon 24/07/2023 10:18

To: [REDACTED] >

Good morning,

Thank you for your email.

I've forwarded your email on to the Air Traffic Services Manager, who will get back to you in due course.

Kind regards,

[REDACTED]

Hawarden Airport ATC Unit

T: [REDACTED]

[REDACTED]

www.hawardenaerodrome.co.uk



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Hook, Hampshire, RG27 9UY

On Mon, 24 Jul 2023 at 08:58, [REDACTED] > wrote:

Dear Sir or Madam,

I am working on behalf of National Grid Electricity Transmission Ltd on a proposal to replace a short section of existing overhead lines associated with the proposed Bodelwyddan substation extension in the county of Denbighshire County Council. The proposed substation and changes to the overhead lines will accommodate additional capacity on the existing lines between Connah's Quay to the east and Pentir to the north.

Please find attached a letter outlining the proposal with enclosed drawings of the works.

I have been unable to access and review the Hawarden Airport Safeguarding Map available online, and therefore cannot confirm whether the existing line and new overhead line connections fall within the safeguarded area. Based on The Town and Country Planning (Safeguarded Aerodromes, Technical Sites and Military Explosives Storage Areas) Direction 2002 hazard radii, I do not anticipate the existing line and new overhead line connections fall within the safeguarded area. However I would appreciate your comments on this proposal and look forward to your response.

Kind regards,

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Cottons Centre, Cottons Lane, London, SE1 2QG, UK

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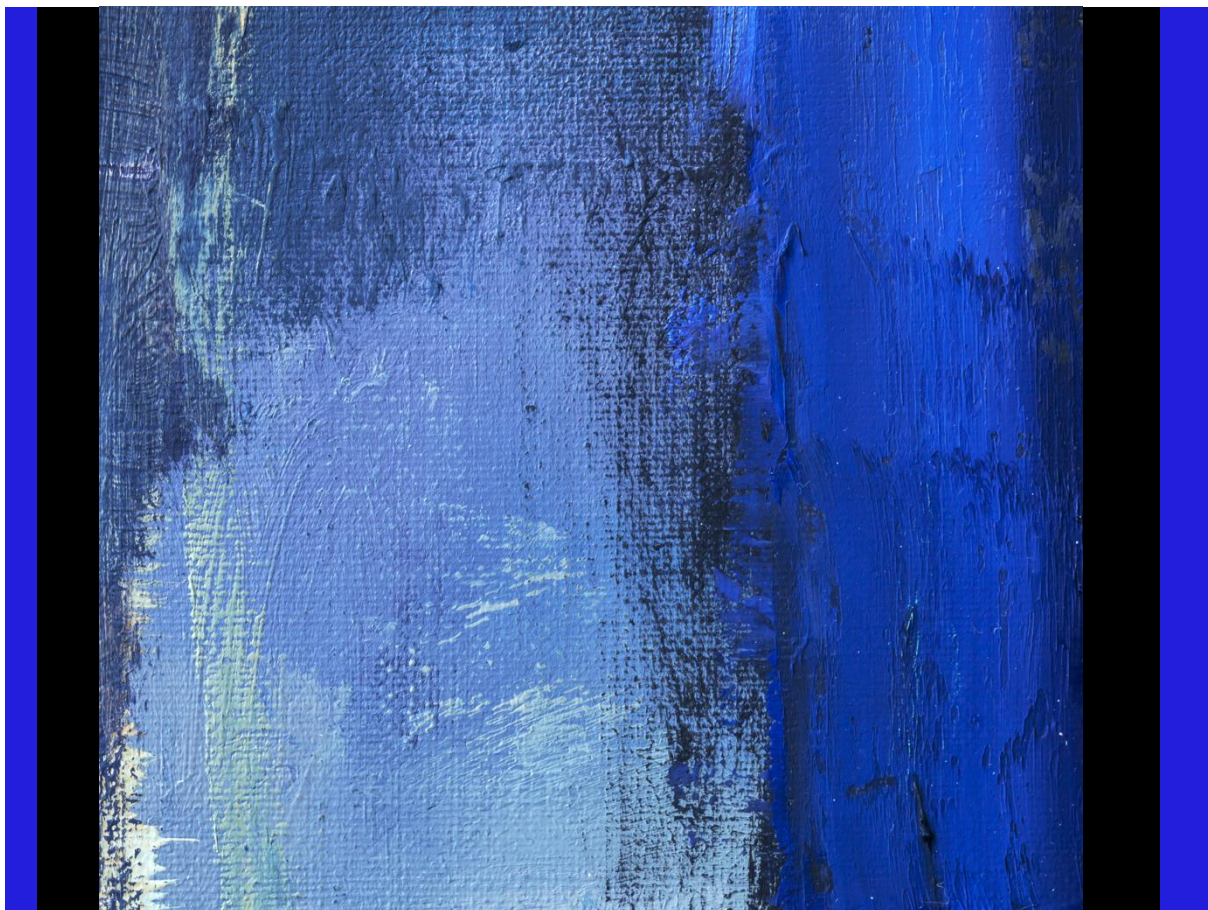
Appendix G. Planning, Design and Access Statement

Bodelwyddan Overhead Lines Connections Project Summary and Planning Appraisal

Document no: B2416603/BODEL/PDA/001
Revision no: 03

National Grid Electricity Transmission
B2416603

Bodelwyddan Overhead Line
28 February 2025



Bodelwyddan Overhead Lines Connections Project Summary and Planning Appraisal

Client name: National Grid Electricity Transmission
Project name: Bodelwyddan Overhead Line
Client reference: B2416603 **Project no:** B2416603
Document no: B2416603/BODEL/PDA/001 **Project manager:** KW
Revision no: 03 **Prepared by:** CS
Date: 28 February 2025 **File name:** B2416603.BODEL.PDA.001
Bodelwyddan Planning, Design and
Access Statement Overhead Line

Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
0	30.11.2023	First Draft	CS	AS		
1	19.12.2023	Second Draft	CS	AS		
2	30.08.2024	Third Draft	CS	AS	AB	KW
3	28.02.2025	Fourth Draft	CS	TW	AB	KW

Distribution of copies

Revision	Issue approved	Date issued	Issued to	Comments

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1. Introduction

1.1 Summary of the Overall Project

National Grid Electricity Transmission ('the Applicant') operates the existing Bodelwyddan 400 kilovolt substation accessed from Glascoed Road, St. Asaph, in Denbighshire, North Wales. National Grid needs to extend its existing substation to accommodate connection requests, which comprise three different elements:

- a. Construction of a new bay and installation of new equipment in the existing substation using permitted development rights;
- b. An extension to the existing substation to allow new connections and a taller fence around the existing substation. National Grid is making an application under the Town and Country Planning Act 1990 to Denbighshire County Council for an extension to the existing Bodelwyddan electricity substation; and
- c. Construction of two overhead lines (hereafter referred to as the 'overhead line works') which will connect to the extended substation and which require consent from the Secretary for Energy Security and Net Zero.

This Project Summary and Planning Appraisal relates to the proposed overhead line works application and forms part of the Section 37 Electricity Act submission.

The new overhead lines will replace the present double circuit 'turn-in' off the existing 4ZB Connah's Quay to Pentir overhead line. The new overhead lines comprising short double-circuit connections from the existing overhead line will create a Connah's Quay to Bodelwyddan overhead line and a Bodelwyddan to Pentir overhead line. The overhead line works and substation extension are required together for the new connections.

An Environmental Impact Assessment Screening Opinion has not been provided by Denbighshire County Council (although one was requested in August 2023) but in discussion the Council has indicated to the Applicant that the substation extension, taking account of the overhead line works required, does not comprise Environmental Impact Assessment development.

In terms of need, the Applicant has identified an extension to the existing Bodelwyddan 400 kilovolt substation as an appropriate response to connection requests relating to the proposed include Awel-y-Môr Offshore Wind Farm (a DCO has been granted to install cables through land around the substation and extension); Mona Offshore Wind Farm (DCO Examination due to conclude February 2025); IGP Solar Farm and battery energy storage system (Environmental Impact Assessment Scoping Opinion requested January 2025); and, the proposed MaresConnect interconnector (applications proposed to be submitted in 2025).

1.2 Site and Context Analysis

The proposed overhead line works fall within the administrative boundary of Denbighshire County Council and are approximately 2 kilometres (km) west of St. Asaph and 1.3km south of Junction 26 of the North Wales A55 Expressway. The proposed locations of the overhead line works and works boundary are shown in Figure 1 1, Appendix A, Appendix B, and Appendix C of the Overhead Line Works Environmental Report (B2416603_BODEL_OHL_001).

The proposed overhead line pylons would be sited on land adjacent to the parts of the existing overhead line and existing pylons that are to be removed and, to the south of the existing Bodelwyddan substation. The land is currently used for agriculture. It is classed as Grade 3b (moderate quality) and is primarily used for grazing and crops. The existing overhead line passes above a number of fields, also Grade 3b agricultural land although the land does not have any particular designation in the Denbighshire Local Development Plan.

The area of works is to the south, southeast and southwest of the existing substation with the existing 44 hectares (ha) St. Asaph Business Park further north. The Business Park is regarded as the premier business park in North Wales and is occupied by a number of businesses and organisations including North Wales Ambulance Services, RNLI, Qioptiq Ltd and Coleg Llandrillo. North-east of the existing National Grid substation is Gwynt y Môr substation and further east still, Burbo Bank Extension Offshore Windfarm.

2. The Overhead Lines Proposal

2.1 Design

Within the constraints of technical and locational requirements, the Applicant has taken cognisance of the site and its surroundings in designing the proposed works order to minimise visual and ecological intrusion into the existing landscape. The proposed overhead lines activities include the following works, the design of which has been dictated by technical requirements and security needs (see Appendix C drawings PDD-32281-SBS-001 to PDD-32281-SBS-006 of B2416603_BODEL_OHL_001 Overhead Line Works Environmental Report):

- Existing overhead single circuit connection from the adjacent overhead line, which would be removed;
- The existing cable sealing end compound and tower (pylon) would be removed and the underground cables single circuit connection from the adjacent overhead line would be decommissioned and removed;
- Two new overhead line connections between the existing adjacent 4ZB overhead line and the proposed extended substation;
- Existing overhead line pylons to be removed; and
- Temporary compounds and car parking would be accommodated on previously developed, operational land within the existing substation and undeveloped, non-operational land to the south and west of the substation extension.

The existing pylon adjacent to the sealing end compound would be removed along with the two low height pylons between it and the existing substation. Four new pylons would be constructed.

Areas have been allowed within the red line boundary for the purposes of installing new conductors between the gantries in the extended substation and Towers 4ZB163 and Towers 4ZB169. Any works within these areas will be of a temporary nature only during the construction period.

A temporary access point to the north-west of the existing substation is proposed giving access to the overhead lines in this area. The overhead line works would include a temporary traffic diversion to allow works to take place.

The overhead line works (and substation extension) would necessitate the removal of trees, some pruning of overhanging branches, and hedgerows. Temporary hedgerow loss will be reinstated following completion of the substation extension and overhead line works. Where there is permanent loss of trees and hedgerow, a commuted sum will be provided to fund works on Denbighshire County Council's Green Gates Farm Nature Reserve approximately 750m northwest of the overhead line works to compensate the loss and meet Net Benefit for Biodiversity.

The existing overhead line pylons are on land used for agriculture. Whilst there will be some temporary disruption to farming activity during construction, once operational, the pylons and overhead lines would require very little maintenance and not impact any such activity. Any land lost to the footprint of new pylons would be compensated for by land recovery relating to those existing pylons that would be removed. General maintenance for such assets consists of an attendant carrying out occasional routine inspections. In case of equipment faults during the year, a team would be dispatched to the site; these would be infrequent and as necessary.

Due to the nature of the development, design opportunities are limited. The proposed pylons are similar in design and scale to the existing pylons, and the materials and colour would match the existing pylons to reduce the visual impact of the development as far as possible with glass or porcelain insulators.

2.2 Environmental Sustainability

An Environmental Report (B2416603/BODEL/OHL/001 Overhead Line Works Environmental Report) has been prepared and submitted with the applications. It indicates that the site is predominantly comprised of moderately flat land with the habitats surrounding the proposed overhead line and pylon development and describes it as semi-improved grassland, modified grassland, species-poor hedgerow, species-rich hedgerow, arable fields, areas of scrub ruderal vegetation, and lowland mixed woodland.

The proposed works would be adjacent to existing electricity infrastructure and overhead lines within an area already subject to man-made influences (existing Bodelwyddan substation and associated overhead lines, Gwynt-y-Môr Offshore Wind Farm substation, Burbo Bank Extension Offshore Wind Farm substation, Scottish Power Distribution Network substation, flexible gas fired power station at TRB Drive, and St. Asaph Business Park are all in the immediate vicinity). The existing undulating landscape is populated by trees and woodland blocks which means the new infrastructure would be screened from most locations with only a few receptors likely to experience full near to middle distance views.

Construction activity would include some limited tree and vegetation clearance, localised ground levelling and earthworks, creation of foundations, construction of pylon towers and installation of cabling. There would be temporary compounds and working areas together with temporary access tracks for the duration of the construction period. The location of the proposed pylons and overhead lines have been carefully designed to limit tree and hedge removal where possible to minimise impact on biodiversity.

The Applicant typically implements landscape mitigation planting to assist screening from views and assimilation into the local landscape. However, it is not possible to plant trees close to pylons or where access may be required for future connections and underground pipelines. Such planting would need to be removed when high voltage underground cables were installed, and trees cannot be planted above these cables.

Further, the consented works for Awel-y-Môr Offshore Wind Farm includes permanent landscaping works and habitat creation which would assist with softening the appearance of the pylons and overhead line works proposed as part of this application from some viewpoints. Once established, the landscaping and habitats would screen some of the pylon and overhead line works, integrating the development in the surrounding landscape. Other proposals in the locale include other landscape proposals that will assist in some screening of views.

A robust environmental assessment has been undertaken and established that the pylons and overhead line works would not cause significant environmental effects. The results of the various assessments are presented in full in the Overhead Line Works Environmental Report submitted with the application.

The Environmental Report concludes that, with the adoption of embedded mitigation measures, specific mitigation measures and good practice construction techniques, the proposed overhead line works would not give rise to any conflicts with relevant planning policies, designations or national or local sustainability, health and wellbeing objectives, and would serve to contribute to Wales renewable energy and net zero targets. A commuted sum will be provided to fund works on Denbighshire County Council's Green Gates Farm Nature Reserve to compensate for the loss and meet Net Benefit for Biodiversity.

2.3 Community Safety

Public access to the extended substation site would be prohibited. Private land around the pylons would continue to be used for agricultural purposes once construction was completed.

Only suitably qualified individuals would be granted access for pylon and overhead line maintenance by the Applicant.

2.4 Access and Movement

2.4.1 Construction Phase

Vehicular access (shown in Appendix A of B2416603/BODEL/OHL/001 Overhead Line Works Environmental Report) to remove the existing pylons and overhead line and for the construction of the proposed pylons and overhead line would utilise the existing access from the B5381 Glascoed Road to the north of the Bodelwyddan substation site. The private road forms the minor arm of a priority T-junction with the B5381 Glascoed Road and a stop line is located on the private road for vehicles wishing to access the B5381 Glascoed Road. The route then directs and runs along the southern boundary of the substation before redirecting along the existing cable route from the substation to the cable sealing end compound, tower 4ZB168 and tower 4ZB166. Working areas approximately 5m either side and existing easements for overhead line towers will be provided for access.

The second route is via Glascoed Road to a tower located at OS Grid Reference SJ 00061 73765, where it connects to the existing easement 25m either side of the tower structures and lines.

The construction period for the pylons and overhead lines would be expected to last approximately six months.

The overhead line works will include a temporary traffic diversion to allow works to take place.

The estimated number of construction staff and vehicles required over the 6-month period to construct the overhead lines has been determined using engineering judgement and experience. During the peak of construction, it is expected that there would be a maximum of 19 staff present on-site daily, who it is assumed will all drive, although car sharing would be encouraged, and five Heavy Goods Vehicles per day accessing the site, spread out across a 9-hour construction working day. Accordingly, during the peak construction period, there would be a maximum of 48 two-way vehicle trips per day, 10 of which would be Heavy Goods Vehicles trips delivering materials to the site outside of the peak network hours.

Given the modest trip generation of 48 vehicles per day during the peak, coupled with the short construction period of six months, it has not been considered proportionate to undertake further assessment such as trip distribution or modelling.

Daylight working is required for overhead line works and there would not be artificial lighting of these works.

2.4.2 Operation

The overhead line works would be designed, constructed and operated in accordance with applicable health and safety legislation, complying with design safety standards. Only suitably qualified individuals would be granted access by the Applicant to carry out inspections and maintenance on their assets. The layout and configuration of the equipment and structures would be suitably designed to ensure the safety of all individuals required to visit the site. Public access to the site would be prohibited. However, land in the vicinity would continue to be used for agricultural purposes once construction was completed.

During operation, routine maintenance checks would be carried out as part of wider network inspections and in the event of equipment faults, a team would attend the site. It is anticipated that these would be infrequent events. The overhead line works operational impact is therefore very limited, with no significant adverse effect on the highway network.

As there would be no change in operational traffic, the existing access road is adequate and no additional access routes are therefore considered to be required.

3. Response to Planning Policy and Guidance

3.1 Introduction

This section considers the predicted effects of the proposed overhead line works against current national and local planning policy and relevant legislation. It uses the environmental information outlined in the Overhead Line Works Environmental Report.

3.2 Policy and Legislative Documents

Future Wales – the National Plan 2040 is the highest tier of development plan – a national development framework plan with a strategy for addressing key national priorities through the planning system, including sustaining and developing a vibrant economy, achieving decarbonisation and climate-resilience, developing strong ecosystems and improving the health and well-being of communities.

Future Wales – The National Plan 2040 is a 20-year national development plan that covers the whole of Wales for the period up to 2040. It embeds the principles of the Well-being of Future Generations (Wales) Act 2015 and provides a strategy for addressing key national priorities through the planning system, covering big issues including the economy, low carbon energy and the environment. It shows where nationally significant developments like energy, transport, water and waste projects should take place and where growth should happen, what infrastructure and services are needed and how Wales can help fight climate change. It tries to make the best use of resources, create accessible healthy communities and protect our environment.

Planning Policy Wales Edition 12 (PPW 12), February 2024, sets out the land use planning policies of the Welsh Government. It is supplemented by a series of TANs, Welsh Government Circulars, and policy clarification letters, which together with PPW 12, provide the national planning policy framework for Wales.

Denbighshire County Council Local Development Plan (LDP) 2006 – 2021, adopted in June 2013, forms part of a range of plans, policies and programmes which have an influence over development in Denbighshire. The local planning policies sit within the framework of national planning policies set out by the Welsh Government and are designed to take forward the LDP objectives, spatial strategy and vision for the County.

The LDP shows that the site boundary is outside a defined settlement, has no other land use designation and is therefore in the countryside for planning policy purposes.

The following legislation is referenced, where relevant.

- Well-being of Future Generations (Wales) Act 2015; and
- Environment (Wales) Act 2016.

3.3 Planning Appraisal

3.3.1 Policy and Legislation

Planning law and policies at a national and local level are generally supportive of the provision, operation and development of infrastructure and services and protecting, enhancing and sustainably developing Denbighshire's natural resources including renewable energy. The following policy and legislation accords with this approach, which is underscored by the national and global responsibility to protect the earth's resources by ensuring sustainable development.

The Well-being of Future Generations (Wales) Act 2015 sets out seven well-being goals for Wales, including making a positive contribution to global well-being and using the earth's resources efficiently and proportionately to contribute to climate change. Both the Well-being of Future Generations (Wales) Act 2015 and the Environment (Wales) Act 2016 require Local Authorities to maintain and enhance the biodiversity of the natural environment with healthy ecosystems which support social, economic as well as ecological resilience and which have the capacity to adapt to change.

Future Wales' spatial strategy places a strong emphasis on the need to make the best use of resources. The National and Regional Growth Areas and the ambitions for enhanced transport infrastructure will require clean

energy and an efficient means of providing heat and power to homes and workplaces. Policies 17 and 18 support the principle of developing renewable and low carbon energy to meet future energy needs. The infrastructure for the transmission and distribution of energy requires to be updated to facilitate this. There is an acceptance of this subject to a sensitive consideration of visual impact. Policy 17 states *"New strategic grid infrastructure for the transmission and distribution of energy should be designed to minimise visual impact on nearby communities. The Welsh Government will work with stakeholders, including National Grid and Distribution Network Operators, to transition to a multi-vector grid network and reduce the barriers to the implementation of new grid infrastructure."*

Policy 24 – North-West Wales and Energy states *inter alia* that the Welsh Government supports north-west Wales as a location for new energy development and investment where *"on-shore developments associated with off-shore renewable energy projects will be supported in principle"*.

PPW 12 recognises that the growth in demand for power will result in significant investment being needed in energy generation, transmission and distribution infrastructure (para. 5.7.2). The planning system should accordingly integrate new renewable and low carbon energy generation with the provision of additional electricity grid network infrastructure and an integrated approach should be adopted towards planning for energy developments and additional electricity grid network infrastructure. Paragraphs 5.7.8-5.7.9 state *"in certain circumstances, additional electricity grid network infrastructure will be needed to support the Pre-Assessed Areas in Future Wales, but also new energy generating developments more generally. The Welsh Government's preferred position on new power lines is that, where possible, they should be laid underground. However, it is recognised that a balanced view must be taken against costs which could render otherwise acceptable projects unviable. Where undergrounding of lines is not possible or applicable, proactive engagement with energy companies and the public to mitigate the visual impact of any potential new transmission lines should take place"*.

With regard to the location of the overhead line works, in the countryside to the south of St. Asaph Business Park, Paragraph 3.60 of PPW 12, states that all new development in the countryside should be of a scale and design that respects the character of the surrounding area. Paragraph 3.61 refers to supporting infrastructure. The policy states that adequate and efficient infrastructure, including, *inter alia*, electricity is crucial for economic, social and environmental sustainability, underpinning economic competitiveness and opportunities for people to achieve socially and environmentally desirable ways of living and working. However, infrastructure which is poorly designed or badly located can exacerbate problems rather than solving them.

Chapter 6. of PPW 12 is relevant to the proposals in relation to off-site compensatory land to address biodiversity loss. It places a strong emphasis on taking a proactive approach towards accommodating compensatory land and even consideration of cross border solutions in order to achieve the greatest benefit for biodiversity and resilient ecological networks.

A new requirement of PPW 12 is the requirement to submit proportionate 'green infrastructure statements' with planning applications. As the overhead line works will be consented under Section 37 of the Electricity Act 1989 there is no requirement to submit a Green Infrastructure Statement. One has however been submitted in support of the related planning application for extension of the Bodelwyddan substation.

There are no directly related planning policies in respect of the proposals within the Denbighshire County Council LDP 2006 – 2021. However, its energy objective is to ensure that *"Denbighshire makes a significant contribution to reducing greenhouse gases through both supporting the principle of large wind farm development within identified zones and other suitable renewable energy technologies and, ensuring that all new developments are built to minimise their carbon footprint"*. By default, such developments need adequate grid connections to facilitate the distribution of energy.

Denbighshire County Council's LDP Policy VOE 6 - Water Management, requires all new development to incorporate water conservation measures, where practicable to eliminate or reduce surface water run-off from site boundaries. The run-off rates from development sites should maintain or reduce pre-development rates.

3.3.2 Planning Appraisal

In principle, the proposed overhead line works accords with national and local planning policy objectives and legislative requirements in that:

- The proposed overhead line works are required for the connection of a number of renewable energy infrastructure schemes in the vicinity, and offshore, to facilitate the distribution of low carbon electricity across Wales and beyond. The works will help facilitate the necessary shift away from fossil fuels and

commitment to achieving 50GW or more of offshore wind connected to the network by 2030 and will contribute to maintaining essential infrastructure for electricity supply to meet the needs of present and future generations in accordance with national planning policy and law, which recognises the importance of the efficient use of resources and is supportive of north-west Wales as a location for new energy development and investment, including on-shore development associated with off-shore renewable projects.

- Decision makers are directed to give significant weight to the need to meet Wales' international commitment towards renewable energy projects, taking a strategic and long-term approach to inter alia decarbonisation and social, economic and environmental sustainability. The proposal will provide necessary updated grid infrastructure to support renewable energy generation and distribution to meet future need to support the defence against climate change as set out in the Well-being of Future Generations (Wales) Act 2015, the Environment (Wales) Act 2016, Future Wales – The National Plan, PPW 12 and the Denbighshire County Council LDP.
- Future Wales and PPW 12 accept that the infrastructure for the transmission and distribution of energy requires to be updated to facilitate the future provision of energy, subject to considerations of visual impact, and that the Welsh Government will work with the Applicant to reduce barriers to the implementation of new grid infrastructure.
- A robust environmental appraisal has been undertaken to establish that the proposed overhead line works would not cause significant environmental effects within the terms of Schedule 9 of the Electricity Act 1989 and current planning policy. Although part of the works falls within an area of mineral protection, the proposed new pylons and lines are adjacent to those that already exist within this land use designation. Notwithstanding, at some point in the future, if requirements change and the electricity equipment is no longer required, it will not have impacted upon the viability of the mineral resource.
- With regard to visual impact, Section 5 of the Overhead Line Works Environmental Report sets out the landscape and visual appraisal which has been carried out, which concludes that the proposed overhead lines development and Bodelwyddan substation extension, would be adjacent to existing electricity infrastructure and other man-made influence is already evident in this area, most notably at St. Asaph Business Park. While the proposals would slightly change the balance of energy infrastructure features within the landscape, this increase is unlikely to result in a notable adverse change to landscape character.
- In cumulative terms, in combination with the substation development and the Awel-y-Môr development, there would be localised effects on the local area during construction. This would be partially reduced once plant and machinery have been removed from site during operation, although the landscape would remain disrupted during the construction of the Awel-y-Môr substation. There would be a slight adverse cumulative landscape effect at operation which would be mitigated by existing trees and woodland blocks making views of the developments limited. Notwithstanding, there are some receptors who may experience moderate to major adverse visual effects at operational stage, (largely due to the impacts arising from the Mona Offshore Wind Farm development). As no mitigation planting can be implemented due to operational constraints, it is likely that these effects would be reduced post-construction but would not be eliminated.
- In accordance with Denbighshire County Council's SPG, an ecological and biodiversity appraisal has been carried out (Section 5 of the Overhead Line Works Environmental Report). In terms of habitats present on site, there would only be minor/temporary losses to poor condition modified grassland habitat. There will also be a temporary loss of 198m of hedgerow which will be replaced.
- With regard to the provision of compensatory land in relation to biodiversity, aside from the above replacement habitat there is limited scope for new onsite habitat due to restrictions in planting over buried services i.e. the water pipeline to the north and a gas pipeline to the west, and the locations of future underground electricity cables which would ultimately tie into the proposed substation extension. However, in line with the proactive approach supported by PPW 12 where there is permanent loss of trees and hedgerow, the Applicant in agreement with Denbighshire County Council, will provide a commuted sum to fund works on Denbighshire County Council's Green Gates Farm Nature Reserve, approximately 750m northwest of the substation and overhead line works, to compensate the loss and meet Net Benefit for Biodiversity. Agreement would be reached with Denbighshire County Council with regard to an appropriate mechanism to secure the off-site mitigation.

- During the operational phase, outside of non-routine maintenance requests and security events, the site would not be lit at night and it is not anticipated that there would be additional noise, emissions or discharges during operation. Operation of the substation extension and the upgraded fencing to the existing substation would not result in an adverse effect on statutory or non-statutory designated sites, habitats, or species.
- A Transport Assessment has been carried out and found that the operational impact of the overhead line works would be negligible. A substation attendant would carry out daily routine inspections of the overhead lines and in case of equipment faults, a team would be dispatched to the site. However, these faults are infrequent and unplanned. Therefore, there would be no material operational impact on the highway network.
- The construction phase is limited to a 6-month period and thus, the transport impacts of the construction phase would also be negligible. Additionally, the operational phase and the cumulative traffic impact with other developments would also have an immaterial impact on the network.
- Other aspects of the environment that were considered to have no significant adverse effects include: the historic environment; air quality; noise and vibration; flood risk; and, geology, soils, land contamination and waste. The consideration of these environmental aspects is outlined in section 5 of the Overhead Line Works Environmental Report.

3.4 Conclusion

The overhead lines, including the proposed pylons, are part of a project to assist sustainable energy generation, utilising and enhancing existing electricity infrastructure, whilst being of a scale and design proportionate to the technical requirements of such facilities.

The overhead lines are adjacent to the existing overhead lines and substation within an area already subject to man-made influences. The environmental appraisal demonstrates that, with the adoption of embedded mitigation measures, off-site contributions to fund works at the Green Gates Farm Nature Reserve and good practice construction techniques, the proposed overhead line works would not give rise to any conflicts with relevant planning policies, designations or national or local sustainability, health and wellbeing objectives and would contribute to Wales renewable energy and net zero targets.

On balance, it is considered that the proposed works are acceptable both in terms of the criteria to be met in Schedule 9 of the Electricity Act 1989 and in accordance with national and local planning policy.

Appendix H. Biodiversity Baseline

Bodelwyddan Substation Extension and Overhead Line route: Biodiversity Baseline

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National Grid
B2416603

Bodelwyddan Substation Extension
27 February 2025

Bodelwyddan Substation Extension and Overhead Line route: Biodiversity Baseline

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1. Introduction

1.1 Background

Jacobs UK Ltd has been commissioned by National Grid to undertake a programme of ecological desk study and field survey to support the proposed extension of the 400kV Bodelwyddan Substation and a new overhead line circuit. The existing substation is located south of Glascoed Rd, Saint Asaph (centred on OS Grid Ref. SJ 01738 73567) with the proposed development extending to the land to the south and the west of the substation.

The permanent and temporary working areas for the proposed substation and overhead line developments are referred to as 'the site' within this report. Where specific information applies to only one aspect of the works, this is clarified in the text. All figures show the boundaries of the two separate aspects.

The spatial scope of the 'study area' takes account of all areas where significant effects to ecological features could occur throughout the lifetime of the proposed development including the construction footprint and potential locations of any ancillary works, compounds and varying Zones of Influence for the ecological receptors present. The field based 'survey area' is specific to each biodiversity feature and discussed further in Section 2.

The site boundary as shown on the figures includes the existing access road to the substation from Glascoed Road. This was not included in the scope of ecological survey as the access road is in existence and no works are proposed.

1.2 Site description

The substation is set within a predominantly rural landscape, comprising agricultural fields, hedgerows, woodland and ditches. A business park is located approximately 25m north of the substation, and a wind farm borders the substation 150m to the east.

1.3 Description of proposal

National Grid proposes to extend the existing Bodelwyddan substation, which lies approximately 2km west of St. Asaph in Denbighshire, and 1.3km south of Junction 26 of the North Wales A55 Expressway. The existing substation occupies an enclosed site approximately 2.5ha in area, with a private access 375m in length from a junction off Glascoed Road. In addition to extending the existing substation site, National Grid proposes to replace the turn-in of the existing Connah's Quay to Pentir overhead line with two double circuit overhead lines.

The proposed works would create a new overhead line from Connah's Quay to Bodelwyddan and Bodelwyddan to Pentir. Each double circuit line would be approximately 400m in length, approaching the substation from the existing overhead line to the south-west. The proposals would also involve the removal of an existing cable sealing end compound, which connects the existing northern circuit to the substation by underground cables.

The substation extension would include provision of the following: telecoms room; control room; Busbar protection relay room; feeder protection relay room; battery room; LVAC room; overhead line connection infrastructure; couplers; and infrastructure to support contracted user assets.

2. Methodology

2.1 Desk Study

An ecological desk study was completed in December 2022 to obtain ecological information relevant to inform and collate current baseline data held by statutory and non-statutory consultees in line with standard guidelines and current best practice (CIEEM, 2017).

Ecological records were requested from Cofnod (North Wales Environmental Information Service) in December 2022. Additionally, the Multi Agency Geographic Information for the Countryside (MAGIC) and DataMapWales websites were searched for any supplementary information. The desk study records include only those from the last 10 years to reflect the current ecological context of the site.

A search was conducted for Special Areas of Conservation (SAC) within 30km of the site for which bats are a qualifying feature.

The following baseline data were gathered for a 2km radius around the site:

- Statutory sites designated for nature conservation comprising all SACs, Special Protection Areas (SPAs), Ramsar sites, Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR) and Local Nature Reserves (LNR);
- Non-statutory sites designated for nature conservation, e.g., Local Wildlife Sites (LWS);
- Ancient Woodland Inventory sites and Priority Habitats (listed in accordance with Section 7 of the Environment (Wales) Act 2016);
- Records of legally protected species and notable species, including Priority species (listed in accordance with Section 7 of the Environment (Wales) Act 2016); and
- Invasive non-native species (INNS).

2.2 UK Habitat Classification Survey

A UK Habitat Classification (UK Hab) survey was first carried out on the 8th July 2022 within the site defined at that time plus an approximate 100m area or full extent of field where boundaries were located beyond this. An updated survey was carried out on the 12th and 13th July 2024. Both surveys were in accordance with the methodology outlined in the UK Habitat Classification User manual (Butcher *et al.*, 2021). This involved mapping and describing the broad habitats and compiling a general plant species list (all plant species nomenclature follows New Flora of the British Isles (Stace, 2019)), to reflect the floristic assemblage of each habitat type. The condition of all habitats (Good, Moderate, Poor and N/A with reference to Natural England, 2021) were also recorded.

Target notes were made for any features which were too small to map or were of particular ecological interest. Photographs were also taken.

2.3 Great crested newt

A review of Ordnance Survey mapping from MAGIC and ESRI aerial photography was undertaken to identify ponds within a 250msurvey area based on the extents of the site. Subsequent Habitat Suitability Index (HSI) assessment and environmental DNA (eDNA) surveys for great crested were then undertaken.

2.3.1 Habitat Suitability Index Assessment

An HSI assessment of ponds was carried out on 30th June 2022. The HSI is a measure of habitat suitability for GCN and is a standardised assessment of the potential of a pond to support the species. A HSI assessment cannot be used as a substitute for presence / absence surveys. However, it can be useful for evaluating the general suitability of waterbodies for GCN.

The assessment and attribution of the HSI followed standard methodology of Oldham *et. al.* (2000). Ten suitability indices (SI) are evaluated for each waterbody. These are:

- SI₁ Geographic location: Sites are scored according to the geographical zone in which they occur. All ponds are located within the optimal range for great crested newt.
- SI₂ Pond area: The surface area of the pond when water is at its highest level (excluding flooding). Measuring by pacing the perimeter in the field or, where this was not possible, by desk study.
- SI₃ Permanence: An estimate on how often a pond dries up. Usually based on the size and depth of the pond.
- SI₄ Water quality: Determined through the apparent invertebrate diversity in the pond, the presence of submerged plants, and knowledge of water sources or possible pollutants/run-off.
- SI₅ Shade: The percentage of perimeter that is shaded to at least 1m from the shore, excluding emergent vegetation.
- SI₆ Waterfowl: The perceived presence and/or impact of waterfowl populations in the pond.
- SI₇ Fish: The perceived presence of fish populations in the pond, including knowledge of presence by the landowner or connectivity to watercourses.
- SI₈ Pond count: The number of ponds within 1km of the survey pond not disconnected by major barriers to movement, such as rivers or main roads.
- SI₉ Terrestrial habitat: The potential value of habitats up to 250m from the pond for GCN foraging, movement, and refuge.
- SI₁₀ Macrophytes: The percentage of plant cover of the pond surface including emergent and submerged plants.

From the ten suitability indices, a geometric mean was calculated using the following equation:

$$HSI = (SI_1 \times SI_2 \times SI_3 \times SI_4 \times SI_5 \times SI_6 \times SI_7 \times SI_8 \times SI_9 \times SI_{10})^{1/10}$$

This gave a HSI score between 0 and 1, where waterbodies with a higher HSI score are considered more suitable for GCN than those with a low score. The scores are given suitability categories as detailed in Table 2.1.

Table 2.1: HSI Score and suitability categories (from Oldham *et. al.* (2000))

HSI Score	Suitability Category
<0.5	Poor
0.5-0.59	Below average
0.6-0.69	Average
0.7-0.79	Good
>0.8	Excellent

2.3.2 Environmental DNA

Environmental DNA (eDNA) is nuclear or mitochondrial DNA that is released from an organism into the environment. Sources of eDNA include secreted faeces, mucous, shed skin and hair, and carcasses. In aquatic environments eDNA is diluted and distributed in the water where it can persist for 7–21 days. Environmental

DNA from a range of aquatic organisms can be detected in water samples at very low concentrations using quantitative Polymerase Chain Reaction (qPCR) methods. eDNA tests for GCN, as evidence of presence or likely absence of GCN within a pond, was undertaken as per the standardised methodology set out in a technical advice note by the Freshwater Habitats Trust (Biggs *et al.*, 2014).

An eDNA survey involves the collection of 20 water samples taken around the perimeter of a pond, which must be collected between April 15th and June 30th. The 20 samples are combined into a single container, mixed well, and six sub-samples are then removed and placed into tubes with a DNA preservative (Biggs *et al.*, 2014). The preserved samples are then couriered to a laboratory for analysis.

The eDNA surveys of ponds identified were conducted on the 30th June 2022 by a GCN licenced surveyor and an assistant (details can be provided on request). Samples were sent to NatureMetrics for analysis.

2.4 Bats

The Preliminary Ecological Appraisal (Jacobs, 2021) did not identify any buildings or structures that provided potential for roosting bats and therefore this survey effort focused on trees. Trees within the site and its immediate surroundings were inspected for their potential to support bat roosts.

2.4.1 Ground based assessment of trees for roosting bats

Trees within the survey area were assessed by two surveyors for their suitability to support roosting bats on 30th August 2022. These surveys were undertaken in accordance with good practice guidelines (Collins, 2016 and Andrews, 2013). A suitably experienced team of ecologists assessed each tree from the ground with the use of torches and close-focusing binoculars. All evidence of the presence of bats or features that had or may have potential as roost sites were recorded and the location mapped.

A category was assigned to each tree based on its single highest Potential Roost Feature (PRF). The locations of all trees with PRFs rated as 'high', 'moderate' or 'low' potential (based on Collins (2016) were recorded. Trees considered to have negligible suitability to support roosting bats were also recorded but not comprehensively. The description of each roosting potential category are summarised in Table 2.2. Typically, PRFs are categorised as decay or damage features in trees. These are summarised in Table 2.3.

The following information for each tree was then recorded to determine the most appropriate options for further survey and to facilitate locating the tree and the PRFs for further survey:

- Location;
- Species;
- Age; and
- Diameter at breast height (DBH).

Table 2.2: Bat roost potential categories (adapted from Collins, 2016)

Bat Roosting Potential Category	Description
Confirmed roost	Evidence of a confirmed roost within a tree or structure would include observations (visual and aural) of bats within or emerging from a roost as well as the presence of fresh or old bat droppings within or below the roost entrances. Other evidence of a confirmed roost (particularly in trees) includes smoothing and /or staining around a roost entrance point.
High	A tree or structure with one or more potential roost sites that are suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.
Moderate	A tree or structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).
Low	A tree of sufficient size and age to contain potential roost features, but with none seen from the ground or features seen with only very limited roosting potential. A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and / or suitable surrounding habitat to be used on a regular basis or by large numbers of bats.
Negligible	Negligible features likely to be used by roosting bats.

Table 2.3: Potential Roost Features typically recorded in trees (adapted from Collins, 2016)

Potential Roost Feature Type	
<u>Decay and Disease</u>	<u>Damage</u>
Woodpecker-holes	Lightning-strikes
Squirrel-holes	Hazard-beams
Knotholes	Subsidence-cracks
Tear-outs	Pruning cuts
Wounds	Shearing-cracks
Cankers	Transverse-snaps
Compression-forks	Lifting bark
Butt-rots	Welds
	Frost-cracks
	Ram's horns

2.4.2 Dusk emergence and re-entry

All trees categorised as having 'moderate' to 'high' potential for roosting bats following the ground-based roost assessment had subsequent dusk emergence/ dawn re-entry surveys or tree climb surveys (where possible), if it was considered likely that they may be impacted by proposed works. The approach to survey effort followed Collins (2016) which is summarised in Table 2.4.

Table 2.4: Bat survey effort

Bat Roosting Potential Category	Survey Effort
High	Three dusk emergence or dawn re-entry surveys
Moderate	Two dusk emergence or dawn re-entry surveys
Low	No further survey required
Negligible	No further survey required

Eighteen trees (T4, T6, T7, T7a, T9, T11, T12, T13, T15, T16, T17, T18, T19, T20, T21, T22, T25 and T26) all illustrated in Figure 5, received a level of survey. Surveys were completed between 30th August 2022 and 22nd of June 2023 by appropriately experienced ecologists, following best practice guidelines. A number of trees (T4, T7, T9, T12, T15, T16, T17, T18, T19, T20, T21, T22, T25) were unsafe to climb due to several factors such as trees being dead, tree being under overhead wires or overhanging a road. Trees that were not climbed were instead subject to dusk and or dawn surveys.

Surveys were carried out over two seasons due to project programme. Dusk emergence surveys commenced 15 minutes before sunset and finished 120 minutes after sunset; dawn re-entry surveys commenced 120 minutes before sunrise and finished 15 minutes after sunrise (Collins, 2016). Sufficient surveyor coverage of each tree was ensured throughout, with either one or two surveyors per tree dependent upon the number of PRFs. Potential roosting features were visually observed throughout the survey and each surveyor used a bat detector to assist in the identification of bats. Each surveyor was equipped with either an Echo Meter (EM) Touch Pro 2 connected to an iPad to record bat calls for identification in the field and assist with any subsequent sonogram data analysis required. Additionally, each surveyor was equipped with an infrared (IR) video camera that was used to capture emergence/re-entries of bats from specific features that may otherwise be missed by the human eye.

Surveyors recorded environmental variables including temperature, wind speed and precipitation on each survey. The local weather was checked prior to the start of each survey, and conditions assessed to ensure they were suitable for recording bats (sunset/sunrise temperature 10 degrees Celsius or above, no strong wind, no heavy precipitation), as per Collins (2016).

2.4.3 Tree climbing inspection

Four trees (T6, T7a, T11 and T13) were subject to tree climb surveys in addition to dusk/dawn surveys by two qualified tree climbing ecologists (with Natural England Class two bat survey licences), following best practice guidelines. The surveys were undertaken from 25th of April to 31st of May 2023 during the daytime (when bats would be present within features). The surveys included using ropes and climbing equipment to climb the trees to reach features, using an endoscope camera to search for bats within features.

2.4.4 Sound analysis

Sound analysis was mainly completed in real time whilst surveying, with the aid of Kaleidoscope built in classifiers feature on EM Touch Pro 2 detectors. Pipistrelle calls with a peak frequency of above 50kHz were labelled as soprano pipistrelle. Pipistrelle calls between 50 and 41kHz were labelled as common pipistrelle.

Identification of *Myotis* spp. bats were made to species level where possible. However, due to a degree of overlap in the call characteristics of the associated species, some calls were identified to genus level only.

2.5 Other species

A desk study and habitat suitability approach was used for assessing the likely presence / absence of other ecological features on site.

2.6 Survey Limitations

Data supplied by records centres provide useful baseline information on the species that have been recorded within a local area and details of sites with nature conservation designations. This data often includes surveys undertaken by third parties on an 'ad hoc' basis so may be incomplete. Absence of species records may not therefore indicate absence of that species from an area.

The woodland areas to the north and south of the substation were fenced and direct access was not possible for some portions of these habitats. However, the scope of the survey was to classify the habitats present and their condition, which was possible, so it is not seen as a significant limitation.

Heavy precipitation that occurred on the 22nd September 2022 from around 19:45 onwards meant the bat dusk emergence surveys on T7 and T7a had to be terminated prematurely, as conditions had become unfavourable for bat activity. No emergences had been observed prior to the onset of the rain. This limitation is not thought to significantly impact upon results as further surveys were completed successfully including a climbing survey where full inspection of the PRF of T7a was possible.

Access to T25 and T26 were restricted and have only had a single bat survey undertaken. However, the trees are outside of the anticipated construction boundary and will not be impacted.

3. Results

3.1 Statutory Designated Sites

One SAC where bats are a qualifying feature is located approximately 25km southeast of the site: Mwyngloddiau Fforest Gwydir/ Gwydir Forest Mines SAC. The SAC comprises a collection of multiple smaller sites of which the lesser horseshoe bat (*Rhinolophus hipposideros*) is listed as an Annex II species present as a qualifying feature, but not a primary reason for site selection.

Two statutory designated sites were identified within 2km of the site, as detailed in Table 3.1. These two concurrent designated sites are located approximately southeast 1.3km of the site (see Figure 1).

No NNR or LNR were identified within 2km of the site.

Table 3.1: Statutory Designated Sites within 2km

Site Name	Approximate Distance and direction from the site	Designation
Coedwigoedd Dyffryn Elwy/ Elwy Valley Woods SAC	1.3km southeast	Annex I habitats that are a primary reason for selection of this site: <ul style="list-style-type: none"> 9180 Tilio-Acerion forests of slopes, screes and ravines * Priority feature.
Coedydd ac Ogofâu Elwy a Meirchion SSSI	1.3km southeast	SSSI features: <ul style="list-style-type: none"> Semi-natural broadleaved woodland; Calcareous grassland; Assemblage of rare vascular plants; Spiked speedwell (<i>Veronica spicata</i>); Lesser horseshoe bat; Mixed bat assemblage; and Cave interest (Countryside Council for Wales, 2012).

3.2 Non-Statutory Designated Sites

The desk study search identified 13 non-statutory designated sites, all Local Wildlife Sites (LWS) or candidate LWS, within 2km of the site as shown in Table 3.2. The closest LWS to the site is Coed Cord and Coed y Saeson LWS comprised of three areas of ancient woodland where the boundary of the Coed Cord area of woodland is approximately 100m southeast of the site at its closest point.

Although not strictly designated sites, 18 areas of ancient woodland (as per the Ancient Woodland Inventory) were identified within 2km of the site (see Figure 2). This includes the Coed Cord and Coed y Saeson LWS. The ancient woodland habitats are categorised as a mix of ancient semi-natural woodland, restored ancient woodland and plantation on ancient woodland site.

An un-named woodland of restored ancient woodland is present within 20m of the proposed development footprint (see Figure 2, also named as Hendy Gorse in Figures 4 and 5).

Table 3.2: Non-Statutory Designated Sites within 2km

Site Name	Approximate Distance from Site	Citation (Cofnod, 2022)
Coed Cord, block to NW and Coed y Saeson (three areas)	150m	Flat, low lying, ancient woodland including alder (<i>Alnus glutinosa</i>), ash (<i>Fraxinus excelsior</i>), oak (<i>Quercus</i> spp.) and birch (<i>Betula</i> spp.) communities. Hazel (<i>Corylus avellana</i>) forms an extensive herb layer with hawthorn (<i>Crataegus monogyna</i>) and ash and elm (<i>Ulmus</i> spp.) saplings. The herb-layer is varied with dog's mercury (<i>Mercurialis perennis</i>), sanicle (<i>Sanicula europaea</i>), giant fescue (<i>Festuca gigantea</i>), false brome (<i>Brachypodium sylvaticum</i>) and early dog-violet (<i>Viola reichenbachiana</i>).
Bryn Meiriadog	0.7km	Ancient woodland with calcareous grassland and rocky outcrops. Part of the Cefn Estate.
Glascoed (2 areas)	1.14km	Lowland, ancient broadleaved woodland.
Ty'n-y-Coed Rough (2 areas)	1.27km	Flat, lowland broadleaved woodland.
Coed yr Accar (2 areas)	1.35km	Ancient broadleaved woodland.
Plas Newydd/Coed Carreg Dafydd	1.38km	A flat, ancient woodland site with ash and beech woodland communities.
Coed y Ddol/Coed y Fadir	1.39km	A south facing lowland ancient woodland on the valley side of the River Elwy. Wet, alder woodland occurs on lower slopes, ash woodland where it is drier, and silver birch (<i>Betula pendula</i>) woodland where soils are more acid.
Coed Fron and Eryl Hall Wood	1.6km	Ancient woodland with alder, ash, oak and birch communities.
Coed Wig [Candidate]	1.8km	Broadleaved woodland (conifer blocks omitted).
Pwllau Graig [Candidate]	1.84km	Standing water – appear to have been infilled.
Coed Kendrick	1.87km	Ancient broadleaved woodland on a gentle, south facing slope.
Coed Nant-y-graig [Candidate]	1.93km	Broadleaved woodland.
Coed Bont Newydd [Candidate]	1.97km	Broadleaved woodland.

3.4 UK Habitat Classification Survey

Habitats present within the site comprised (see Figure 3):

- modified grassland of poor condition;
- cereal crops;
- species poor, managed hedgerows with trees (a priority habitat) and scattered trees, of moderate condition. These habitats are considered to be of local importance for biodiversity;
- dense scrub (of less than local importance); and
- the existing substation which comprised areas of hardstanding with electrical infrastructure and buildings as well as small areas of modified grassland. These habitats have little to no ecological value and are considered to be of negligible importance.

Figure 3 shows the full UK Habitat Classification survey results over the wider survey area. The habitats recorded are described in Table 3.3. Photographs are provided in Annex A and locations in Figure 3.

Table 3.3: UK Habitat Classification Survey Results

UKHab Primary Habitat	Habitat Condition	Description
g3c - Other neutral grassland: Tall ruderal (1) (Annex A; Table A.2, Photograph 1)	Moderate	Area of grassland left to grow unmanaged. Located near northern boundary of substation adjacent to urban area and woodland. Grass species included Yorkshire fog (<i>Holcus lanatus</i>), red fescue (<i>Festuca rubra</i>), common bent (<i>Agrostis capillaris</i>). Frequent herb species included Tufted vetch (<i>Vicia cracca</i>), field horsetail (<i>Equisetum arvense</i>), broad-leaved willowherb (<i>Epilobium montanum</i>), great willowherb (<i>Epilobium hirsutum</i>), broadleaf dock (<i>Rumex obtusifolius</i>), creeping thistle (<i>Cirsium arvense</i>), meadow buttercup (<i>Ranunculus acris</i>) and perforate St. John's wort (<i>Hypericum perforatum</i>). Occasional species included rush species (<i>Juncaceae</i> spp.), sedge species (<i>Cyperaceae</i> spp.), hop trefoil (<i>Trifolium campestre</i>), scarlet pimpernel (<i>Anagallis arvensis</i>), meadowsweet (<i>Filipendula ulmaria</i>), cut leaf geranium (<i>Geranium dissectum</i>), weld (<i>Reseda luteola</i>) and prickly sow thistle (<i>Sonchus asper</i>).
g3c - Other neutral grassland: Tall ruderal (2) (Annex A; Table A.2, Photograph 2)	Moderate	Area of grassland featuring tall ruderal, north of the substation along the access track. Grass species included cock's-foot (<i>Dactylis glomerata</i>), false oatgrass (<i>Arrhenatherum elatius</i>), brome species (<i>Cytisus</i> spp.) and fescue species (<i>Festuca</i> spp.). Frequent herb species included common hogweed (<i>Heracleum sphondylium</i>), meadowsweet, great willowherb, creeping thistle, meadow vetchling (<i>Lathyrus pratensis</i>), cleavers (<i>Galium aparine</i>) and meadow buttercup. Occasional herb species included red clover (<i>Galium aparine</i>), and scarlet pimpernel.
g3c - Other neutral grassland (Annex A; Table A.2, Photograph 3)	Poor	The access track to the northwest of the existing substation featured an area of species poor grass along its centre. Species included cock's-foot, Yorkshire fog, and perennial rye grass (<i>Lolium perenne</i>). White clover (<i>Trifolium repens</i>) was also frequent.

Bodelwyddan Substation Extension and Overhead Line route: Biodiversity Baseline

UKHab Primary Habitat	Habitat Condition	Description
g4 - Modified grassland (Annex A; Table A.2, Photographs 4, 5)	Poor	Two areas of grassland separated by species poor hedgerow and fencing were identified north of the substation. Grazing and management looked to take place, with perennial rye grass and couch grass (<i>Elymus repens</i>) being the only grass species of note. No tall herbs were present.
g4 - Modified grassland (Annex A; Table A.2, Photograph 6)	Poor	Areas of well-maintained species poor modified grassland were located adjacent to buildings and sealed surfaces to the north of the site. Yorkshire fog was the dominant species.
h2a - Hedgerow (1) (Annex A; Table A.2, Photograph 7, 8, 9,)	Moderate	Species rich hedgerow was present to the north of the substation, travelling east to west along the south side of the access track, located northwest of the existing substation. The west side of the hedgerow then extended south along the border of the cropland. The hedgerow was well managed at approximately 2.5m high and 1m wide, with no gaps present. Species included dominant blackthorn (<i>Prunus spinosa</i>) to the west, abundant hawthorn to the east and frequent Dogrose (<i>Rosa canina</i>), hazel, oak, and nettle (<i>Urtica dioica</i>) along the entire length of the hedgerow. Occasional Ash and gorse (<i>Ulex europaeus</i>) were also present along sections of the hedgerow.
h2a - Hedgerow (2) (Annex A; Table A.2, Photograph 10)	Moderate	Hedgerow habitats were present within the carpark of the ambulance service building, to the north of the site. These were approximately 3m tall and 1.5m wide, with no gaps present at the base or along the length of the habitat. No invasive plant species present. The hedgerow was dominated by hawthorn, with frequent hazel, dogwood (<i>Cornus sanguinea</i>), and occasional birch species.
h3 - Dense scrub (Annex A; Table A.2, Photograph 11)	N/A	An area of dense scrub was identified north of the existing substation. Hawthorn was dominant, and blackthorn and nettle were abundant. Frequent species included ivy (<i>Hedera spp.</i>) and hogweed, as well as occasional ash and elder (<i>Sambucus nigra</i>).
w1f - Lowland mixed deciduous woodland (Annex A; Table A.2, Photograph 12)	Moderate	A small area of lowland mixed deciduous woodland was identified to the north of the site, adjacent to the ambulance centre car park. Trees were of varied ages, but no saplings were present. No invasive species were present. More than half of the canopy and understory species were native, with no damage, and less than 20% of the woodland had open space. Tree canopy species included frequent common oak (<i>Quercus robur</i>), and ash, with occasional birch species. The understory featured occasional dogwood.

Bodelwyddan Substation Extension and Overhead Line route: Biodiversity Baseline

UKHab Primary Habitat	Habitat Condition	Description
w1h - Other woodland – mixed (Annex A; Table A.2, Photograph 13, 14)	Moderate	An area of plantation woodland was present to the north of the existing substation and to the south of the retail park. Over 50% of the canopy species were native, and no damage was evident. Young and mature trees were present within the woodland. No invasive plant species were identified. The canopy included abundant silver birch, frequent alder, and occasional Acer species. The understorey featured frequent blackthorn and occasional dogwood, young ash, hazel, and elder. The ground layer featured frequent bramble (<i>Rubus fruticosus</i> agg.), ivy, occasional herb-robert (<i>Geranium robertianum</i>), rose sp. (<i>Rosa</i> spp.) and hogweed.
Scattered trees (Annex A; Table A.2, Photograph 15)		Instances of scattered trees were identified in areas of grassland, examples of the species present were common oak, whitebeam (<i>Sorbus aria</i>), and silver birch.
r1a - Eutrophic standing waters (Annex A; Table A.2, Photograph 16)	Moderate	A pond was present within the industrial estate to the north of the substation, . The pond was large, approximately 20m x 25m, and surrounded by woodland planting consisting of oak, birch and dogwood with a scrub understorey.
u1b5 -Buildings	N/A	A business park was identified to the north of the substation. Buildings present included offices and warehouses. The substation also featured a building. Multiple buildings were present within the farm area to the south of the overhead line works, including residential buildings and buildings for agricultural use.
u1b - Developed land; sealed surface (Annex A; Table A.2, Photograph 17)	N/A	The business park and substation featured sealed surfaces in the form of roads, car parks and areas with industrial/electrical equipment use.
u1 - Built up areas and gardens (Annex A; Table A.2, Photograph 18)	N/A	Gardens with modified grassland featuring introduced non-native shrubs were identified in areas around the business park, adjacent to buildings and entrance roads.
c - Cropland (Annex A; Table A.2, Photograph 19, 31 & 35)	N/A	Large crop fields were present to the west and southwest of the substation.

Bodelwyddan Substation Extension and Overhead Line route: Biodiversity Baseline

UKHab Primary Habitat	Habitat Condition	Description
g4 - Modified grassland (Annex A; Table A.2, Photograph 20)	Poor	Areas of modified grassland were identified to the south of the substation. Grassland was well managed and possibly grazed by cattle. Perennial rye grass and couch were the dominant species.
g4 - Modified grassland (Annex A; Table A.2, Photograph 21)	Poor	Many areas of managed modified grassland were identified within the south area of the site separated by species poor hedgerows.
h2a - Hedgerows (1) (Annex A; Table A.2, Photographs 22, 23)	Moderate	Many instances of species poor hedgerows were recorded along field boundaries and roads in the area to the south of the substation. These hedgerows were dominated by hawthorn and blackthorn, with rare holly (<i>Ilex</i> spp.). Some instances hedgerows south of the substation also featured occasional tree species such as oak. All the hedgerows were relatively well managed, approximately 1.5m tall and 1m wide, with no invasive species present, and no gaps at the base or along the lengths.
H2a - Hedgerows (2) (Annex A; Table A.2, Photograph 24)	Good	Two hedgerows were present near the south-western boundary of the survey area. These hedgerows were on opposite sides of the road adjacent to the farm. The hedgerows were approximately 3-4m tall, and 1-2m wide, with no gaps at the base or along the length, and no damage. The dominant species was hawthorn with frequent bindweed (<i>Calystegia sepium</i>) and rare sycamore (<i>Acer pseudoplatanus</i>).
h3 - Dense scrub (Annex A; Table A.2, Photograph 25)	N/A	A small area of dense scrub was present in a field of modified grassland to near the south boundary of the site.
w1f - Lowland mixed deciduous woodland (Annex A; Table A.2, Photographs 26-28)	Moderate	An area of lowland mixed deciduous woodland was identified approximately 10 m south of the existing access track to the substation. The north area of the woodland consisted of only oak species of the same age, with bat boxes present in the trees, and grazing looked to take place with more than 50% of this area consisting of open space. The south area of the woodland had 50% of the canopy consisting of native species, and no damage was evident. Young and mature trees were present within the woodland, and no invasive plant species were identified. Canopy species included abundant ash, frequent common oak, and rare pine species (<i>Pinus</i> spp.). The understory featured abundant hawthorn and frequent bindweed.
r2b - Other rivers and streams – Dry ditch	Poor	Several dry ditches were present in areas adjacent to hedgerows located to the south of the substation. Some dry ditches featured piles of rubble that had good potential for reptiles, these are detailed in Appendix A, Table A.1 and shown in Figure 3. The ditches were dry at the time of

Bodelwyddan Substation Extension and Overhead Line route: Biodiversity Baseline

UKHab Primary Habitat	Habitat Condition	Description
(Annex A; Table A.2, Photograph 29)		survey and featured frequent perennial rye grass and couch grass as well as occasional nettle.
u1b - Developed land; sealed surface (Annex A; Table A.2, Photograph 30)	N/A	Roads and concrete areas were located within the survey area and a farm yard to the west consisted of sealed ground..
g4 - Modified grassland (Annex A; Table A.2, Photograph 32)	Poor	The survey area was dominated by modified grassland, that was used for hay production at the time of the survey. The grassland is generally species-poor (and does not satisfy condition A of the BNG metric condition assessments). The sward has a consistent height throughout and is composed of Perennial Rye-grass (A), Annual Meadow Grass (A), Rough Meadow Grass (A), Creeping Buttercup (F), Daisy (O), Meadow Foxtail (O), Red Fescue (R), False-oat Grass (O), Cock's-foot (F), Dandelion (O), Cow Parsley (R), Creeping Bent (O), Yorkshire Fog (A), Common Mouse ear (O), Creeping Cinquefoil (O), Smooth meadow Grass (A), Blackthorn saplings (R), Common Chickweed (R), Crested Dog's-tail (O), Lesser trefoil (R), Timothy (O), Meadow Buttercup (O), Broadleaved Dock (O), Curled Dock (O), White Clover (A), Spear thistle (R), Creeping Thistle (R), Common Hogweed (O).
g4 - Modified grassland (Annex A; Table A.2, Photograph 33)	Poor	Other fields of modified grassland werewere grazed predominantly by sheep and cattle. The grassland sward is species-poor and has been grazed to a short height (the grassland does not support enough species diversity to satisfy criteria A or have the structural diversity to stratify criteria B of the BNG metric condition assessments). Species composition includes Yorkshire fog (A), perennial rye-grass (A), red fescue (<i>Festuca rubra</i>) (A), annual meadow grass (F), creeping bent (O), crested dog's tail (R), Creeping Buttercup (O) and common mouse-ear (O).
W1g- Other Woodland Broad-leaved (Annex A; Table A.2, Photograph 34)	Moderate	An area of broad-leaved woodland was located within the Overhead Line Works and Access Boundary. However, this is avoided by the existing overhead line infrastructure and no impact would occur through the project. This plantation woodland was dominated by English oak (D - composing of about 90% of the tree species), hawthorn, ash, willow also occur. The ground flora was composed a low growing scrub and ruderal species including bramble, common nettle, false-oat grass, cock's-foot, greater willowherb, cleavers and meadow sweet. The woodland was fenced off from the surrounding agricultural land and a dry ditch ran along the northern boundary.
H2a - Hedgerows (species-poor) (Annex A; Table A.2, Photograph 36)	Moderate	Several hedgerows existed within the survey area on field margins. The hedgerows appeared to have been subject to frequent management keeping them at an approximate height of between 2m and 4m in height and average width of 2m (none of the hedgerows were less than 1.5m wide at any point). The hedgerows were not found to support gaps at the bases, or along the length except at the site access points. The hedgerows were not found to support a band of perennial herbaceous vegetation of at least 1m from one edge. There were no species indicative of nutrient enrichment, no invasive non-native species were present and there were no signs of damage due to human activities.
H2a - Hedgerows (Species-rich)	Moderate	





UKHab Primary Habitat	Habitat Condition	Description
(Annex A; Table A.2, Photograph 37)		<p>Some of the hedgerows supported mature trees which satisfy the additional criteria of having trees in a healthy condition but not supporting more than one age class.</p> <p>The typical species composition for the species-poor hedgerows was blackthorn (A), hawthorn (A), elder (O), holly (R) and elm (R).</p> <p>The typical species composition for the species-rich hedgerows was blackthorn (A), hawthorn (A), elder (O), holly (O) and elm (O), hazel (F), dog rose (O), honeysuckle (F), gorse (O), white bryony (R), ash (R), sycamore (R) and ivy (F).</p>
R1g – Other standing water (Wet Ditch) (Annex A; Table A.2, Photograph 38)	Poor	There was a wet ditch that flows through the site, to the east, which was shaded by hawthorn and blackthorn scrub. The ditch had a shallow water level and was poached in places (minor). There was no aquatic or marginal vegetation associated with the ditch and it is possible that it dried out at times.
Pond (Annex A; Table A.2, Photograph 39)	Moderate	A pond to the east of the site, north of the overhead line works, was assessed as having a moderate condition due to the presence and coverage of duckweed (<i>Lemna</i> sp.) and the lack of other aquatic vegetation
u1b - Developed land; sealed surface (Annex A; Table A.2, Photograph 40)	N/A	Roads, access tracks and areas of hardstanding/buildings were present within the survey area and immediately adjacent to it.

3.5 Great crested newt

Several records of GCN were returned from Cofnod between 1993 and 2022. The nearest record was located approximately 0.3km north-east of the site. Records of common toad (*Bufo bufo*), common frog (*Rana temporaria*), smooth newt (*Lissotriton vulgaris*) and palmate newt (*Lissotriton helveticus*) were also returned.

Ten ponds were identified as requiring further survey for GCN (see Figure 4). However, during the field survey, five of the ten ponds were dry or no longer existed: ponds 2, 4, 6, 7 and 8. These ponds were not subject to further survey. Ponds 1, 3, 5, 9 and 10 were subject to HSI and eDNA assessments with full bank-side access possible. A description and photographs of these ponds are provided in Table 3.4.

Table 3.4: Pond description

Pond ID (see Figure 4)	Description	Photograph
Pond 1	Pond in corner of grazed field, fenced off from livestock poaching with tall ruderal vegetation on the bankside. Iris and some pondweed present. Pond shallow at time of survey with 2-3cm of water present.	
Pond 3	Pond present within centre of cropland field. The pond was surrounded by willow and mixed scrub. Heavy layer of duckweed on surface.	No photograph
Pond 5	Pond was present within a field boundary and comprised a shallow depression filled with grass from surrounding arable/graazed grassland.	
Pond 9	Large pond, approximately 20m x 25m located within an industrial estate. Surrounded by woodland planting consisting of oak, birch and dogwood with a scrub understory.	
Pond 10	Large lake approx. 35m x 100m within an industrial estate. Moderate levels of algae and duckweed present with ducks and likely fish. Plantation woodland bordered well vegetated banks.	

3.5.1 Habitat Suitability Index Assessment

The output of the HSI assessment determined all surveyed ponds to have below average suitability to support GCN, see Table 3.5. Ponds 1, 3 9 and 10 are also considered to be suitable to support populations of common toad.

Table 3.5: HSI Assessment score and suitability categories

Habitat Suitability Index		Pond 1	Pond 3	Pond 5	Pond 9	Pond 10
SI ₁	Location	A	A	A	A	A
SI ₂	Pond area	81m ²	160m ²	10m ²	563m ²	1826m ²
SI ₃	Pond drying	Sometimes	Rarely	Annually	Never	Never
SI ₄	Water quality	Moderate	Poor	Poor	Moderate	Moderate
SI ₅	Shade	10%	90%	10%	40%	10%
SI ₆	Waterfowl	Minor	Minor	Absent	Minor	Minor
SI ₇	Fish	Minor	Minor	Absent	Major	Major
SI ₈	Pond count	14	14	14	14	14
SI ₉	Terrestrial habitat	Good	Moderate	Moderate	Good	Good
SI ₁₀	Macrophytes	20%	100%	40%	75%	45%
HSI Score		0.58	0.59	0.59	0.55	0.54
Suitability		Below Average	Below Average	Below Average	Below Average	Below Average

3.5.2 Environmental DNA

Three ponds returned positive eDNA results for GCN. The eDNA results for surveyed ponds is summarised in Table 3.6. A negative result means that no GCN DNA has been detected in the sample and therefore the likely absence of GCN can be concluded. A positive result indicates the presence of GCN within the ponds.

Pond 5 is located within the Overhead Line Works and Access Boundary (see Figure 4) and has been identified as positive result indicating the presence of GCN, the pond.

Table 3.6: eDNA results

Pond ID (see Figure 4)	GCN eDNA Presence
Pond 1	Present
Pond 3	Absent

Pond ID (see Figure 4)	GCN eDNA Presence
Pond 5	Present
Pond 9	Present
Pond 10	Absent

3.6 Bats

The data search identified records of the following bat species within 2km of the site:

- Daubenton's bat (*Myotis daubentonii*);
- Whiskered bat (*Myotis mystacinus*);
- Natterer's bat (*Myotis nattereri*);
- Noctule bat;
- Common pipistrelle;
- Soprano pipistrelle;
- Brown long-eared bat;
- Lesser horseshoe bat; and
- Brandt's bat (*Myotis brandti*).

3.6.1 Ground based assessment of trees for roosting bats

The ground based assessment of trees for bat roost potential identified twenty-seven trees within the survey area. Two trees were assessed as negligible bat roosting potential, seven trees with low bat roosting potential, nine trees with moderate bat roosting potential and nine trees with high bat roosting potential (See Table 3.7 and Figure 5).

All trees assessed as moderate and high bat roosting potential (eighteen of the twenty-seven trees) assessed were then subject to further surveys which included dusk emergence, dawn re-entry and aerial inspection (endoscope) surveys.

Table 3.7: Ground based assessment of trees for roosting bats

Tree ref.	Distance to Proposed works	Tree Species	Tree age	Diameter at Breast Height (m)	Location	Potential Roost Features	Bat Roost Potential
T1	Within Substation Extension Boundary	Oak	Mature	0.8m	SJ 01552 73604 Field boundary	Split up main stem. However, no suitable features with any suitable crevices exposed to elements	Low

Bodelwyddan Substation Extension and Overhead Line route: Biodiversity Baseline

Tree ref.	Distance to Proposed works	Tree Species	Tree age	Diameter at Breast Height (m)	Location	Potential Roost Features	Bat Roost Potential
T2	Within Substation Extension Boundary	Oak	Mature	0.8	SJ 01509 73616 Field boundary	Tree tag 0250. Dead limbs with splits, however, these are exposed to elements	Low
T3	On Substation Extension Boundary	Oak	Mature	0.8	SJ 01519 73628 Field boundary	Very thin ivy cover. No other features	Negligible
T4	10m north of Substation Extension Boundary	Oak	Mature	0.6	SJ 01518 73643 Field boundary	Rotted limbs with loose bark and exposed cavities. Large fissure in main trunk leading to suitable cavities.	High
T5	50 m north of Substation Extension Boundary	Oak	Mature	-	SJ 01531 73663 Edge of woodland strip	Superficial damage	Negligible
T6	40m north of Substation Extension Boundary	Oak	Mature	1	SJ 01471 73658 Field boundary next to access track	Large rotten limb with split stem leading to raised bark and cavity.	Moderate
T7	Within Overhead line Boundary	Dead	Mature	0.5	SJ 01398 73387 Field boundary	Loose bark and multiple stem cavities	High
T7A	Within Overhead Line Boundary	Oak	Mature	0.7	SJ 01415 73409 Field boundary	Woodpecker hole leading to cavity on limb	High – later confirmed as a roost (see Section 3.5.3)

Bodelwyddan Substation Extension and Overhead Line route: Biodiversity Baseline

Tree ref.	Distance to Proposed works	Tree Species	Tree age	Diameter at Breast Height (m)	Location	Potential Roost Features	Bat Roost Potential
T8	Within Substation Extension Boundary	Oak	Mature	-	SJ 01522 73527 Field boundary	Superficial damage	Low
T9	Within Overhead Line Boundary	Oak	Mature	0.7	SJ 01502 73502 Field boundary	Split limb leading to cavity	Moderate, Later downgraded to Negligible (see Section 3.5.3)
T10	Within Overhead Line Boundary	Oak	Mature	-	SJ 01485 73484 Field boundary	Superficial area of raised bark	Low
T11	Within Overhead Line Boundary	Oak	Mature	0.8	SJ 01462 73336 Field boundary	Dead branch coming off main limb on southwest aspect. Raised bark around limb leading to potential cavity	High
T12	Within Overhead Line Boundary	Oak	Mature	1.1	SJ 01478 73257 Field boundary	Multiple split limbs leading to raised bark and cavity in the crown of the tree.	Moderate
T13	Within Overhead Line Boundary	Oak	Mature	0.8	SJ 01394 73191 Field boundary / hedgerow	Split/dead limbs leading to raised bark and cavity. Rot hole from tear off. All on southern aspect.	Moderate
T14	Within Overhead Line Boundary	Oak	Mature	1	SJ 01380 73177 Field boundary / hedgerow	No visible features from the ground however potential for the tree to have suitable PRF.	Low

Bodelwyddan Substation Extension and Overhead Line route: Biodiversity Baseline

Tree ref.	Distance to Proposed works	Tree Species	Tree age	Diameter at Breast Height (m)	Location	Potential Roost Features	Bat Roost Potential
T15	Within Overhead Line Boundary	Oak	Mature	1.1	SJ 01359 73280 Field boundary / road edge	Single hole into main stem and crack within pruned limb above.	High Later confirmed roost (see Section 3.5.2)
T16	Within Overhead Line Boundary	Oak	Mature	1.2	SJ 01213 73350 Corner of field, north of road	Dying crown, lots of loose bark with multiple PRF throughout the tree	High
T17	Within Overhead Line Boundary	Oak	Mature	0.9	SJ 01189 73364 Field boundary, north of road	Split limb leading to potential cavity on main stem.	Moderate
T18	Within Overhead Line Boundary	Oak	Mature	1.1	SJ 01181 73355 Field boundary, south of road, raised.	Rotting limb leads to multiple features in crown	Moderate
T19	Within Overhead Line Boundary	Oak	Mature	0.9	SJ 01162 73377 Field boundary, north of road	Broken branch leading to lifted bark	Moderate
T20	Within Overhead Line Boundary	Oak	Mature	0.7	SJ 01141 73387 Field boundary, north of road	Rot hole / woodpecker hole in broken limb.	High

Bodelwyddan Substation Extension and Overhead Line route: Biodiversity Baseline

Tree ref.	Distance to Proposed works	Tree Species	Tree age	Diameter at Breast Height (m)	Location	Potential Roost Features	Bat Roost Potential
T21	Within Overhead Line Boundary	Oak	Mature	1	SJ 01129 73393 Field boundary, north of road	Knot hole in main stem on eastern face of main trunk approx. 20m high	High
T22	5m west of Overhead Line Boundary	Oak	Mature	0.7	SJ 01117 73397 Field boundary, north of road	Twisted dead limbs lead to multiple cracks and crevices	Moderate
T23	Within Overhead Line Boundary	Oak	Mature	0.8	SJ 01115 73394 Field boundary south of road	No visible features but state of tree suggests potential for PRF.	Low
T24	20m north of Overhead Line Boundary	Oak	Mature	0.6	SJ 01082 73414 Field boundary north of road	No suitable features visible for state of tree suggests PRF.	Low
T25	25m north of Overhead Line Boundary	Oak	Mature	1.2	SJ 01059 73420 Field boundary south of road	Lifted bark on dead limb	Moderate
T26	Immediately north of the Overhead Line Boundary	Oak	Mature	1.5	SJ 00990 73419 Field boundary west of road.	A lifted bark leading to suitable PRF throughout crown of tree	High

3.6.2 Dusk emergence and dawn re-entry

Table 3.8 summarises the programme of dusk emergence and dawn re-entry bat surveys. Weather conditions for all surveys are detailed in Annex B. Bat emergence/re-entry was recorded on T15 (OS Grid reference SJ 01359 73280) from two separate features on its southern aspect. Two soprano pipistrelle bats emerged from PRF 2 on 30th August 2022; one at 20:13 and the second at 20:25. A single soprano pipistrelle re-entered PRF 1 on 23rd September at 06:33. Two soprano pipistrelle bats emerged on 29th September; the first at 19:11 from PRF 2, and the second at 19:13 from PRF 1. IR camera footage confirmed the emergence from PRF 1 on 29th September 2022 at 19:13. No other bat roosts were observed during the 2022 surveys. Photographs in Annex C show the roosting features.

General bat activity was recorded during the surveys including foraging, commuting, or social call behaviour was noted from the below eight species:

- Common pipistrelle;
- Noctule;
- Soprano pipistrelle;
- Natterer's bat*;
- Daubenton's bat*;
- Lesser horseshoe bat;
- Brown long-eared bat; and
- Brandt's bat*.

**Probable species identification*

No bat emergence or re-entry was recorded during any of the surveys undertaken in 2023. Low levels of bat activity were recorded for most of the surveys, similar to those recorded during the 2022 surveys. Common and soprano pipistrelle was the most common species recorded either foraging, commuting with low levels of social calls observed. Noctule was also recorded during majority of the surveys but were often distant calls. Other low-level activity was recorded and included brown long eared bat and myotis sp., (likely Brandt's bat and Daubenton's bat).

Table 3.8: Summary of bat emergence / re-entry surveys

Tree ref.	Tree Species	Date of survey	Temp at start of survey (°C)	Survey notes	Survey type	Start/finish time	Roost present	Roost Details
T4	Oak	06/09/22	16	Foraging activity throughout survey	Emergence	19:37 / 21:52	No	N/A
		29/05/2023	16	General foraging and commuting activity observed throughout, mainly soprano and common pipistrelle with the occasional myotis and noctule calls observed.	Emergence	21:14 / 23:29	No	N/A
		20/06/2023	14	Low activity of individual soprano and common pipistrelle heard and seen foraging along tree line of T4.	Re-entry	03:19 / 05:01	No	N/A
T6	Oak	07/09/22	13	Minimal activity during survey, one soprano pipistrelle seen commuting along road	Re-entry	04:29 / 06:47	No	N/A
T7	Dead	31/08/22	19	Foraging and commuting activity recorded of pipistrelle sp. and natterers bat.	Emergence	19:50 / 22:05	No	N/A
		22/09/22	15	Suspected emergence observed at 19:30 of a soprano pip, however, this was not supported by IR camera footage and is thought the bat flew around tree. Noctule seen commuting west at 19:28.	Emergence	18:58 / 21:13	No	N/A
		31/05/2023	9	Low levels of commuting activity, mostly distant common pipistrelle, myotis and brown long eared bat call observed.	Re-entry	02:54 / 05:09	No	N/A
T7A	Oak	31/08/22	21	Common and soprano pipistrelle foraging throughout survey	Emergence	19:50 / 22:05	No	N/A
		22/09/22	15	Noctule seen commuting south, soprano pip foraging throughout. Survey called off at 20:15 due to heavy rainfall.	Emergence	18:58 / 21:13	No	N/A
T9	Oak	07/09/22	17	No emergences, foraging throughout survey from soprano pip and noctules	Emergence	19:35 / 21:50	No	N/A

Bodelwyddan Substation Extension and Overhead Line route: Biodiversity Baseline

Tree ref.	Tree Species	Date of survey	Temp at start of survey (°C)	Survey notes	Survey type	Start/finish time	Roost present	Roost Details
T11	Oak	08/09/22	13	Minimal activity throughout survey, one soprano pip seen commuting into woodland	Re-entry	04:35 / 06:50	No	N/A
		01/06/2023	9	Low levels of soprano pipistrelle, myotis and noctule calls heard and one soprano pipistrelle observed foraging along hedge.	Re-entry	02:54 / 04:54	No	N/A
		19/06/2023	16	Low activity of noctule, soprano and common pipistrelle heard. Only noctule was observed commuting west to east.	Emergence	21:30 / 23:05	No	N/A
T12	Oak	21/09/22	16	Common and soprano pipistrelle along with brown long-eared bat recorded. Frequent Noctule calls recorded between 19:51-20:05	Emergence	19:00 / 21:15	No	N/A
		30/09/22	10	Distant calls recorded from brown long-eared, noctule, and soprano pip	Re-entry	05:15 / 07:27	No	N/A
T13	Oak	22/09/22	14	Minimal activity throughout survey, distant lesser horseshoe call picked up at 05:47 (confirmed from sound analysis)	Re-entry	05:00 / 07:15	No	N/A
T15	Oak	30/08/22	19	One emergence of a single soprano pipistrelle from hole on main stem at 20:13. One emergence of a single soprano pipistrelle from crack within pollarded limb at approximately 20:25.	Emergence	05:00 / 07:15	Yes	One soprano pipistrelle emergence from hole in main stem at 20:13 and one soprano pipistrelle emergence from crack within pruned limb at 20:25. Ivy cover blocked IR camera from capturing footage. Both observations were confirmed from sound analysis.
		23/09/22	13	One re-entry of a single soprano pipistrelle at 06:33. Minimal activity throughout rest of the survey with only a few foraging calls recorded.	Re-entry	05:00 / 07:15	Yes	One re-entry into cavity on main stem at 06:33, bat flew from west and entered the cavity within the main stem of the tree.
		29/09/22	12	One emergence of a single soprano pipistrelle at 19:11, and then one further emergence of a single soprano pipistrelle 1 at 19:13. Foraging activity up and down hedgerow throughout rest of survey.	Emergence	05:00 / 07:15	Yes	One emergence from PRF 1 at 19:11 and one emergence from PRF 2 at 19:13. This second emergence was captured on IR camera footage.

Bodelwyddan Substation Extension and Overhead Line route: Biodiversity Baseline

Tree ref.	Tree Species	Date of survey	Temp at start of survey (°C)	Survey notes	Survey type	Start/finish time	Roost present	Roost Details
T16	Oak	31/08/22	11	Brown long-eared bat recorded foraging, natterers bat and common/soprano pipistrelle also recorded throughout survey.	Re-entry	04:21 / 07:15	No	N/A
		30/05/2023	10	Moderate levels of activity recorded for common & soprano pipistrelle and single call observed of	Emergence	21:13 / 23:28	No	N/A
		21/06/2023	15	Continuous soprano pipistrelle foraging activity observed along hedge of T16 with calls heard sporadically for noctule and common pipistrelle.	Re-entry	03:19 / 05:01	No	N/A
T17	Oak	01/09/22	12	Foraging up and down hedgerow recorded throughout survey.	Re-entry	04:50 / 06:38	No	N/A
		28/09/22	12	Frequent soprano pip calls throughout. Some common pip, brown long-eared and noctule calls recorded	Emergence	18:43 / 20:58	No	N/A
T18	Oak	01/09/22	12	Soprano pip activity throughout survey	Re-entry	04:50 / 06:38	No	N/A
		28/09/22	12	Foraging activity throughout survey, soprano/common pip as well as a brown long-eared bat recorded at 19:47. All bats heard not seen	Emergence	18:43 / 20:58	No	N/A
T19	Oak	02/09/22	14	Mainly soprano pipistrelles recorded throughout, foraging a commuting activity	Re-entry	04:50 / 06:40	No	N/A
		29/09/22	12	Frequent common and soprano pip activity throughout.	Re-entry	05:10 / 7:25	No	N/A
T20	Oak	01/09/22	21	Frequent common and soprano pip activity throughout.	Emergence	19:48 / 22:02	No	N/A
		29/09/22	12	Generally quiet survey with some soprano foraging throughout	Re-entry	05:10 / 07:25	No	N/A
		01/06/2023	15	Low levels of activity recorded for common and soprano pipistrelle displaying foraging and	Emergence	21:16 / 23:31	No	N/A

Bodelwyddan Substation Extension and Overhead Line route: Biodiversity Baseline

Tree ref.	Tree Species	Date of survey	Temp at start of survey (°C)	Survey notes	Survey type	Start/finish time	Roost present	Roost Details
				commuting behaviour. Noctule was observed foraging west to east above the tree canopy. Two passes of brown long eared was observed and myotis was recorded commuting.				
T21	Oak	01/09/22	21	Foraging activity recorded throughout survey	Emergence	19:48 / 22:02	No	N/A
		01/06/2023	15	Low levels of activity recorded for common and soprano pipistrelle displaying foraging and commuting behaviour. Brown long eared bat and noctule was heard foraging occasionally.	Emergence	21:16 / 23:31	No	N/A
		20/06/2023	15	Low levels recorded of common pipistrelle foraging and commuting of three individuals along hedge of T21 and T22. Noctule bat heard in the distance. Low levels of brown long eared bats heard.	Emergence	21:30 / 23:05	No	N/A
T22	Oak	02/09/22	14.5	Soprano pipistrelle, brown long-eared bat and noctule all recorded	Re-entry	04:55 / 06:55	No	N/A
		21/06/2023	16	Low levels of foraging and commuting soprano and common pipistrelle along hedge and commuting east. Noctule observed foraging in adjacent field to the north. Brown long eared calls recorded in the distance.	Emergence	21:30 / 23:05	No	N/A
T25	Oak	20/09/22	16	General foraging and commuting activity observed throughout, mainly soprano and common pipistrelle	Emergence	19:03 / 21:18	No	N/A
T26	Oak	21/09/22	10	Generally quiet survey with little activity recorded, soprano pipistrelle and myotis calls observed	Re-entry	04:58 / 07:13	No	N/A

3.6.3 Tree climbing inspection

Table 3.8 summarises the results of the tree climbing inspection surveys. The surveys identified and confirmed a bat roost present within T7a on the 25th of March 2023. The roost was identified within a pruning cut on the west side of the tree at approximately 1.7m high (PRF-b). A single pipistrelle sp. bat was identified via the endoscope viewer but the identification on species level was not possible due to the angle the bat was situated. Photographs in Annex C show the roosting features. No bat roost or evidence of bats were recorded within T6, T9 and T13.

Table 3.8: Summary of tree climbing inspections for bats

Tree ref.	Tree Species	Survey Visit No.	Survey Notes	Roost Present	Roost Details
T6	Oak	V2	<p>PRF-a: Lifting bark - crevice between the bark and the heartwood. Inactive birds' nest on top of exposed heartwood at top of the same limb. Cavity entrance 20cm high / 2.5cm wide / 6cm deep. DPH 25cm. Doesn't extend down - flat base. Extends up 7cm with domed apex. Internal up dimensions 3x4cm. Debris, bumpy, no smell, dry. No bats or evidence of bats.</p> <p>PRF-b: Newly described sub-feature (unable to see from ground). Tear out on upper side of northern facing limb at height of 6m. DPH 30cm. Entrance 3cm high and 2cm wide. Extends up 4cm with a width of 3cm and depth of 4cm. Dome apex. Doesn't extend down. Some bird droppings at base. Debris, rough, no smell, dry. No bats or evidence of bats.</p>	No	N/A
T7a	Oak	V3	<p>1 x Pipistrellus sp. in PRF-b found within a pruning cut on west side at 1.7m high (feature not mentioned in ground-based notes). Unable to identify whether common or soprano due to angle the bat was sitting / quality of images from endoscope. Located above the entrance approximately 10cm, bat was awake.</p> <p>PRF-a: knothole northeast facing. Extends up and down at least 1m - unable to fully inspect, high potential.</p>	Yes	Single pipistrelle bat recorded within feature b of a pruning cut.
T9	Oak	V2	Feature too exposed with bird droppings. Downgraded to negligible.	No	N/A
T13	Oak	V2	The split/dead limbs and raised bark and rot hole cavity inspected but no evidence of bats found.	No	N/A

3.6.4 Bat survey results evaluation

One soprano pipistrelle bat roost was confirmed in T15. The roost features of T15 are considered to be actively used as a regular roost for individuals/small groups of male or non-breeding female bats.

A single pipistrelle bat (undefined species) roost was confirmed in T7a during the tree climb survey in March 2023. The roost feature of T7a is considered likely to be used by male or non-breeding female bats, sporadically as a transitional/occasional roost to shelter during the prolonged cold spells of the winter. T7a and T15 are both located within the Overhead Line Works and Access Boundary. However these trees will be retained.

A single lesser horseshoe bat was heard and recorded, at distance, during the 2022 dawn re-entry survey of T13. Lesser horseshoe bat was not recorded during any other surveys of 2022 and 2023. Lesser horseshoe bat is listed as an Annex II species and a qualifying feature of Mwyngloddiau Fforest Gwydir/ Gwydyr Forest Mines SAC which is located approximately 25km from the site and a feature of the Coedydd ac Ogofâu Elwy a Meirchion SSSI which is located approximately 1.3km south-east of site.



3.7 Invasive species


Four records of Himalayan balsam (*Impatiens glandulifera*), two records of Japanese knotweed (*Fallopia japonica*) and one record of Montbretia (*Crocsmia x crocosmiiflora*) were returned by the desk study. The closest is a record of Himalayan balsam approximately 1.78km north of the site, which was recorded as a small area of growth alongside a stream in 2021. No INNS were identified during field survey.

3.8 Other species

The desk study returned nine records of grass snake (*Natrix helvetica*) within 2km of the site. Suitable refugia (see Table 3.9 and Figure 3) and foraging habitat for reptiles, including grass snake, were recorded within the site comprising hedgerows, tall ruderal vegetation and dry ditches. TN1 and TN3 are not anticipated to be impacted by the proposed work and TN2 is not within the proposed working area for either substation extension or Overhead Lines. The cropland and grassland habitats on-site provided sub-optimal potential as reptile habitat due to their short sward and heavily managed nature. A small population of reptiles are assumed to be present.

Table 3.9: Habitat suitable for reptiles

Description	Photograph	Description	Photograph
<p>TN1 (Figure 3)</p> <p>Pile of rocks good for reptiles</p> <p>r2b – dry ditch</p>		<p>TN3</p> <p>Pile of rocks good for reptiles</p> <p>G4</p>	

Description	Photograph	Description	Photograph
<p>TN2</p> <p>Pile of rocks good for reptiles</p> <p>G4</p>		-	-

The desk study returned three records of hazel dormouse (*Muscardinus avellanarius*) within 2km of the site. The closest record was approximately 1.2km southwest within Coed Plas Newydd woodland in 2013. Dormouse are considered rare in this part of Wales. The ancient woodland (Coed Cord and Coed y Saeson LWS), approximately 100m south-east of the site provided potential habitat for dormouse, with connectivity to the site via the surrounding hedgerows. However, the hedgerows present were heavily managed by farming practices reducing suitability for dormouse.

Scrub, hedgerow, and scattered trees across the site had potential to support tree and shrub nesting birds. Grassland field margins and arable habitats had the potential to support ground-nesting birds. The site also had potential to be used by foraging barn owl (*Tyto alba*) but there was negligible potential for roosting/nesting barn owl within buildings or trees within the site. Equipment surrounding the transformer within the existing substation, such as surge arresters, provided suitable areas for nesting birds. However, no evidence of Schedule 11 listed bird species was recorded during the field surveys.

A single disused badger sett (a single hole) was recorded in 2021, as part of the Preliminary Ecological Appraisal (Jacobs, 2021). However, no evidence of this sett was recorded during the subsequent surveys in 2022 and 2023. A live badger was observed during a dusk emergence bat survey foraging along the road to the north of the site.

Small mammals including hedgehog (*Erinaceus europaeus*) are likely to be active across the site particularly in hedgerows and scrub.

No suitable habitat for otter (*Lutra lutra*), water vole (*Arvicola amphibius*) or white-clawed crayfish (*Austropotamobius pallipes*) were recorded within the site. The habitats present and desk study do not indicate the presence of important invertebrate assemblages.

¹ Wildlife and Countryside Act 10981 (as amended)

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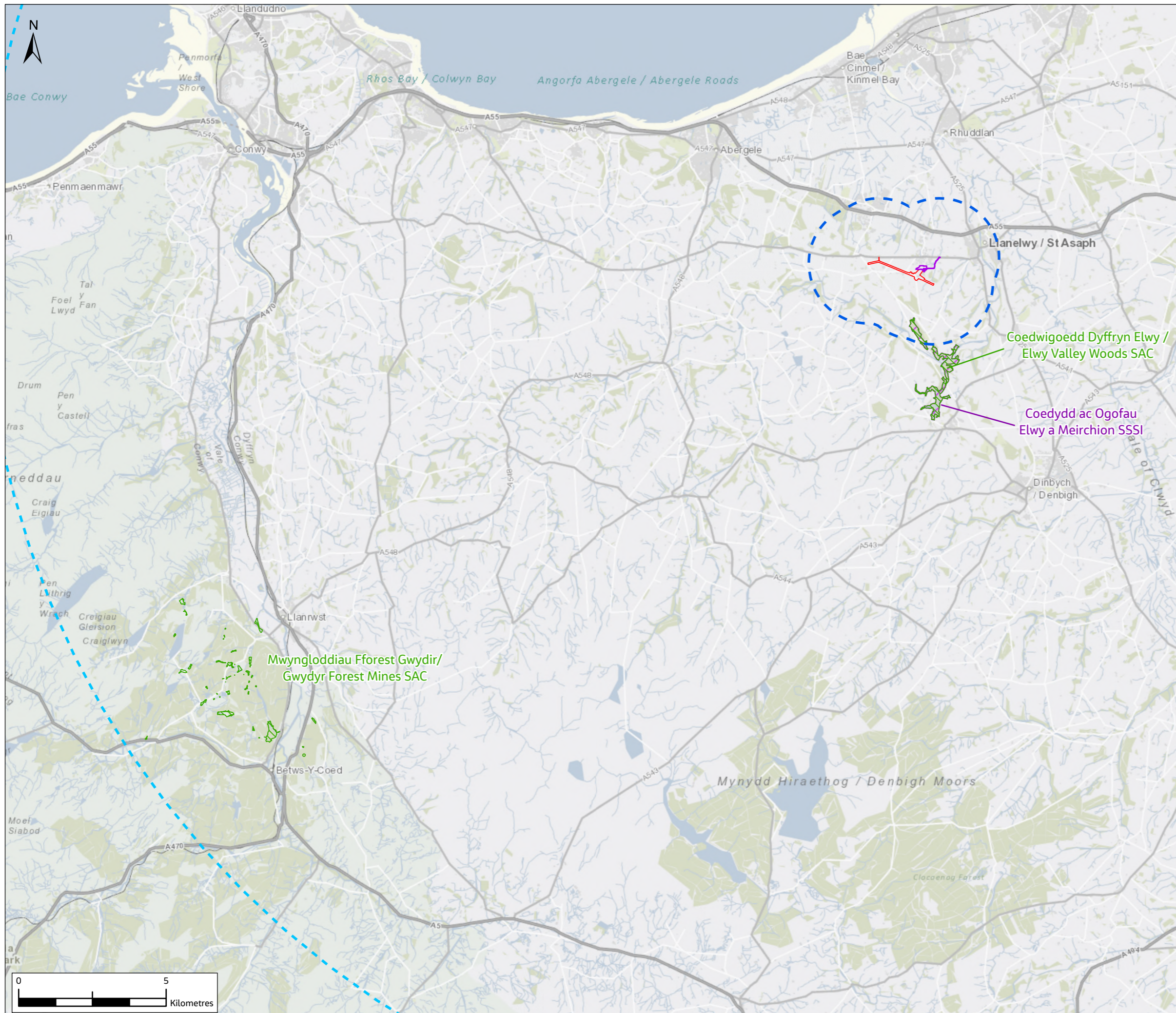
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5. Figures

Figure 1. Statutory Designated Sites



Legend

- Overhead Line Works and Access Boundary
- Substation Extension Application Boundary (includes access road and existing substation)
- 2km Buffer
- 30km Buffer
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)



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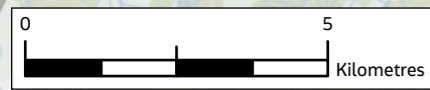
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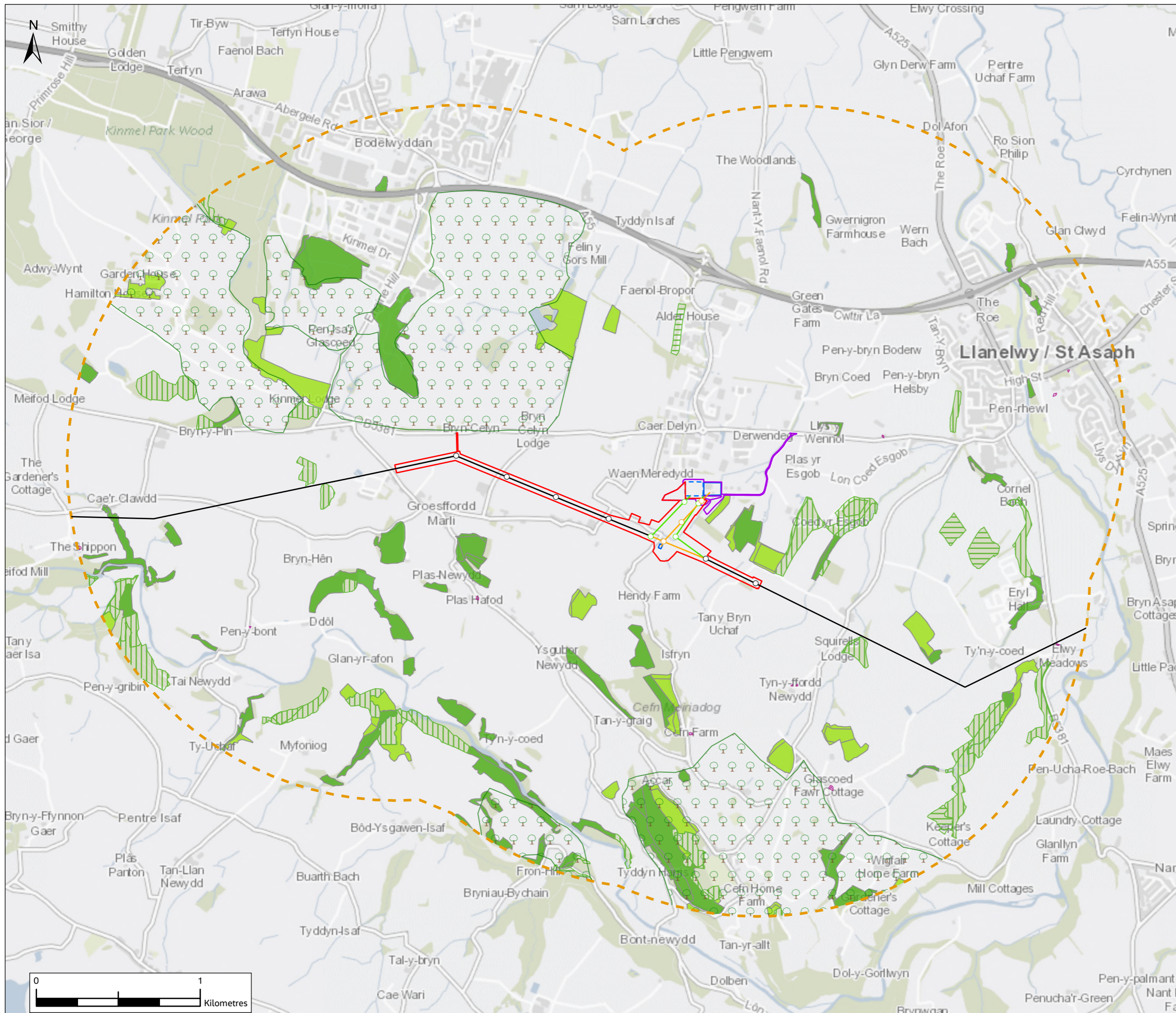
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FIGURE 1

Figure 2. Ancient Woodland and Priority Habitats



Legend

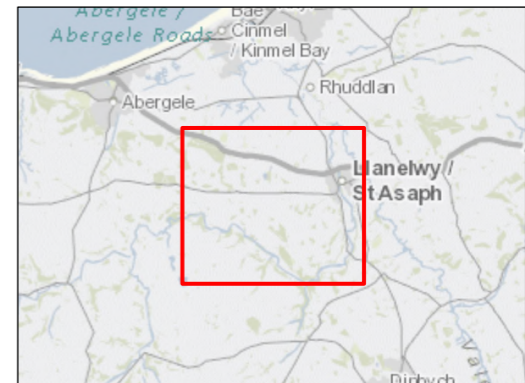
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- Substation Extension Application Boundary (includes access road and existing substation)
- Substation Extension Boundary
- Existing Substation Boundary
- Existing Overhead Line and Towers - Retained
- New Overhead Lines and Towers
- Existing Overhead Lines and Towers - Removed
- 2km Buffer

Priority Habitats

- Parkland
- Traditional Orchards

Ancient Woodland Inventory

- Ancient Semi Natural Woodland
- Restored Ancient Woodland Site
- Plantation on Ancient Woodland Site
- Ancient Woodland Site of Unknown Category



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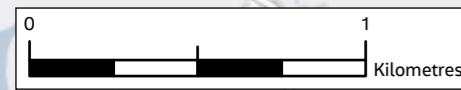
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BODELWYDDAN OVERHEAD LINES

Drawing Title

ANCIENT WOODLAND AND PRIORITY HABITATS AREAS

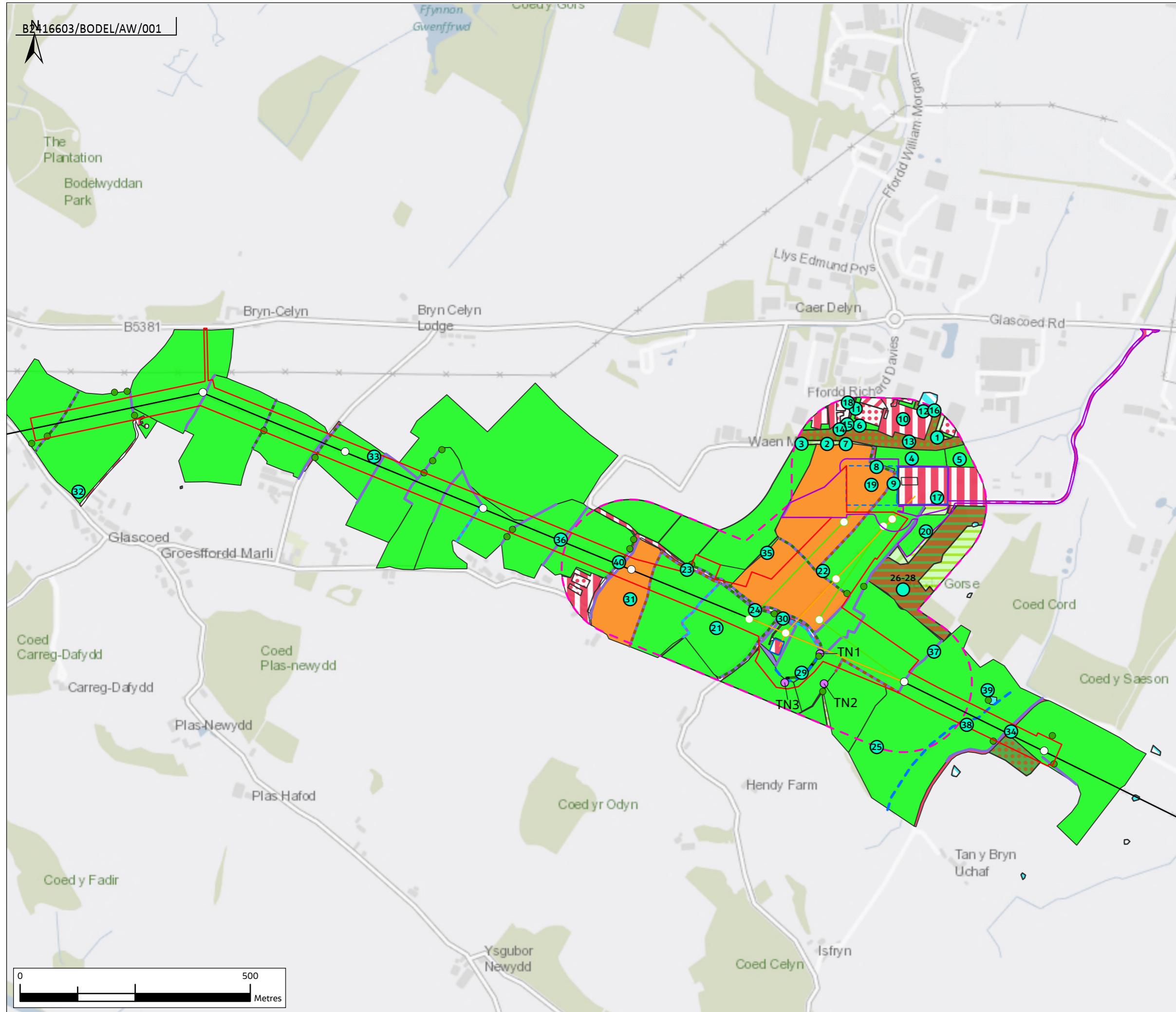
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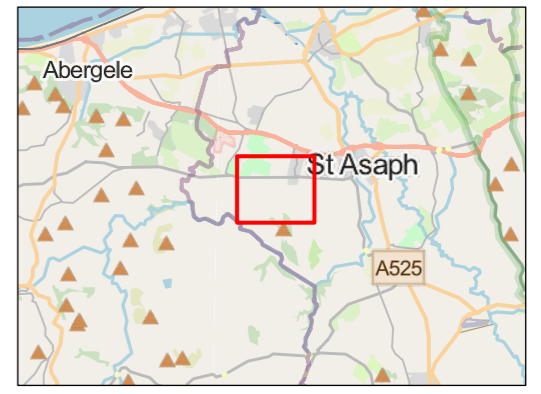
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FIGURE 2

Figure 3. UK Habitats Classification



- Legend**
- Overhead Line Works and Access Boundary
 - Proposed Substation Extension Works Boundary
 - Substation Extension Boundary
 - Existing Substation Boundary
 - Study area
 - Individual Tree
 - Target Note
 - Photo Location
 - Existing Overhead Line and Towers - Retained
 - New Overhead Lines and Towers
 - Existing Overhead Lines and Towers - Removed
 - Habitat type (linear)
 - w1g6 - line of trees
 - r1g - other standing water (wet ditch)
 - Habitat type (area)
 - c - Cropland
 - g3 - Neutral grassland
 - g3c - Other neutral grassland
 - g4 - Modified grassland
 - h - Heathland and shrub
 - h3 - Dense scrub
 - r1a - Eutrophic standing waters
 - u - Urban
 - u1 - Built-up areas and gardens
 - u1b - Developed land; sealed surface
 - u1b5 - Buildings
 - w1f - Lowland mixed deciduous woodland
 - w1h - Other woodland; mixed
 - w1g - Other woodland; broad-leaved
 - Hedgerow type
 - Native hedgerow
 - Native hedgerow with trees
 - Native hedgerow - associated with bank or ditch
 - Native hedgerow with trees - associated with bank or ditch



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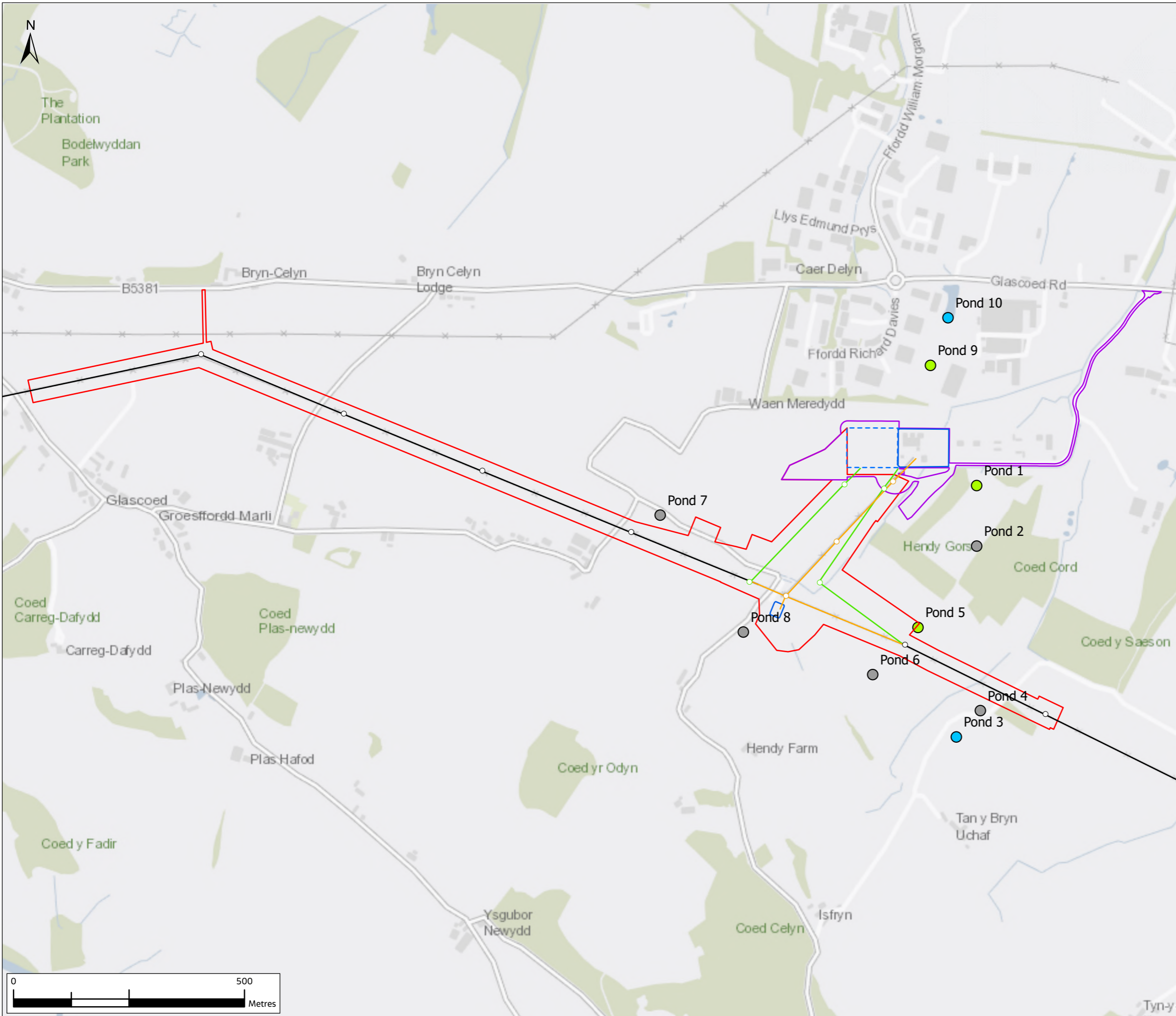
UK Habitat Classification

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FIGURE 3

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Figure 4. Great Crested Newt eDNA



- Legend**
- Overhead Line Works and Access Boundary
 - Proposed Substation Extension Works Boundary
 - Existing Substation
 - Substation Extension
 - Existing Overhead Line and Towers - Retained
 - Existing Overhead Lines and Towers - Removed
 - New Overhead Lines and Towers

- Great Crested Newt eDNA Survey Result**
- dry
 - negative
 - positive



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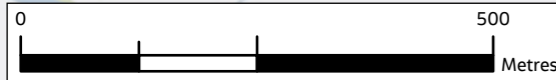
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Drawing Title
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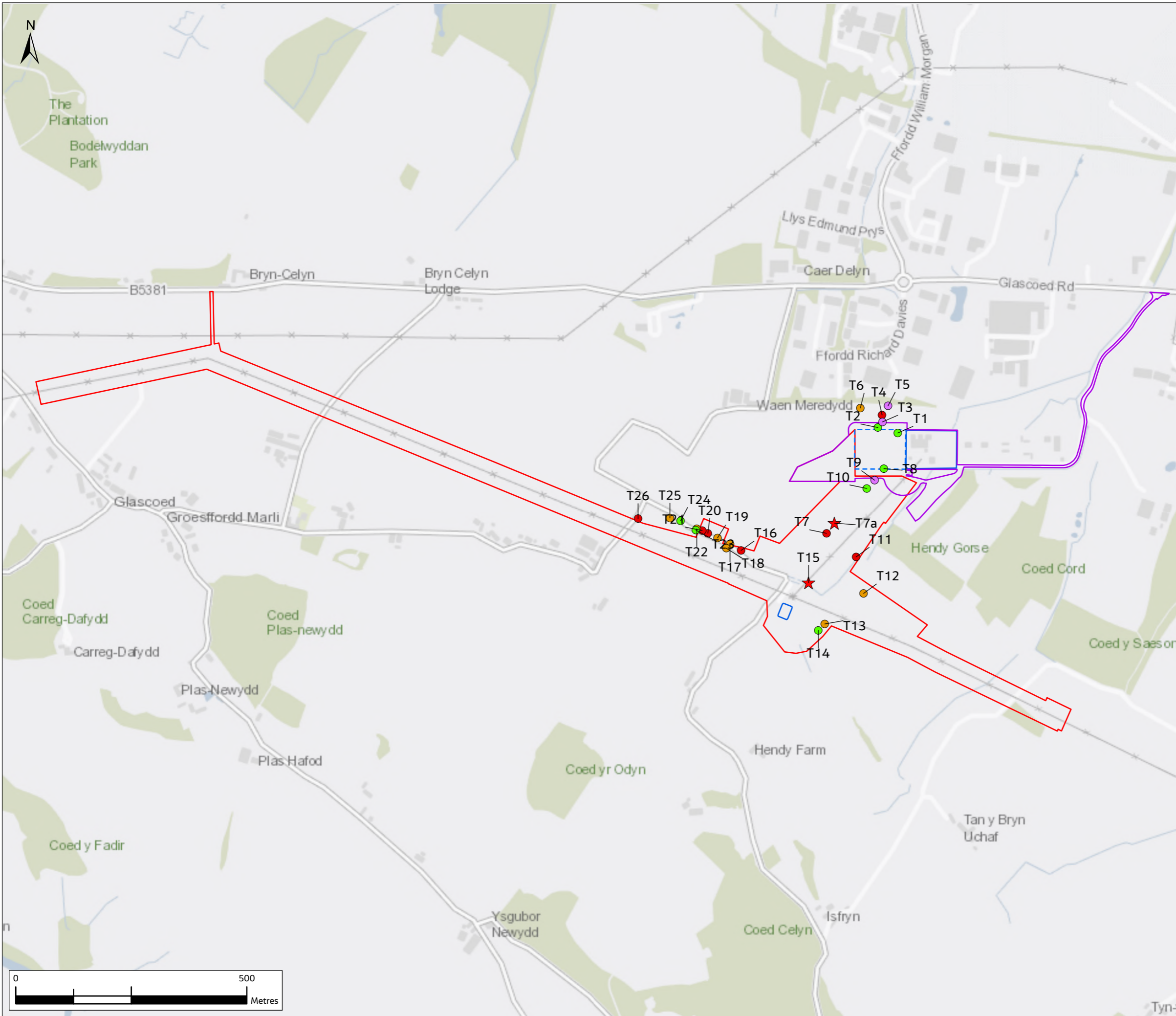
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FIGURE 4

Figure 5. Bat Survey



Legend

- Overhead Line Works and Access Boundary
- Proposed Substation Extension Works Boundary
- Substation Extension Boundary
- Existing Substation Boundary
- Existing Overhead Lines and Towers - Removed
- New Overhead Lines and Towers
- Existing Overhead Line and Towers - Retained

Tree - bat roosting potential

- ★ Confirmed Bat Roost
- High - Confirmed
- Moderate
- Negligible
- Low



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02	6/16/2025	FINAL	WW	RW	LG	TW
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
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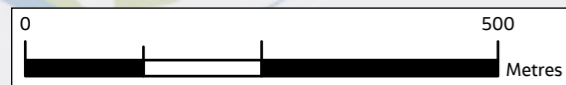
nationalgrid

Client
 Project
 BODELWYDDAN SUBSTATION

Drawing Title
 BAT SURVEY










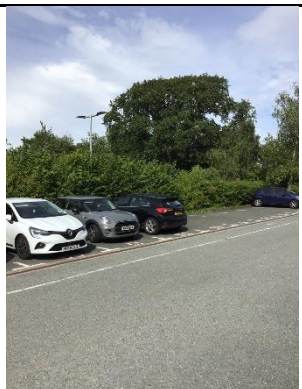


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FIGURE 5





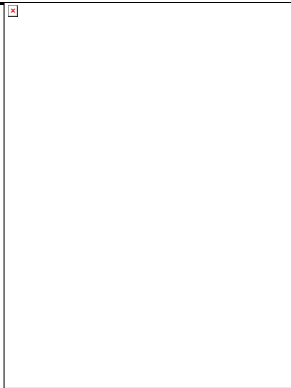









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Annex A. Habitat Survey Photographs

			
Photograph 1 Other neutral grassland: Tall ruderal, identified on site.	Photograph 2: Other neutral grassland: Tall ruderal, identified on site.	Photograph 3: other neutral grassland identified along road on site.	Photograph 4: Well managed other neutral grassland: semi improved, identified north of substation.
			
Photograph 5: Well managed other neutral grassland: semi improved, identified north of substation.	Photograph 6: well managed modified grassland identified north of the site, adjacent to buildings and sealed surfaces.	Photograph 7: Species rich hedgerow identified to the west of the crop field in the north area of the site.	Photograph 8: Species rich hedgerow identified north of the substation between semi improved neutral grassland and the road.
			
Photograph 9: Species rich hedgerow identified north of the substation between semi improved neutral grassland and the road.	Photograph 10: hawthorn dominated hedgerow identified near northern boundary of site.	Photograph 11: dense scrub near northern boundary of site.	Photograph 12: lowland mixed deciduous woodland identified at the northern boundary of the site.

Bodelwyddan Substation Extension and Overhead Line route: Biodiversity Baseline

			
<p>Photograph 13: other woodland mixed, identified along to the north of the substation.</p>	<p>Photograph 14: other woodland mixed, identified along to the north of the substation.</p>	<p>Photograph 15: An example of scattered trees within the grassland areas north of the substation.</p>	<p>Photograph 16: Pond located on the northern boundary of the site.</p>
			
<p>Photograph 17: Substation with buildings and sealed surface.</p>	<p>Photograph 18: An example of Introduced shrubs within gardens identified to the north of the site.</p>	<p>Photograph 19: Crop fields identified to the north of the site, west of the substation.</p>	<p>Photograph 20: An example of semi improved neutral grassland identified to the south of the substation.</p>
			
<p>Photograph 21: An example of well managed modified grassland identified to the south of the substation.</p>	<p>Photograph 22: An example of species poor hedgerow separating grassland habitat south of the substation.</p>	<p>Photograph 23: An example of species poor hedgerow containing oak tree species south of the substation.</p>	<p>Photograph 24: Hedgerow in good condition to the southwest of the site, near the western boundary.</p>

Bodelwyddan Substation Extension and Overhead Line route: Biodiversity Baseline

			
Photograph 25: Dense scrub within modified grassland near the south site boundary.	Photograph 26: north area of lowland mixed deciduous woodland featuring bat boxes in oak trees	Photograph 27: north area of lowland mixed deciduous woodland featuring bat boxes in oak trees	Photograph 28 south area of lowland mixed deciduous woodland.
			
Photograph 29: an example of the several dry ditches identified within the south area of the site, along borders of grass fields.	Photograph 30: an example of the sealed surface habitat identified on site in the form of country roads.	Photograph 31: Crop fields identified to the south of the site, adjacent to the southern site boundary.	Photograph 32: showing the modified grassland cut for hay.
			
Photograph 33: showing the modified grassland grazed by cattle.	Photograph 34: showing the plantation oak woodland (other broad-leaved woodland).	Photograph 35: showing the unsown arable field	Photograph 36: showing a species-poor hedgerow
			
Photograph 37: showing a species-rich hedgerow	Photograph 38: showing the wet ditch	Photograph 39: showing the pond on site	Photograph 40: showing the urban; developed land sealed surface habitat on site


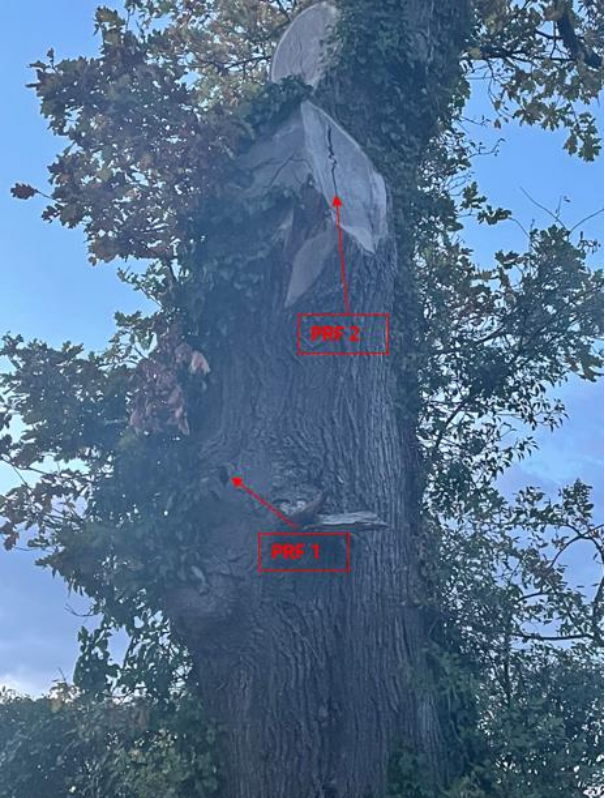
Annex B. Bat Survey Weather Data

Tree ref.	Date of survey	Survey type	Sunrise/sunset times	Start/finish time	Temp at start of survey (°C)	Cloud cover (%)	Precipitation	Windspeed
T4	06/09/22	Emergence	19.52	19:37 / 21:52	16	100	0	calm
	29/05/2023	Emergence	21.29	21:14 / 23:29	16	0	0	calm
	20/06/2023	Re-entry	04.46	03:19 / 05:01	14	85	0	calm
T6	07/09/22	Re-entry	06.32	04:29 / 06:47	13	85	0	calm
T7	31/08/22	Emergence	20.05	19:50 / 22:05	19	10	0	calm
	22/09/22	Emergence	19.13	18:58 / 21:13	15	70	light	calm
	31/05/2023	Re-entry	04.54	02:54 / 05:09	9	20	0	calm
T7A	31/08/22	Emergence	20.05	19:50 / 22:05	21	0	0	calm
	22/09/22	Emergence	19.13	18:58 / 21:13	15	100	0	calm
T9	07/09/22	Emergence	19.49	19:35 / 21:50	17	60	light	calm
T11	08/09/22	Re-entry	06.35	04:35 / 06:50	13	20	0	calm
	01/06/2023	Re-entry	04.54	02:54 / 04:54	9	90	0	calm
	19/06/2023	Emergence	21.45	21:30 / 23:05	16	5	0	calm
T12	21/09/22	Emergence	19.17	19:00 / 21:15	16	30	0	calm
	30/09/22	Re-entry	07.12	05:15 / 07:27	10	20	0	calm
T13	22/09/22	Re-entry	07.00	05:00 / 07:15	14	60	0	breezy
T15	30/08/22	Emergence	20.08	19:53 / 22:08	19	35	0	calm
	23/09/22	Re-entry	07.00	05:00 / 07:15	11	55	0	calm
	29/09/22	Emergence	18.58	18:43 / 20:58	13	0	0	calm
T16	31/08/22	Re-entry	06.21	04:21 / 07:15	11	35	0	calm

Bodelwyddan Substation Extension and Overhead Line route: Biodiversity Baseline

Tree ref.	Date of survey	Survey type	Sunrise/sunset times	Start/finish time	Temp at start of survey (°C)	Cloud cover (%)	Precipitation	Windspeed
	30/05/2023	Emergence	21.28	21:13 / 23:28	10	0	0	calm
	21/06/2023	Re-entry	0.46	03:19 / 05:01	15	50	0	calm
T17	01/09/22	Re-entry	06.23	04:50 / 06:38	12	0	0	calm
	28/09/22	Emergence	18.58	18:43 / 20:58	12	30	0	calm
T18	01/09/22	Re-entry	06.3	04:50 / 06:38	12	0	0	calm
	28/09/22	Emergence	18.53	18:43 / 20:58	12	90	0	breezy
T19	02/09/22	Re-entry	06.25	04:50 / 06:40	14	40	0	calm
	29/09/22	Re-entry	07.10	05:10 / 7:25	12	45	light	breezy
T20	01/09/22	Emergence	20.02	19:48 / 22:02	21	0	0	calm
	29/09/22	Re-entry	07.10	05:10 / 07:25	12	80	0	slight gusts
	01/06/2023	Emergence	21.31	21:16 / 23:31	15	0	0	light
T21	01/09/22	Emergence	20.02	19:48 / 22:02	21	0	0	calm
	01/06/2023	Emergence	21.31	21:16 / 23:31	15	0	0	light
	20/06/2023	Emergence	21.45	21:30 / 23:05	15	35	0	calm
T22	02/09/22	Re-entry	06.25	04:55 / 06:55	14.5	100	0	calm
	21/06/2023	Emergence	21.45	21:30 / 23:05	16	20	0	calm
T25	20/09/22	Emergence	19.18	19:03 / 21:18	16	10	0	calm
T26	21/09/22	Re-entry	06.58	04:58 / 07:13	10	90	0	calm

Annex C. Confirmed Bat Roost Features

Tree 7a	Tree 15
 <p>T7a - confirmed Pip sp. Roost</p>	 <p>PRF 2</p> <p>PRF 1</p>

Appendix I. Habitats Regulations Assessment Screening



Bodelwyddan Substation Extension and Overhead Line Route: Habitats Regulations Assessment Stage 1 Screening Report

Document no: B2416603/BODEL/ECO/004
Version: 04

National Grid
B2416603

Bodelwyddan Substation Extension and Overhead Line Route
28 February 2025

Bodelwyddan Substation Extension and Overhead Line Route: Habitats Regulations Assessment Stage 1 Screening Report

Client name: National Grid
Project name: Bodelwyddan Substation Extension and Overhead Line Route
Client reference: B2416603 **Project no:** B2416603
Document no: B2416603/BODEL/ECO/004 **Project manager:** KW
Version: 04 **Prepared by:** RW/HL
Date: 28 February 2025 **File name:** B2416603-BODEL-ECO-004
Bodelwyddan Substation HRA
Screening_Approved

Document status: FINAL

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00	03/10/23	DRAFT for Internal Review	LS	LG	LG	AB
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Executive summary

National Grid proposes to extend the existing Bodelwyddan substation, which lies approximately 2km west of St. Asaph in Denbighshire, and 1.3km south of Junction 26 of the North Wales A55 Expressway. The existing substation occupies an enclosed site approximately 2.5ha in area, with a private access 375m in length from a junction off Glascoed Road. In addition to extending the existing substation site, National Grid proposes to replace the turn-in of the existing Connah's Quay to Pentir overhead line with two double circuit overhead lines.

This report has been prepared in accordance with the requirements of National Grid, as the Competent Authority, to undertake a Habitats Regulations Assessment as set out in the Conservation of Habitats and Species Regulations 2017 (as amended). It considers the potential for the proposed project to result in significant effects to European sites either alone or in combination with other plans or projects. This report covers Stage 1 Screening only.

Two European sites have been considered during the Screening Assessment:

- Coedwigoedd Dyffryn Elwy / Elwy Valley Woods Special Area for Conservation (SAC); and
- Mwyngloddiau Fforest Gwydir / Gwydir Forest Mines SAC.

The results of the Stage 1 Screening Assessment show that the proposed project alone and in-combination with other plans and developments will have **no** Likely Significant Effects on the qualifying features of the two SACs. Consequently, the subsequent stages of HRA, including Stage 2: Appropriate Assessment, will not be required for this project.

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Acronyms and Abbreviations

CO	Conservation Objectives
CSZ	Core Sustainance Zone (bats)
CTMP	Construction Traffic Management Plan
DCO	Development Consent Order
DPF	Diesel Particulate Filters
EU	European Union
GCN	Great Crested Newt (<i>Triturus cristatus</i>)
GIB	Gas Insulated Busbars
GIS	Gas Insulated Substation
ha	Hectares
HGV	Heavy Goods Vehicle
HRA	Habitats Regulations Assessment
INNS	Invasive Non-Native Species
LGV	Light Goods Vehicle
LSE	Likely Significant Effects
QI	Qualifying Interest
SAC	Special Area of Conservation
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
ZoI	Zone of Influence

1. Introduction

1.1 Habitats Regulations Assessment

Habitats Regulations Assessment (HRA) assesses the potential for plans or projects to significantly affect European designated sites. In accordance with National Planning Policy and best practice guidelines, potential and candidate European sites, as well as Ramsar sites, are subject to HRA. Section 63(1) of the Conservation of Habitats and Species Regulations 2017 (as amended) requires that:

'A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which—

(a) is likely to have a significant effect on a European Site or a European offshore marine site (either alone or in combination with other plans or projects), and

(b) is not directly connected with or necessary to the management of that site,

must make an appropriate assessment of the implications of the plan or project for that site in view of that site's conservation objectives.'

1.2 Purpose and Structure of this Report

This report has been prepared in accordance with the requirements of National Grid, as the Competent Authority, to undertake an HRA as set out in the Conservation of Habitats and Species Regulations 2017 (as amended). The report is also available to inform decisions made by other Competent Authorities that are relevant to the proposed project e.g. Local Planning Authorities and Natural Resources Wales. It considers the potential for the proposed project to result in significant effects to European sites either alone or in combination with other plans or projects.

Planning Inspectorate Advice Note 10 (2022) outlines a three-stage process for HRA which has been followed as part of the assessment. Not all three stages of the process are required. This report concludes at Stage 1 – Screening and is structured as follows:

- Section 2 – provides a description of the project, including construction programme and methods;
- Section 3 – describes the methodology followed in this study to inform this HRA;
- Section 4 – presents the results of the Stage 1 Screening Assessment;
- Section 5 – presents the results of the in-combination assessment; and
- Section 6 – concludes the results of the Stage 1 Screening Assessment.

2. The Project

2.1 Project Proposal

National Grid proposes to extend the existing Bodelwyddan substation, which lies approximately 2km west of St. Asaph in Denbighshire, and 1.3km south of Junction 26 of the North Wales A55 Expressway. The existing substation occupies an enclosed site approximately 2.5 hectares (ha) in area, with a private access 375 metres (m) in length from a junction off Glascoed Road. The substation extension would include provision of the following: telecoms room; control room; Busbar protection relay room; feeder protection relay room; battery room; LVAC room; overhead line connection infrastructure; couplers; and infrastructure to support contracted user assets. Demolition and removal of some existing assets would also be required as part of the proposed development.

In addition to extending the existing substation site, National Grid proposes to replace the turn-in of the existing Connah's Quay to Pentir overhead line with two double circuit overhead lines. The proposed works would create a new overhead line from Connah's Quay to Bodelwyddan and Bodelwyddan to Pentir. Each double circuit line would be approximately 400m in length, approaching the substation from the existing overhead line to the south-west.

The proposals would also involve the removal of an existing cable sealing end compound, which connects the existing northern circuit to the substation by underground cables. Temporary working areas and access routes will be required to enable reconductoring or replacing conductors and wires, which will be between approximate OS Grid Reference SJ 01578 73153 and SJ 01885 73010, and SJ 00989 73380 and SH 99726 73686. See Figure 1 for site location and proposed red line boundary.

2.2 Site Description

The substation is set within a predominantly rural landscape, comprising agricultural fields, hedgerows, woodland and ditches. The substation is located to the south of Glascoed Road, St. Asaph (central Ordnance Survey (OS) grid reference: SJ 01738 73567) with the proposed development extending to the land to the south and the west of the substation. A business park is located approximately 25m north of the substation, and a wind farm borders the substation 150m to the east.

2.3 Project Delivery

It is important that the substation extension and connection of the proposed double circuit overhead lines are delivered as early as feasible to accommodate the anticipated new connections. These are required due to increasing energy demand and the need to mitigate the causes of climate change by achieving a carbon-neutral economy. The Welsh Government targets to generate 70% of electricity needs from renewable energy sources by 2030 and to reach net-zero by 2050.

Subject to planning permission, work is anticipated to commence on the Bodelwyddan substation extension during 2025 to deliver the wider project in time to accommodate the proposed new connections and additional load. The substation extension will take approximately 24 to 28 months to construct. The overhead line works will take longer due to required outages (period of time when at least one circuit or one 'side' of the overhead line is not live, allowing works to take place). The availability of outages can vary dependent on system conditions, but the current sequence of work is outlined in the stage-by-stage drawings, and as follows;

- Stage 1: Pre-outage assumes works commence 2026 with completion in April 2027;;
- Stage 2: Pentir - Deeside - Bodelwyddan 2 circuit outage assumed 5 weeks;
- Stage 3: Pentir - Deeside - Bodelwyddan 1 circuit outage assumed 3 weeks;

- Stage 4: Pentir - Deeside - Bodelwyddan 2 circuit outage assumed 6 weeks subject to confirmation of remote end works;
- Stage 5: Pentir - Deeside - Bodelwyddan 1 circuit outage assumed 4 weeks subject to confirmation of remote end works; and
- Stage 6: Post outage and final arrangement.

The programme anticipates delivery of the overhead line works in late 2028 or early 2029, which would allow the new connections into the substation (subject to the connecting projects securing required consents) and accommodation of the additional load on the revised overhead lines arrangements following completion of the substation extension.

2.4 Construction Methods and Techniques

The total area of the proposed substation extension comprising the permanent development of the substation extension, temporary working areas and compound and temporary car parking is approximately 3ha (29,510 m²). The substation extension permanent works comprise approximately 0.9ha (9,420m²).

The working methods are as follows:

- The majority of the Gas Insulated Substation (GIS) will be constructed within the main building and will not be visible during installation. The visible items will consist of Gas Insulated Busbars (GIB) and GIB enclosed cable sealing ends;
- Relay Rooms will be installed outside adjacent to the main building and the associated GIB. These are approximately 9m long by 4m wide and 4m high. The finish of these will be similar to the existing external relay rooms and to planning consent requirements;
- For the GIS/GIB it will require approximately 50 articulated low load lorries to the requirements in line with the Government Guidelines for "*Maximum length of vehicles used in the UK*" and "*Road Vehicles (Construction and Use) Regulations 1986 (as amended)*"; and
- External GIB are normally painted white. This helps to reduce any solar gain on the GIB and as a consequence keeps the gas pressure within the GIB within acceptable levels.

Construction working hours will typically be from 07:30 – 17:30 and may occasionally require weekend working between 08:00 – 17:00. Working during daylight hours will generally not require lighting, although lighting may be required in winter or if needed in work-specific areas, compounds and for security.

2.5 Ecological Survey Work

Jacobs UK Ltd was commissioned by National Grid to undertake a programme of ecological field survey and desk study to support the proposed project. The study area accounted for all areas where significant effects to ecological features could occur throughout the lifetime of the proposed project including the construction footprint, potential locations of any ancillary works, compounds and varying Zones of Influence (Zoi) for the ecological receptors present. The field survey area comprised the permanent and temporary working areas for the proposed project (combined substation extension and overhead line works) and is referred to as 'the site'. Surveys conducted comprised UK Habitat Classification and Condition Assessment, bat emergence and re-entry surveys, climbing assessments of trees for bats and great crested newt (GCN; *Triturus cristatus*) environmental DNA (eDNA) surveys.

The existing access road to the substation from Glascoed Road was not included in the scope of the ecological survey as the access road is in existence and no works are proposed. The development also includes a temporary construction compound to the north of Glascoed Road, opposite the substation access road. This

was not included in the scope of this report as it is an existing area of hardstanding used previously as a construction compound for a separate development.

Full results of the desk study and ecological field surveys undertaken are provided in a separate report: Bodelwyddan Substation Extension and Overhead Line Route: Appendix E Biodiversity Baseline. A summary of the bat survey results is provided below.

2.5.1 Bat Survey Work (2022-2023)

The ground-based assessment of trees for bat roost potential identified 27 trees within the survey area. Two trees were assessed as having 'negligible' potential to support roosting bats, seven trees with 'low' bat roosting potential, nine trees with 'moderate' bat roosting potential and nine trees with 'high' bat roosting potential. No buildings were identified to have any potential to support roosting bats.

Of the original 27 trees identified, 18 were then subject to further survey (dependent on potential impacts) between 2022 and 2023 which included dusk emergence surveys, dawn re-entry surveys and climb and inspect surveys.

A soprano pipistrelle (*Pipistrellus pygmaeus*) bat roost was confirmed in tree T15 (see Biodiversity Baseline, B2416603/BODEL/ECO/003, for further details on bat survey work). The roost features of T15 are likely to be actively used as a regular roost for individuals/small groups of male or non-breeding female bats.

A single pipistrelle bat (undefined species) roost was confirmed in T7a during the tree climb survey in March 2023. The roost feature of T7a is likely to be sporadically used by male or non-breeding female bats, as a transitional/occasional roost to shelter during the prolonged cold spells of the winter.

A single lesser horseshoe bat (*Rhinolophus hipposideros*) was heard and recorded, at distance, during the 2022 dawn re-entry survey of T13. Lesser horseshoe bat was not recorded during any other surveys of 2022 and 2023. Lesser horseshoe bat is listed as an Annex II species and a qualifying feature of Mwyngloddiau Fforest Gwydir/ Gwydyr Forest Mines Special Area for Conservation (SAC) which is located approximately 25km south west of the site and a feature of the Coedydd ac Ogofâu Elwy a Meirchion Site of Special Scientific Interest (SSSI) which is located approximately 1.3km south of the site.

An update to the UK Habitat Classification survey was undertaken in July 2024. No change in supporting habitat or potential bat roosting features were found.

3. Methodology

3.1 Background Information

This HRA Report follows guidance provided by the European Commission in 2001. It also follows guidance set out within the Planning Inspectorate's Advice Note Ten: Habitats Regulations Assessment (Planning Inspectorate, 2022) which provides a framework for the assessment of implications for European sites of Nationally Significant Infrastructure Projects (NSIP). The proposed project is not classed an NSIP, however the guidance for assessment is still relevant to this report. The latter outlines a three stage process for HRA, which comprises:

- Stage 1: Screening – the purpose of this Stage is to screen the project to see if it will have a significant effect on the European site's conservation objectives (alone or in combination with other projects or plans). If one or more likely significant effects were likely to occur, it would then be necessary to proceed to HRA Stage 2;
- Stage 2: Appropriate Assessment – assess the implications of the proposal for the qualifying features of the European site, in view of the site's conservation objectives, and identify ways to avoid or minimise any effects; and
- Stage 3: Derogation – consider if proposals that would have adverse effects on the integrity of a European site qualify for an exemption. There are three tests to this stage to be followed in order: consider alternative solutions; consider Imperative Reasons of Overriding Public Interest (IROPI); and secure compensatory measures. Each test must be passed in sequence for a derogation to be granted.

This HRA Report covers HRA Stage 1: Screening. Stage 2 is only triggered where one or more likely significant effects have been identified at Stage 1 (in the absence of mitigation).

3.2 Identifying Impact Pathways

The aim of Stage 1 Screening is to identify any Likely Significant Effects originating from the proposed project on qualifying interest features of European site. This assessment has used the 'impact pathway' approach to identify the mechanisms by which the proposed project might have likely significant effects on the qualifying interest features of European sites. The approach starts by identifying potential sources of effects and then mapping the progression of the effect along potential pathways. The geographical location and nature of the receiving environment are fundamental to the approach to determine the likely risk of exposure for a given receptor. An understanding of the receptor, its behavioural traits and specific vulnerability to the anticipated level and nature of the effect is similarly important. The approach is consistent with the iterative steps that European Commission guidance prescribes for the appraisal of potential receptors, effects and pathways that lead to the identification of European sites to be considered in Screening (European Commission, 2001).

Consideration is also given to the potential for more complex pathways that might link a receptor to an impact source, including indirect linkages. This includes consideration of effects to qualifying features of European sites that are located outside European sites but still fall within the proposed Project's Zone of Influence i.e. mobile species such as birds or bats.

The Stage 1 Screening Assessment considers all relevant European sites identified using the following criteria where the project:

1. is within 2km of a European site or functionally linked land;
2. is within 30km of a SAC, where bats are noted as one of the qualifying interest features;

3. crosses or lies adjacent to, upstream of, or downstream of, a watercourse which is designated in part or wholly as a European site;
4. has a potential hydrological or hydrogeological linkage to a European site containing a groundwater dependent terrestrial ecosystem (GWDTE) which triggers the assessment of European sites;
5. has an affected road network within 200m of European sites;
6. located within relevant Sites of Special Scientific Interest (SSSI) Impact Risk Zones (IRZ); and/or
7. there is existence of ecological connectivity with European sites in addition to those above.

3.3 Identification of Proposed Project Activities with the Potential to Generate LSEs

All proposed project activities with the potential to generate effects on European sites were identified, see Table 3.1. The following criteria were considered when reviewing the proposed activities:

- the size, scale and area of the works as they relate to land take;
- the extent of physical changes that would emanate from proposed activities;
- emissions and waste (disposal to land, water or air); and
- transportation requirements.

Best practice guidance, literature, and professional judgement were used to gauge the Zone of Influence of potential effects, e.g. the effects associated with dust emissions were considered over a distance of 50m in line with the Institute of Air Quality Management (IAQM) (2014) guidance. Based on this, a study area was identified reflecting the geographical area over which relevant significant effects may potentially arise. An assessment of the presence of European sites within this zone was then undertaken with respect to their Conservation Objectives.

Table 3.1: Potential Effect pathways from development on European sites

Broad categories of potential impacts	Potential impact pathways
Physical disturbance e.g. loss of habitats / supporting habitat / habitat fragmentation / habitat erosion	Physical loss of habitat is only likely to be significant if it is within the boundary of a European site, or within an area of supporting habitat outside of the European site (for example, off-site area of known foraging, roosting, breeding habitat for a qualifying interest (QI) for which a European site is designated – functionally linked land).
Habitat degradation e.g. changes in water quality (pollution) through ground contamination (toxic)	Water quality can be affected by spills of fuels, oil and chemicals from site vehicles. Changes in water quality could directly affect QI species or habitats or affect them indirectly through loss of aquatic prey species, or through changes in their habitat.
Mortality	Mortality of species could occur through direct impact (e.g. destruction of a bat roosting site) or indirectly (e.g. as a result of pollution events or in response to high noise/vibration stress).
Air quality changes e.g. dust emissions	Air emissions associated with vehicular traffic during construction of the proposed project and the release of dust following excavations and tracking of machinery.
Non-physical disturbance e.g. noise / vibration / machinery movements /	Disturbance may include, but not be limited to, noise, vibration, movement (of people and/ or vehicles) and lighting.

Broad categories of potential impacts	Potential impact pathways
human presence / light pollution	There is no current authoritative guidance on how far a noise study area should extend from construction activities due to the variability of the potential noise generating activities and plant used. However, the effects of noise (as well as visual/human presence) are only likely to be significant where the boundary of the proposed project extends within or is directly adjacent to the boundary of the European site, or within/adjacent to an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated).
Introduction or spread of invasive non-native species (INNS)	Introduction or spread of INNS e.g. due to plant movements or ground disturbance. Only likely to be experienced within the immediate vicinity of areas where machinery movements etc. would be undertaken. Potential for wider effects to occur where works are within the vicinity of flowing watercourses.

3.4 Assessment of Likely Significant Effects

In the assessment of likely significant effects, consideration is given to what proposed project outcomes would constitute a significant effect in terms of loss, fragmentation, disruption, disturbance and changes to key elements that may compromise the Conservation Objectives of the European site.

The HRA Screening process is underpinned by an interpretation of likely significant effects. The terms 'likely' and 'significance' have been defined variously by governments and through the courts. The following sections seek to provide clarification on the current interpretation of these terms as determined by recent guidance and case law.

An interpretation of 'Likely'

The two defining cases on the meaning of an LSE are provided in *Bagmoor Wind Ltd v The Scottish Ministers (2012)* and *Feeney v Secretary of State for Transport (2013)*. The cases establish that the term 'likely' should not be regarded as a measure of probability in the context of a HRA but instead infers the presence of a risk. An LSE finding is, therefore, an acknowledgment that the risk of a significant effect occurring exists.

The above rulings are consistent with the Advocate General's opinion in *Sweetman v An Bord Pleanála (2013)* and with the findings in the *Waddenzee* judgement. The former of these judgments found that "...there is no need to establish such an effect; it is merely necessary to determine that there may be such an effect".

The *Waddenzee* judgment clarifies the benchmark for a determination of an LSE and that "...if it cannot be excluded, on the basis of objective information, that [the works under consideration] would have a significant effect on that site..." then an LSE finding is appropriate. There must remain "no reasonable scientific doubt as to the absence of such effects."

Planning Inspectorate guidance also advises that if a large amount of evidence and data gathering is necessary to determine LSE, it is assumed that LSEs likely exist and an Appropriate Assessment is likely required (Planning Inspectorate, 2016).

An interpretation of 'Significant' under the Habitats Directive

It was clarified in the *Waddenzee* judgment that the measure of significance should be made against the Conservation Objectives for which the site was designated: "*where a plan or project [...] is likely to undermine the site's conservation objectives, it must be considered likely to have a significant effect on that site*"¹.

3.5 Mitigation Measures

Mitigation refers to measures proposed to avoid or reduce adverse environmental effects. Previously, mitigation aimed at avoiding or reducing significant effects to European sites was considered to be appropriate 'objective information' about a plan or project and was considered at the Screening stage, in accordance with the *Waddenzee* ruling. Moreover, in *R (Hart D C) v SSCLG and others* (EWHC 1204 (Admin)) the judgement was that:

'... there is no legal requirement that a screening assessment ... must be carried out in the absence of any mitigation measures that form part of a plan or project. On the contrary, the competent authority is required to consider whether the project, as a whole, including such measures, if they are part of the project, is likely to have a significant effect...'

However, in April 2018 a converse decision was reached by the Court of Justice of the European Union (CJEU) in *People Over Wind and Sweetman v Coillte Teoranta* (C323/17) which stated that:

'... Article 6(3) of the Habitats Directive must be interpreted as meaning that, in order to determine whether it is necessary to carry out, subsequently, an Appropriate Assessment of the implications, for a site concerned, of a plan or project, it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site.'

As such, good practice or mitigation measures (other than embedded measures) specifically intended to reduce the adverse effects of a plan or project on a European site have not been taken into account during the Stage 1 Screening.

3.6 In-combination Assessment

The Habitats Directive requires that a HRA must assess whether a project or plan would be likely to have a significant effect on a European site "*either individually or in combination with other plans or projects*". The Directive recognises that in some cases, the effects of a project or plan on its own would be either unlikely or insignificant. Nevertheless, the Directive also recognises that those plans and projects which are unlikely to have a likely significant effect alone may have a likely significant effect in combination with other plans and projects.

The in-combination component of the likely significant effect test needs to focus only on those plans or projects that potentially could interact with the project under consideration. In this respect the in-combination assessment must consider whether:

- The effects of the plans and projects, in combination, would make effects more likely to occur, or more likely to occur at significant levels, that alone would be unlikely to either occur or be significant.
- The effects of the plans and projects, in combination, would make insignificant effects significant.
- The effects of the plans and projects, in combination, would generate new or different effects that would not occur if the plans and projects proceeded alone.

¹ Case C-127/02 *Waddenzee*, para 49.

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The in-combination assessment was restricted to an area within 200m of the proposed project, as this is the anticipated maximum extent of the proposed project's zone of influence. Plans or projects located beyond 200m are not considered likely to act in-combination with any potential effects from the proposed project.

4. Screening Results

Two sites have been identified during the Screening Assessment (see Figure 2):

- Coedwigoedd Dyffryn Elwy / Elwy Valley Woods SAC is located within 2km of the proposed project; and
- Mwyngloddiau Fforest Gwydir / Gwydir Forest Mines SAC is located within 30km of the proposed project and is designated on behalf of the bat interest present.

Each designated site is taken in turn and screened in Table 4.1 and Table 4.2, respectively.

Table 4.1: Coedwigoedd Dyffryn Elwy / Elwy Valley Woods SAC, Stage 1 Screening Assessment

Project Name	Bodelwyddan Substation Expansion and Overhead Line Route
European Site	Coedwigoedd Dyffryn Elwy / Elwy Valley Woods SAC
Characteristics of European Site	
Location and distance of European site from the proposed works	Central OS Grid Reference: SJ 020691 1.3 km to the south of the existing National Grid sub-station at its closest point
European site size	81.44 ha
Key features of European site including the primary reasons for selection and any other qualifying interests.	<u>Annex I habitats that are a primary reason for selection of the SAC:</u> <ul style="list-style-type: none"> • 9180 Tilio-Acerion forests of slopes and screes and ravines • Elwy Valley Woods is one of three sites selected to represent <i>Tilio-Acerion</i> forest across its geographic range on the Carboniferous limestone of north Wales, and is an example of the habitat with an outstanding lower-plant flora. The canopy is quite varied: ash (<i>Fraxinus excelsior</i>) is the commonest tree, but there is also occasional small-leaved lime (<i>Tilia cordata</i>) and wild service-tree (<i>Sorbus torminalis</i>). There is a rich, calcicolous understorey and ground flora, and rare bryophytes include <i>Bryum canariense</i>, <i>Cololejeunea rossettiana</i>, <i>Plagiochila britannica</i>, <i>Platydictya confervoides</i> and <i>Isothecium striatulum</i>. The woods have developed along steep valley-sides and ravines that are also important for their cave systems and Pleistocene fossil mammal assemblages.
Vulnerability of European site - any information available from the standard data forms on potential effect pathways	Pressures considered to have an impact on the SAC are (JNCC, 2015a): <ul style="list-style-type: none"> • Air pollution and air-borne pollutants • Grazing in forests/ woodland • Invasive non-native species • Forest and Plantation management and use • Pollution to groundwater (point sources and diffuse sources) • Interspecific floral relations
Conservation Objectives of the European Site	The vision for the SAC is for it to be in favourable conservation status, where all of the following are satisfied (Countryside Council for Wales, 2008a): <ul style="list-style-type: none"> • The area of <i>Tilio-acerion</i> woodland is stable or increasing, at the expense of areas of non-native trees, including beech (<i>Fagus sylvatica</i>). • The woodland is maintained as far as possible by natural processes.

	<ul style="list-style-type: none"> • The following canopy species ash, field maple, rowan, Wych elm and small leaved lime should be present throughout. • The remainder of the site will be other semi-natural habitat. • Trees and shrubs are mainly locally native broadleaved species. • The abundance and density of individual native species varies across the site. • Trees and shrubs of a wide range of ages and sizes are present. • Tree seedlings are plentiful throughout the site. • Other canopy forming species including conifers (except yew (<i>Taxus baccata</i>) which is native), beech, hornbeam (<i>Carpinus betulus</i>) and sycamore (<i>Acer pseudoplatanus</i>) will be discouraged. • Deadwood, standing or fallen, will be retained to provide habitat for invertebrates, fungi and other woodland species. • Field and ground layers are well developed with a patchwork of vegetation communities characteristic of local soil and humidity conditions. • All factors affecting the achievement of these conditions are under control.
Description of the Project	
Size and scale	The total area of the proposed substation extension comprising the permanent development of the substation extension, temporary working areas and compound and temporary car parking is approximately 3ha. The substation extension permanent works comprise approximately 0.9ha.
Land-take	Loss of approximately 0.78ha of agricultural land (modified grassland and cropland) and 89m of hedgerow would be required. However, this is at distance from the SAC which is located approximately 1.3km from the site.
Resource requirements	There will be no resource requirements from the SAC or from any land which is considered to be functionally linked to the SAC.
Emissions (e.g. polluted surface water runoff - both soluble and insoluble pollutants, atmospheric pollution).	<p>Construction works will unavoidably result in some noise, vibration, dust emissions and light emissions, although the extent of which will be limited to the proposed project boundary and immediate surrounds. Due to the distance the proposed project is located from the SAC, it is considered that the change in air, noise and light quality will be negligible and inconsequential in comparison to those generated by the existing sub-station.</p> <p>There is no affected road network that would trigger an assessment of possible vehicle emissions on sensitive receptors and the SAC is beyond the 50m distance where dust could potentially cause an impact and the 200m where nitrogen deposition could cause an impact on sensitive receptors.</p> <p>There will be no discharge to surface or ground water during works and no pathway to any accidental discharge as there are no hydrological connections between the project and the SAC.</p> <p>Outside of non-routine maintenance requests and security events, the site would not be lit at night. It is not anticipated that there would be additional noise, emissions or discharges during operation.</p>

Excavation requirements (e.g. impacts of local hydrogeology)	The proposed project will not require any excavation works within the SAC or within any land which could be considered as hydrologically linked to the SAC.
Transportation requirements	<p>During the peak of construction for the substation extension, it is anticipated that the site will generate 19 HGV trips two-way and 50 LGV/ cars trips two way per day. There will be a maximum of 25 staff present on site daily.</p> <p>During the peak of construction for the overhead lines, it is anticipated that the site will generate 36 HGV trips two-way and 34 LGV/ cars trips two way per day. There will be a maximum of 17 staff present on site daily.</p> <p>During operation the substation extension would be subject to routine maintenance checks but will not lead to any increase in the number of personnel working at the substation. Consequently, there will be no change in operational traffic and no new permanent access routes.</p> <p>This does not meet the criteria to be considered an affected road network.</p>
Duration of construction, operation etc.	Construction of the substation is scheduled to commence in 2024 and will take between 24 and 28 months to complete. The overhead lines work will commence in 2026 and will be complete by 2027.
<p>Initial Assessment: The key characteristics of the site and the details of the European site should be considered in identifying potential impacts.</p> <p>Describe any likely changes to the site arising as a result of the following:</p>	
Reduction of habitat area	There will be no reduction in habitat area of the SAC as a result of the proposed project. No vegetation clearance is required within the SAC. Approximately 0.78ha of agricultural land (modified grassland and cropland) and 89m of hedgerow would be permanently lost. However, this would be at over 1.3km from the SAC.
Disturbance to key species / habitats	<p>There will be no disturbance to the qualifying habitats located within the SAC, as a result of the proposed project. Works are located approximately 1.3km from the SAC and are relatively small scale.</p> <p>There will be no discharge to ground water during works and no pathway linking the SAC and the project should there be any accidental discharge.</p>
Habitat or species fragmentation	There will be no fragmentation of the woodland habitat that comprises the SAC designation.
Reduction in species / habitat density	There will be no reduction of the woodland habitat that comprises the SAC designation. Minor habitat loss would be required for the project but this would be of agricultural land only and be at distance from the SAC.
Changes in key indicators of conservation value (water quality, etc)	Direct or indirect impacts upon the key indicators of conservation value in the SAC will not occur as there are no pathways to effect: there are no hydro or hydrogeological connections between the project and the SAC and the SAC is further than the 200m where potential air quality changes could cause an effect.
Climate Change	Works will produce some small-scale carbon dioxide emissions and, on this basis, contribute to the global production of carbon dioxide emissions from human activities. However, given the localised scope and preference for

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	modern machinery and/or machinery with diesel particulate filters (DPFs) to limit pollutants, a negligible impact is anticipated.
Describe any likely impacts on the European site as a whole in terms of:	
Interference with key relationships that define the structure of the site	There are no pathways to effects that could interfere with the key relationships that define the structure of the site (i.e. habitat distribution and extent within the SAC) given that there is no vegetation clearance required and no pathway to effect that would change the habitat structure of the SAC.
Interference with key relationships that define the function of the site	There are no pathways to effects that could result in interfere of the key relationships that define the function of the site.
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	No likely significant effect
Disturbance to key species	No likely significant effect
Habitat or species fragmentation	No likely significant effect
Loss	No likely significant effect
Fragmentation	No likely significant effect
Disruption	No likely significant effect
Change to key elements of the site (e.g. water quality, hydrological regime etc)	No likely significant effect
Describe those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known:	
Outcome of screening stage	No Likely Significant Effect
Are the appropriate statutory environmental bodies in agreement with this conclusion	This report is for consultation purposes.

Table 4.2: Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC Stage 1 Screening Assessment

Project Name	Bodelwyddan Substation Expansion and Overhead Line Route
European Site	Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC
Characteristics of European Site	
Location and distance of European site from the proposed works	Central OS Grid reference: SH 795 578 Approximately 25km to the south-west of the existing National grid sub-station
European site size	39.13ha
Key features of European site including the primary reasons for selection and any other qualifying interests.	<u>Annex I habitats that are a primary reason for selection of the SAC:</u> <ul style="list-style-type: none"> 6130 Calaminarian grasslands of the <i>Violetalia calaminariae</i> <u>Annex II species present as a qualifying feature but not as a primary reason for site selection:</u> <ul style="list-style-type: none"> 1303 Lesser horseshoe bat (significant presence) As only the lesser horseshoe bat feature of the SAC that meets the criteria for inclusion the screening assessment, this feature shall be assessed only.
Vulnerability of European site - any information available from the standard data forms on potential effect pathways	Pressures considered to have an impact on the SAC are (JNCC, 2015b): <ul style="list-style-type: none"> Forest and Plantation management and use Air pollution and air-borne pollutants Invasive non-native species Biocenotic evolution, succession Outdoor sports and leisure activities, recreational activities Other ecosystem modifications Mining and quarrying Other urbanisation, industrial and similar activities
Designated Site Conservation Objectives	The vision for the SAC is for it to be in favourable conservation status, where all of the following are satisfied (lesser horseshoe bat objectives only (Countryside Council for Wales, 2008b): <ul style="list-style-type: none"> The remainder of the management units not highlighted for calaminarian grassland will be maintained in a favourable condition for lesser horseshoe bat.
Description of the Project	
Size and scale	The total area of the proposed substation extension comprising the permanent development of the substation extension, temporary working areas and compound and temporary car parking is approximately 3ha. The substation extension permanent works comprise approximately 0.9ha.
Land-take	Loss of approximately 0.78ha of agricultural land (modified grassland and cropland) and 89m of hedgerow would be required. However, this is at distance from the SAC which is located approximately 25km from the site.
Resource requirements	There will be no resource requirements from the SAC.
Emissions (e.g. polluted surface water runoff - both soluble and insoluble pollutants, atmospheric pollution).	Construction works will unavoidably result in some noise, vibration, dust emissions and light emissions, although the extent of which will be limited to the proposed project boundary and immediate surrounds. Due to the

	<p>distance the proposed project is located from the SAC, it is considered that the change in air, noise and light quality will be negligible and inconsequential in comparison to those generated by the existing sub-station.</p> <p>There is no affected road network that would trigger an assessment of possible vehicle emissions on sensitive receptors and the SAC is beyond the 50m distance where dust could potentially cause an impact and the 200m where nitrogen deposition could cause an impact on sensitive receptors.</p> <p>There would be no discharge to surface or ground water during works and no pathway to any accidental discharge as there are no hydrological connections between the project and the SAC.</p> <p>Outside of non-routine maintenance requests and security events, the site would not be lit at night. It is not anticipated that there would be additional noise, emissions or discharges during operation.</p>
Excavation requirements (e.g. impacts of local hydrogeology)	The proposed project will not require any excavation works within the SAC or within any land which could be considered as hydrologically linked to the SAC.
Transportation requirements	<p>During the peak of construction for the substation extension, it is anticipated that the site will generate 19 HGV trips two-way and 50 LGV/ cars trips two way per day. There will be a maximum of 25 staff present on site daily.</p> <p>During the peak of construction for the overhead lines, it is anticipated that the site will generate 36 HGV trips two-way and 34 LGV/ cars trips two way per day. There will be a maximum of 17 staff present on site daily.</p> <p>During operation the substation extension would be subject to routine maintenance checks but will not lead to any increase in the number of personnel working at the substation. Consequently, there will be no change in operational traffic and no new permanent access routes.</p> <p>This does not meet the criteria to be considered an affected road network.</p>
Duration of construction, operation etc.	Construction of the substation is scheduled to commence in 2024 and will take between 24 and 28 months to complete. The overhead lines work will commence in 2026 and will be complete by 2027.
<p>Initial Assessment: The key characteristics of the site and the details of the European site should be considered in identifying potential impacts.</p> <p>Describe any likely changes to the site arising as a result of the following:</p>	
Reduction of habitat area	<p>The project will not require any land-take or habitat loss from the SAC. Approximately 0.9ha of agricultural land would be lost, though this is not considered important foraging habitat for bats. The permanent loss of 110m of hedgerow is unlikely to affect lesser horseshoe bats as although hedgerows provide important commuting routes, at the distance from the SAC (i.e. 25km) the effected hedgerow is highly unlikely to provide an important habitat link between important feeding or roosting resources for the SAC bats which have a core sustenance zone² of 2km.</p>

² The area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the resilience and conservation status of the colony using the roost

Disturbance to key species	Bats are sensitive to changes in noise, vibration and lighting. However, the SAC is located approximately 25km to the south west of the project so disturbance to bats inhabiting roosts of the SAC is considered highly unlikely. Impacts to lesser horseshoe bats are also considered unlikely as the on-site habitats do not contribute to the functional habitat for the local lesser horseshoe bat population. This is because the CSZ for the species will normally be within 2km of an individual's roosting site (Collins, 2016) and the site is located approximately 25km from the proposed project. Amongst a programme of bat survey over two year, lesser horseshoe bat activity was identified just once.
Habitat or species fragmentation	The proposed project is not considered to be functionally linked land to the SAC. No vegetation clearance is required within the SAC and no vegetation which constitutes a foraging or commuting pathway for lesser horseshoe bats will be cleared as a result of the proposed project.
Reduction in species / habitat density	There will be no reduction in habitat density located within the SAC or functionally linked land. The project will not result in a reduction of species density i.e. injury or mortality of individual bat species of the SAC population. A programme of bat survey over two years did not identify any roosting lesser horseshoe bats in the survey area.
Changes in key indicators of conservation value (water quality, etc)	Direct or indirect impacts upon the key indicators of conservation value in the SAC will not occur as there are no pathways to effect: there are no hydro or hydrogeological connections between the project and the SAC and the SAC is further than the 200m where potential air quality changes could cause an effect.
Climate Change	Works will produce some small-scale carbon dioxide emissions and, on this basis, contribute to the global production of carbon dioxide emissions from human activities. However, given the localised scope and preference for modern machinery and/or machinery with DPFs to limit pollutants, a negligible impact is anticipated.
Describe any likely impacts on the European site as a whole in terms of:	
Interference with key relationships that define the structure of the site	There are no pathways to effects that could interfere with the key relationships that define the structure of the site (i.e. bat roosting or feeding habitat abundance within the SAC).
Interference with key relationships that define the function of the site	There are no pathways to effects that could result in interfere of the key relationships that define the function of the site.
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	There will be no reduction of habitat area within the SAC. Approximately 0.9ha of agricultural land and 110m of hedgerow would be permanently lost but this would be at 25km from the SAC and therefore beyond the 2km CSZ where habitats are important feeding and roosting resources.
Disturbance to key species	There will be no disturbance to lesser horseshoe bats within the SAC due to the 25km distance between the project and the SAC. The project site does not constitute functionally linked land for the mobile lesser horseshoe bats of the

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	SAC with a single recording of the species made in two years of field survey indicating that the project site is not an important resource.
Habitat or species fragmentation	Although there would be a permanent loss of 89m of hedgerow, this would be at 25km from the SAC and in a location that does not provide an important habitat connection for individuals of the SAC between important feeding and roosting resources outside of the SAC.
Loss	There will be no loss of any species, habitats or connectivity that could compromise the lesser horseshoe bat population.
Fragmentation	There will be no fragmentation of habitats as no vegetation clearance within the SAC is required.
Disruption	The project will not significantly disrupt the structure or function of the SAC.
Change to key elements of the site (e.g. water quality, hydrological regime etc)	N/A – No pathway to effect
Describe those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known:	
Outcome of screening stage	No Likely Significant Effect
Are the appropriate statutory environmental bodies in agreement with this conclusion	This report is for consultation purposes.

5. In-Combination Assessment

In order to take account of in-combination effects, plans and projects that are completed, approved but uncompleted, or proposed (but not yet approved) should be considered in this context (European Commission, 2002).

The in-combination assessment was restricted to an area within 200m of the proposed project, as this is the anticipated maximum extent of the proposed project's ZOI. Plans or projects located beyond 200m are not considered likely to act in-combination with any potential effects from the proposed project.

A search for planning applications and local plans located within 200m of the proposed works was conducted using the following sources:

- Denbighshire County Council (Denbighshire County Council, 2025);
- Denbighshire County Council Adopted Local Plan Interactive Map (Denbighshire County Council, 2025 (a)); and
- The Planning Inspectorate website (<https://national-infrastructure-consenting.planninginspectorate.gov.uk/project-search>)

For the purposes of this HRA Stage 1 Screening exercise, individual residential planning applications and other small construction projects including school renovations and upgrades have not been considered as part of the in-combination assessment. This is because small residential upgrades for example will not have an impact on SAC qualifying interest habitats or species (lesser horseshoe bats).

An assessment of the Denbighshire County Council Local Plan and Planning Portal found no development proposals or ongoing development which would act in-combination with the Bodelywyddan Substation Extension and Overhead Powerlines Project to have a likely significant effect on the Coedwigoedd Dyffryn Elwy/ Elwy Valley Woods SAC or Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC.

Developments of potential in-combination interest identified comprised:

- Awel-y-Môr Offshore Wind Farm (substation to the northwest with underground cables) (The Planning Inspectorate National Infrastructure Planning Ref: EN010112);
- Mona Offshore Wind Farm (DCO Examination closed January 2025) (The Planning Inspectorate National Infrastructure Planning Ref: EN010136 and EN010137); and
- IGP Solar EIA Scoping Opinion Request of January 2025 (Denbighshire County Council Application 40/2024/1575/EIA-SCO).

In-combination effects on European sites are highly unlikely to occur. The scale of habitat affected (and therefore also any dependent species) by the proposed substation and overhead line works is relatively small and much of it temporary. While the two offshore wind farm projects considered include an underground cable and new substation to the south of the existing Bodelywyddan substation, the nature and scale of the Bodelywyddan works are so minor in comparison that no in-combination effect is anticipated, even if construction works were to overlap. It is highly unlikely that there would be any overlap in construction between the Bodelywyddan substation and overhead line works and the IGP Solar project,

In light of the above information, there is no potential for in-combination effects to undermine the conservation objectives of any European sites from the proposed substation extension and overhead power lines and other plans or projects.

6. Stage 1 Screening Assessment Conclusions

This Stage 1 Screening Assessment report presents the objective scientific information required to inform a robust and complete examination of the potential impacts of the proposed works on European sites. The conclusion of the Screening Assessment is that there is no potential for Likely Significant Effects, alone or in combination, on the conservation objectives of European sites listed in this report. Therefore, further assessment, including Stage 2 Appropriate Assessment of the proposed works, is not required.

7. References

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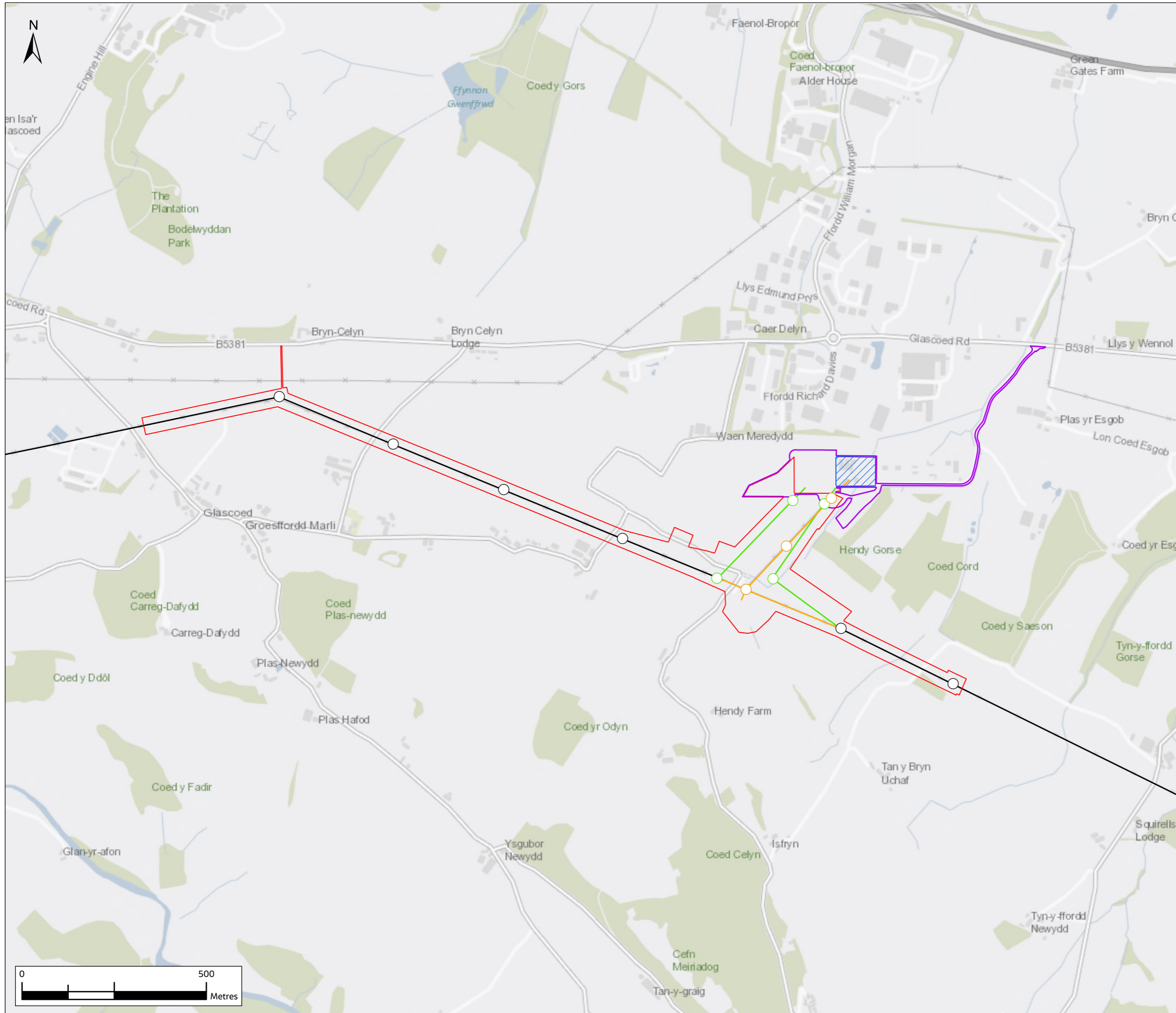
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





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Figures

Figure 1. Works Site Plan



Legend

-  Overhead Line Works and Access Boundary
-  Substation Extension Application Boundary (includes access road and existing substation)
-  Existing Substation Boundary
-  Existing Overhead Line and Towers - Retained
-  Existing Overhead Lines and Towers - Removed
-  New Overhead Lines and Towers



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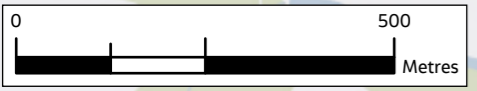
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Project
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Drawing Title
 WORKS SITE LOCATION PLAN

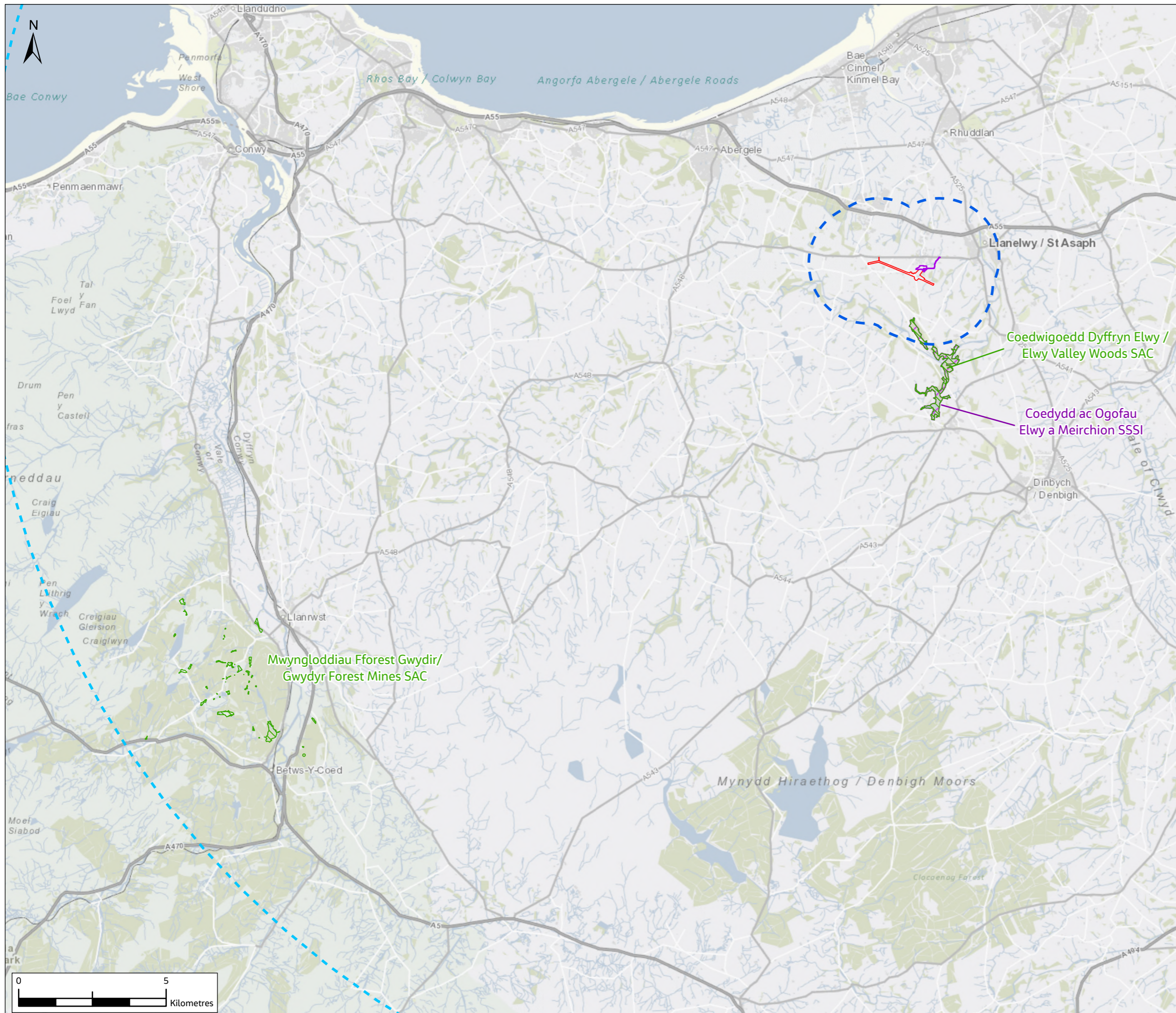
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FIGURE 1

Figure 2. Designated Sites Plan



Legend

- Overhead Line Works and Access Boundary
- Proposed Substation Extension Works Boundary
- 2km Buffer
- 30km Buffer
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)



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Drawing Title
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FIGURE 2

Appendix J. Landscape and Visual Methodology

J.1 LVA Assessment Criteria

The criteria for assessing the sensitivity of receptors, magnitude of effects and level of effects is presented below.

The nature of landscape and visual effects may be beneficial or adverse. Beneficial effects are those that enhance and/or reinforce characteristics that are valued. Adverse effects are those that remove and/or undermine characteristics that are valued.

J.1.1 Evaluation of Sensitivity

Sensitivity is defined by GLVIA3 as, '*the nature of the receptor likely to be affected*'. In accordance with GLVIA3, the assessment of landscape and visual sensitivity combines judgements on the value attached to that receptor and the susceptibility of the receptor to the specific type of development proposed.

Sensitivity has been assessed on a three-point scale of High, Medium or Low. The application of these criteria is not formulaic, and the tables below only indicate general categories of sensitivity.

J.1.1.1 Landscape Sensitivity

For the purpose of this assessment, landscape sensitivity to change is defined as the ability of the landscape receptor to accommodate the overhead line works without undue, negative consequences.

Sensitivity of landscape receptors to change will be assessed using the criteria detailed in Appendix Table 1 below.

Appendix Table 1: Landscape Sensitivity Criteria

Sensitivity	Criteria
High	Landscape of particular distinctive character, which is highly valued and considered susceptible to relatively small changes.
Medium	Landscape of moderately valued characteristics considered reasonably tolerant of change. Some ability to accommodate the overhead line works without undue harm.
Low	Landscape of generally low valued characteristics considered potentially tolerant of substantial change.

The sensitivity of visual receptors to changes in their views have been evaluated in accordance with the criteria provided in Appendix Table 2, based on the receptor susceptibility to change and the value of views.

Appendix Table 2: Visual Sensitivity Criteria

Sensitivity	Criteria
High	Receptors where the changed view is of high value and importance and/or where the receptor will notice any change to visual amenity by reason of the nature of use and their expectations. Receptors where the view is important to users will be considered to be of high sensitivity such as residential properties with views from principal rooms or outdoor spaces or PROW and long distance routes.
Medium	Receptors where the changed view is incidental, but not critical to amenity and/or the nature of the view, is not a primary consideration of the users. Such as residential properties with restricted views or views from non-principal rooms where the focus is not on the landscape or view and receptors where users are travelling through or engaged in outdoor recreation where the view is incidental or transient and sporadic.
Low	Receptors where the changed view is unimportant and/or users are not sensitive to change. People at their place of work, industrial facilities or people traveling through the landscape in cars, trains or

Sensitivity	Criteria
	other transport such that the speed and nature of the views involved area short lived and have no special significance

J.1.2 Evaluation of Magnitude of Effect

The magnitude of effect is defined by GLVIA3 as, '*the nature of the effect likely to occur*'. It combines judgements on the size and scale of the effect; the geographical extent of the area over which it occurs; whether the effect is reversible or irreversible; and the duration of the effect.

The overall magnitude of effect is judged on individual merit rather than by a formulaic process, guided by the criteria set out below.

J.1.2.1 Magnitude of Landscape Effects

The magnitude of landscape effect has been assessed in terms of its size or scale of the development, the geographical extent of the area that would be influenced, its duration and reversibility. This judgement takes into consideration the following factors:

Size/Scale

- The extent or proportion of landscape elements lost or added;
- The contribution of that element to landscape character and the degree to which aesthetic or perceptual aspects are altered; and
- Whether the change is likely to alter the key characteristics of the landscape, which are critical to its distinctive character.

Geographical Extent

The geographical extent of landscape changes has considered how far reaching the changes would be at the following scales:

- Within the immediate setting;
- Landscape character areas or types; and
- At a larger scale, influencing several landscape character areas.

Duration and Reversibility

Duration and reversibility of the changes has been categorised as follows:

- Short-term or reversible – change that is reversible and would last up to five years;
- Medium-term or reversible – change that is theoretically reversible but would last for between five years and 10 years;
- Long-term or reversible – change that is theoretically reversible but would last for between 10 and 25 years; and
- Permanent or irreversible – change that would last for 25 years or more, which are deemed as permanent or irreversible.

The criteria used to assess the size, scale and geographic extents of landscape effects has been based upon the amount of change that would occur as a result of the overhead line works, as described in Appendix Table 3 below.

Appendix Table 3: Magnitude of Landscape Effects Criteria

Magnitude of effect	Criteria
Major	<p>Size/Scale: substantial change to the key characteristics of the landscape; and/or total loss or substantial change to the existing landscape elements; and/or the addition of major new and uncharacteristic features or components.</p> <p>Geographical Extent: effects on a large part of the landscape character area or types; and/or a large proportion of landscape elements or features.</p> <p>Duration and Reversibility: introduction of permanent or irreversible change.</p>
Moderate	<p>Size/Scale: noticeable change to the key characteristics of the landscape; and/or partial loss or noticeable change to existing landscape elements; and/or the introduction of moderate new and uncharacteristic features or components.</p> <p>Geographical Extent: effects on a moderate part of the landscape character area or types; and/or a notable proportion of landscape elements or features.</p> <p>Duration and Reversibility: introduction of long-term or reversible change.</p>
Minor	<p>Size/Scale: minor change to the key characteristics of the landscape; and/or minor loss or slight change to existing landscape elements; and/or the introduction of minor new and uncharacteristic features or components.</p> <p>Geographical Extent: effects on a small part of the landscape character area or types; and/or a small proportion of landscape elements or features.</p> <p>Duration and Reversibility: introduction of medium-term or reversible change.</p>
Negligible	<p>Size/Scale: barely perceptible change to the key characteristics of the landscape; and/or minimal loss or barely perceptible change to existing landscape elements; and/or the introduction of barely perceptible new and uncharacteristic features or components.</p> <p>Geographical Extent: effects on a negligible part of the landscape character area or types; and/or a very small proportion of landscape elements or features.</p> <p>Duration and Reversibility: introduction of a short-term or reversible change.</p>

J.1.2.2 Magnitude of Visual Effects

Evaluation of the magnitude of effect on visual receptors has been carried out by considering the following factors:

Size and Scale

- The scale of the change in the view with respect to the loss or addition of features and changes in its composition, including the proportion of the receptor's available view affected by the development;
- The degree of contrast or integration of any new features or changes in the landscape with the existing landscape elements and characteristics; and
- The nature of the view, in terms of the relative amount of time over which it will be experienced and whether views will be full, partial or glimpsed.

Geographical extent

The angle of view relative to the main activity of the receptor and the distance of the viewpoint from the overhead line works.

- Short distance – up to 250m from the overhead line works;

- Middle distance – between 250m and 500m from the overhead line works; and
- Long distance or background – beyond 500m of the overhead line works.

Duration and Reversibility

Duration and reversibility of the changes has been categorised as follows:

- Short-term or reversible – change that is reversible and would last up to five years;
- Medium-term or reversible – change that is theoretically reversible but would last for between five years and 10 years;
- Long-term or reversible – change that is theoretically reversible but would last for between 10 and 25 years; and
- Permanent or irreversible – change that would last for 25 years or more, which are deemed as permanent or irreversible.

The criteria used to help determine the magnitude of visual effects are shown in Appendix Table 4 below.

Appendix Table 4: Magnitude of Visual Effects Criteria

Magnitude	Criteria
Major	<p>Size/Scale: the project, or a part of it, would become the dominant feature or focal point of the view; and/or total loss or substantial alteration to key characteristics of the view (e.g., the proposals dominate the view and fundamentally change its character and components); and/or introduction of uncharacteristic features across a large proportion of the view.</p> <p>Geographical Extent: the view is available from all or most parts of a specific location; or from the majority of a linear route; and/or is within the direct frame of view; and/or experienced at close proximity from the receptor that the project would form part of the foreground of the view.</p> <p>Duration and Reversibility: introduction of permanent or irreversible change.</p>
Moderate	<p>Size/Scale: the project, or a part of it, would form a noticeable feature or element of the view which is readily apparent to the receptor (e.g., the proposals are noticeable in the view), affecting its character and altering some of its components and features; and/or partial loss or noticeable alteration to key characteristics of the view; and/or introduction of uncharacteristic features across part of the view.</p> <p>Geographical Extent: the view is available from a moderate proportion of a specific location; or from the moderate part of a linear route; and/or is at a slightly oblique angle; and/or experienced at a distance from the receptor that the project would form part of the middle ground of the view.</p> <p>Duration and Reversibility: introduction of long-term or reversible change.</p>
Minor	<p>Size/Scale: the project, or a part of it, would be perceptible but not alter the overall balance of features and elements that comprise the existing view; and/or slight loss or alteration to key characteristics of the view; and/or the introduction of uncharacteristic features across a small part of the view.</p> <p>Geographical Extent: the view is available from a small proportion of a specific location; or from limited sections of a linear route; and/or is at an oblique angle; and/or experienced at a relatively long distance from the receptor that the project would form part of the background of the view.</p> <p>Duration and Reversibility: introduction of medium-term or reversible change.</p>
Negligible	<p>Size/Scale: only a very small part of the project would be discernible; and/or the introduction of features largely characteristic of the view.</p>

Magnitude	Criteria
	<p>Geographical Extent: the view is available from hardly any part of a specific location; or from a very limited part of a linear route; and/or is at a very oblique angle; and/or experienced at such a distance from the receptor that the project would form a barely noticeable feature or element of the view.</p> <p>Duration and Reversibility: introduction of a short-term or reversible change.</p>

Mitigation measures and standard construction and operational management practices has been incorporated into the design and have been considered in the determination of the magnitude of effect.

J.1.3 Evaluation of Level of Effect

The resulting sensitivity and magnitude assessments has been applied together to determine the level of effect on each landscape or visual receptor, as shown in the matrix in Appendix Table 5 below.

This matrix forms only a guide (i.e., an aide memoir) to the way that sensitivity and magnitude of effect give rise to a prediction of effects. The assessment of level of effect relies upon common sense, experience and professional judgement, supported by substantiated reasoning. The predicted effect therefore may not always fit with the matrix. For example, in assessing the level of an effect, an assessor may consider changes of a relatively low magnitude to be of a high level of effect if they relate to a highly sensitive (or 'important' or 'vulnerable') landscape or visual resource, whilst a high magnitude of effect on a less sensitive receptor may be deemed to be a relatively low level of effect. The relationship between sensitivity and magnitude of effect is therefore not always linear.

Appendix Table 5: Level of Effect Matrix

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

Effects have been qualified as either 'adverse' or 'beneficial'. The level of landscape and visual effects has been assessed on a four-point scale of 'major', 'moderate', 'slight' and 'negligible', which are based on professional judgement and informed by GLVIA3.

Appendix Table 6: Landscape and Visual Level of Effect Criteria

Category	Landscape	Visual
Major Beneficial Effect	The project would fit well with the scale, landform and pattern and enhance the character (including quality and value) of the landscape; enable the restoration of characteristic features and elements lost as a result of changes from inappropriate management or development; enable a sense of place to be enhanced.	The project would create a new feature that would greatly enhance the view. For example, new feature or landmark of local importance.
Moderate Beneficial Effect	The project would improve the character (including quality and value) of the landscape; enable the restoration of characteristic features and elements partially lost or diminished as a result of changes from	The proposals would cause obvious improvement to a view from a receptor of lower sensitivity or a perceptible improvement to a view from a more sensitive receptor.

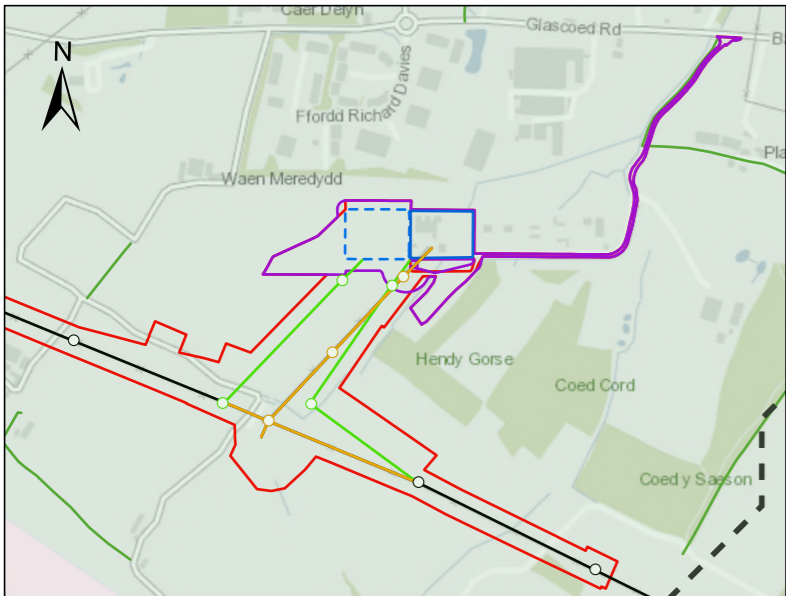
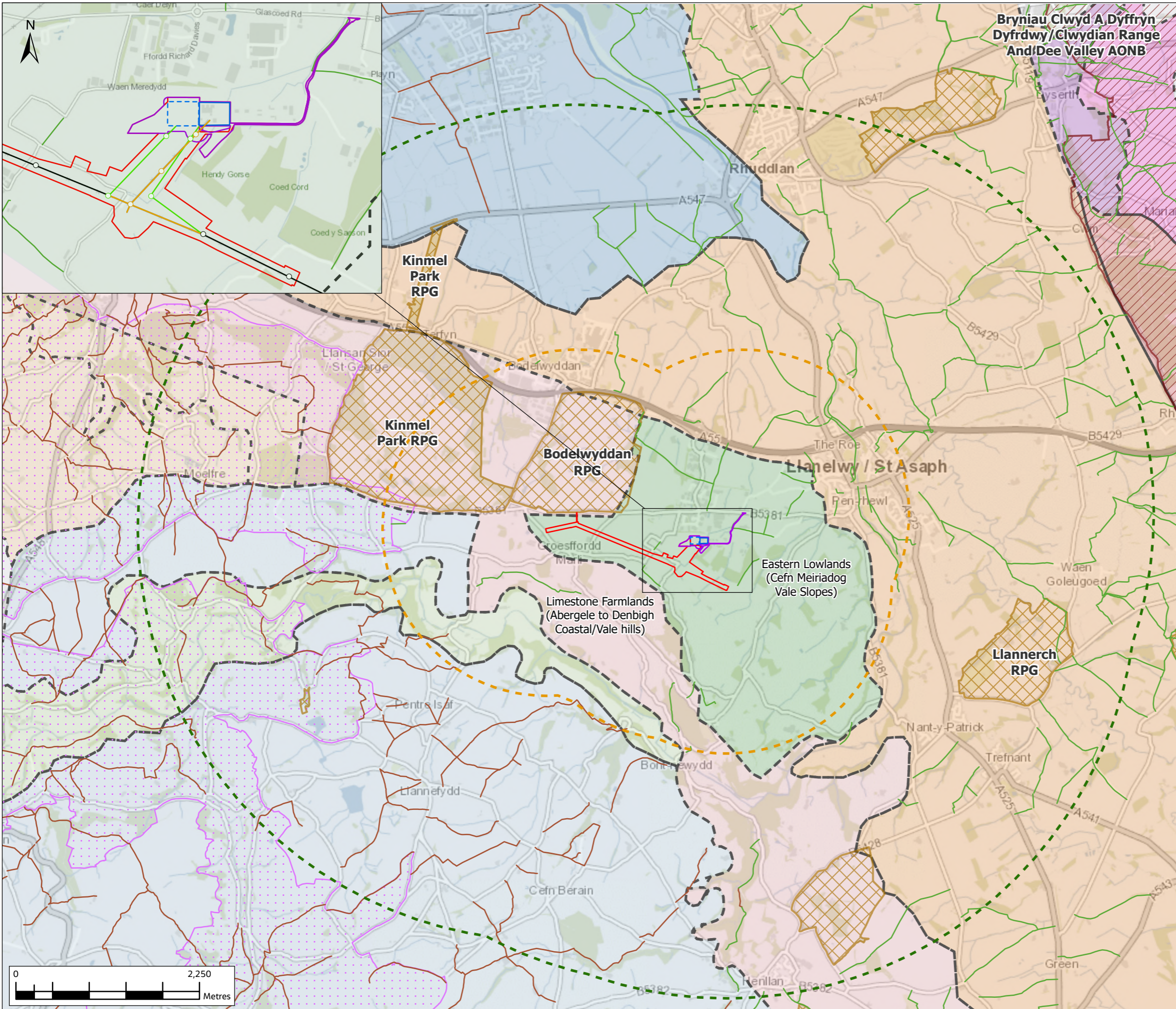
Category	Landscape	Visual
	inappropriate management or development; enable a sense of place to be restored.	
Slight Beneficial Effect	The project would complement the character (including quality and value) of the landscape; maintain or enhance characteristic features and elements; enable some sense of place to be restored.	The project would cause limited improvement to a view from a receptor of higher sensitivity or would cause greater improvement to a view from a receptor of lower sensitivity.
Negligible Effect	The project would be compatible with the existing character (including quality and value) of the landscape; blend in with characteristic features and elements; enable a sense of place to be retained.	No perceptible deterioration or improvement in the existing view
Slight Adverse Effect	The project would not quite fit the character (including quality and value) of the landscape; be at variance with characteristic features and elements; detract from a sense of place.	The project would cause limited deterioration to a view from a receptor of higher sensitivity or cause greater deterioration to a view from a receptor of lower sensitivity.
Moderate Adverse Effect	The project would conflict with the character (including quality and value) of the landscape; have an adverse impact on characteristic features or elements; diminish a sense of place	The project would cause obvious deterioration to a view from a receptor of lower sensitivity or perceptible damage to a view from a more sensitive receptor.
Major Adverse Effect	The project would be at complete variance with the character (including quality and value) of the landscape; cause the integrity of characteristic features, elements and sense of place to be lost.	The project would cause major deterioration or loss of a view from a highly sensitive receptor and would constitute a major discordant element in the view.

J.1.4 Cumulative Assessment Methodology

J.1.4.1 Inter-Project Effects (Local)

- 1) Inter-project cumulative effects assessment considered relevant other proposed developments as listed by Denbighshire County Council within 5km of the overhead line works.
- 2) The council provided a list of planned energy and electrical infrastructure in the vicinity of the site (email 22/07/2022) which formed a 'long list' of potential other developments for further consideration by the Landscape Architect. This list has been assessed and shortened to those applications that were still awaiting decisions, others that had been rejected were removed from the list and entered the cumulative assessment process.
- 3) The short list was then used by the Landscape Architect who then exercised professional judgement in determining which proposed other local developments might reasonably and foreseeably act cumulatively with their respective areas of interest. In all cases only likely significant cumulative effects were considered. Non-significant potential cumulative effects were taken no further.
- 4) For each other development consideration was given to the anticipated programme, scale and location and professional judgement was applied to determine landscape and visual effects.

Appendix K. Landscape Character and Constraints



- Legend**
- Overhead Line Works and Access Boundary
 - Substation Extension Application Boundary (includes access road and existing substation)
 - Substation Extension Boundary
 - Existing Substation Boundary
 - 2km Study Area
 - 5km Search Area
 - Existing Overhead Lines and Towers - Removed
 - New Overhead Lines and Towers
 - Existing Overhead Line and Towers - Retained
 - Denbighshire Public Rights of Way (PRoW)
 - Conwy Public Rights of Way (PRoW)
 - Special Landscape Areas (SLAs)
 - Area of Outstanding Natural Beauty (AONB)
 - Registered Park and Garden (RPG)
 - Landscape Character Areas (LCA)**
 - Aled Hireathog Hills (West)
 - Coastal and Estuarine Flats (Prestatyn to Abergele)
 - Deep Valleys (Aled and Elwy)
 - Eastern Lowlands (Cefn Meiriadog Vale Slopes)
 - Limestone Farmlands (Abergele to Denbigh Coastal/Vale hills)
 - Limestone Farmlands (North Clywdian Range)
 - Lowland Hills
 - Vale Farmlands (Vale of Clywd)
 - Limestone Escarpment and Hills (Prestatyn – Dyserth Hillside)
 - Trelawnyd Plateau



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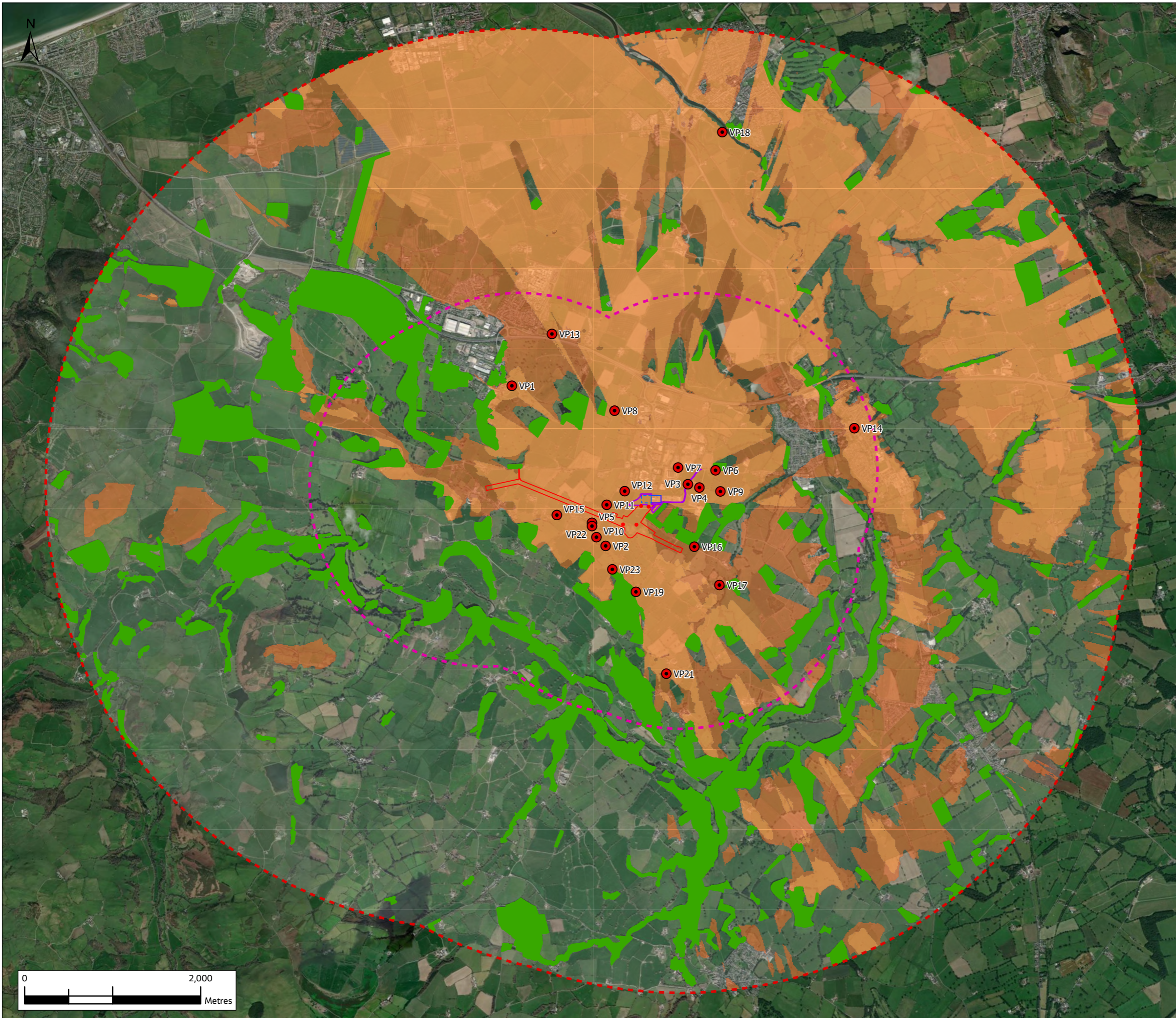
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APPENDIX K

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Appendix L. Zone of Theoretical Visibility



Legend

- Overhead Line Works and Access Boundary
- Substation Extension Application Boundary (includes access road and existing substation)
- Proposed New Replacement Towers (Pylons)
- Viewpoints
- Existing Substation Boundary
- Substation Extension Boundary
- 2km Study Area
- 5 km Search Area
- National Forest Inventory Woodland

Zone of Theoretical Visibility for the Proposed Substation

- No Theoretical Visibility
- Theoretical Visibility of the Substation and Pylons

Zone of Theoretical Visibility for the Proposed Pylons

- No Theoretical Visibility
- Theoretical Visibility of any of the Proposed Pylons

NOTES

- The Zone of Theoretical Visibility (ZTV) is generated using computer program ArcGIS Pro 2.9.6 and is based on a OS Terrain 10 DTM generated from the contour data.
- The ZTV is based upon a bare earth ground model combined with National Forest Inventory (NFI) Woodland data, with the assumption that all trees are 10 m height. The ZTV does not take account of surface features, such as buildings, which could also provide screening.
- The ZTV has been modelled with a viewing height of 1.7m.



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Drawing Title
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Drawing No. B2416603/BODEL/ZTV/001	Drawing Status FINAL
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Appendix M. Zone of Theoretical Visibility Methodology

M.1 Introduction

Zone of Theoretical Visibility (ZTV) mapping has been generated in ArcGIS software using the 'Viewshed' tool under the 'Surface' section of the Spatial Analyst software extension. Viewsheds are used to display where there is theoretical intervisibility between a designated target point, to reflect the location and height of the proposed substation and pylons and the surrounding topography. The ZTV has been modelled assuming a person's viewing height of 1.7m above the surrounding topography.

The ZTV illustrates the theoretical maximum extents to which the proposals may be visible from within an area. It is the starting point for defining the area from which the substation and pylons could potentially be seen. The actual extent of visibility is likely to be less due to intervening features that are not incorporated into the ZTV modelling (e.g., buildings outside of the red line boundary, other pylons and other screening vegetation that is not included in the National Forest Inventory (NFI)).

M.2 Topography layer

The ZTV mapping has been generated based on a digital terrain model (DTM) OS5.

A topography layer in raster format has been used to generate the viewshed.

A point dataset of target points representing points along the overhead line works has been taken from a 3d model. The 3d model has been provided by Jacobs Front-End Engineering Design team.

Blocks of trees and woodlands identified in the NFI Woodland Map have been incorporated, based upon the assumption that all trees are 10m high, with the following exception: trees within the extent of the red line boundary have been omitted to represent a worst-case scenario where all existing vegetation within would be removed. The NFI data does not include all trees but is focused on woodland of at least 0.5ha and minimum 20m width. While the NFI data includes blocks of deciduous woodland, the blocks are considered to generally provide an effective screen even during winter, due to the width of the blocks.

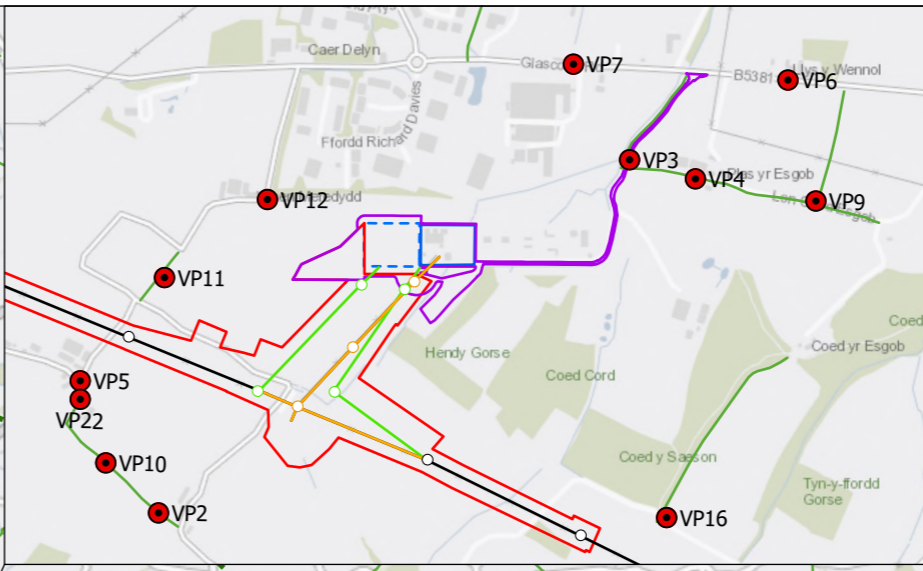
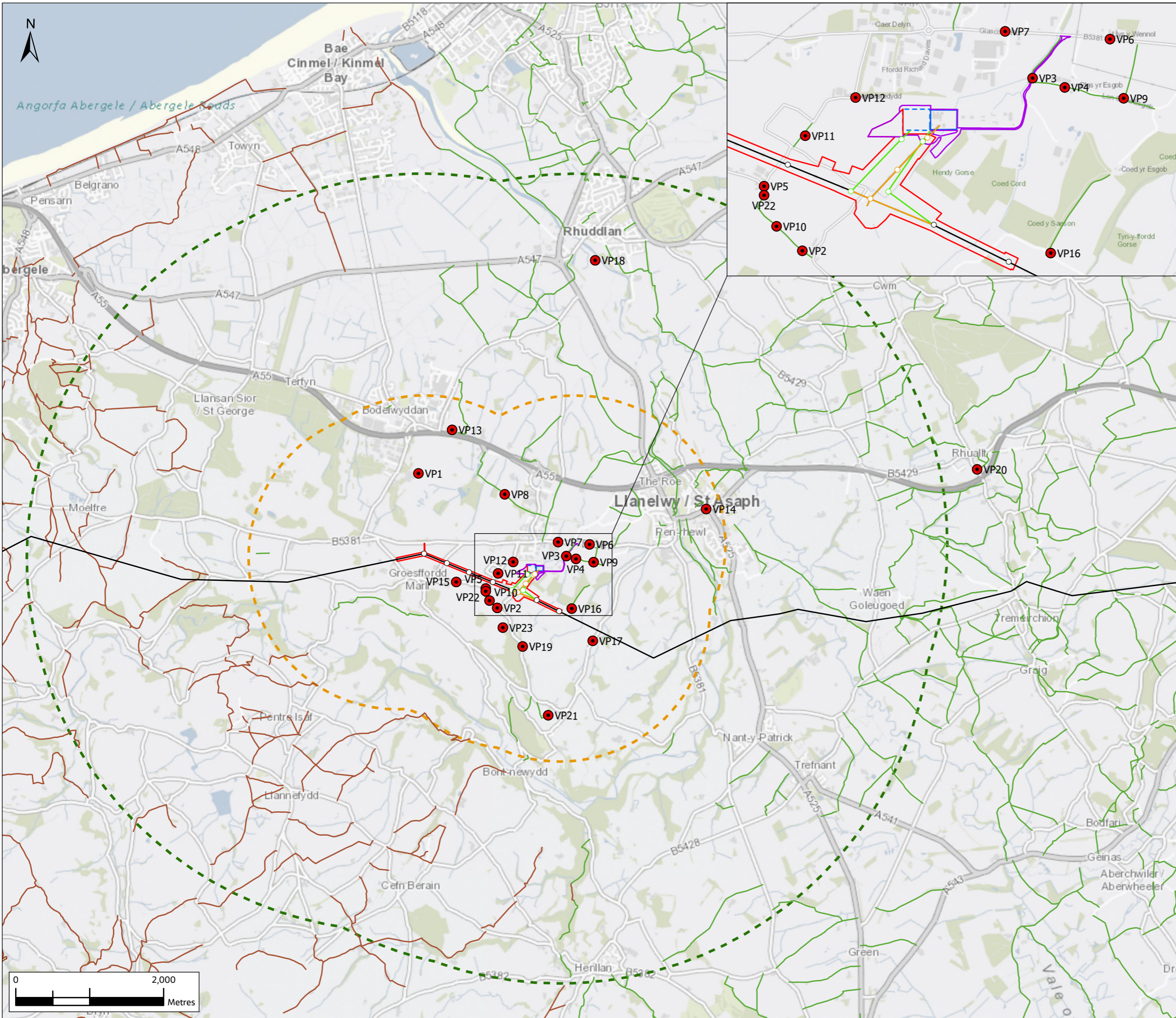
M.3 Point database or target points

The ZTVs have been generated using target points at each of the four corners of all buildings at roof height and the highest points on each end of all the gantries for the substation extension. Points have been taken from the top of each of the four proposed pylons.

M.4 Theoretical range of visibility

The final output of the ZTV mapping is a raster image. The raster image contains value columns, where 0 is not visible and numbers 1 and above are visible. A symbology has been automatically applied to the raster dataset as it is loaded into ArcGIS. The ZTVs show a multiple point analysis approach to identify how much of the overhead line works would be theoretically visible from a point in the study area.

Appendix N. Viewpoint Plan



Legend

- Overhead Line Works and Access Boundary
- Substation Extension Application Boundary (includes access road and existing substation)
- Existing Substation Boundary
- Substation Extension Boundary
- 2km Study Area
- 5km Search Area
- Existing Overhead Line and Towers - Retained
- Proposed New Overhead Lines and Replacement Towers (Pylons)
- Existing Overhead Lines and Towers - Removed
- Viewpoints
- Denbighshire Public Rights of Way (PRoW)
- Conwy Public Rights of Way (PRoW)



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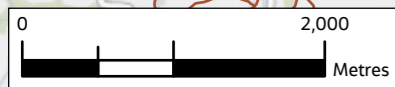
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Client: BODELWYDDAN OVERHEAD LINES

Project: VIEWPOINT PLAN

Drawing No. B2416603/BODEL/VP/001 Drawing Status: FINAL

APPENDIX N



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Appendix O. Landscape & Visual Effects Table

Appendix Table 7: Landscape Effects Table

Character Area	Sensitivity	Key Characteristics	Assessment Timescale	Description of the change	Magnitude of Change	Level of effect
Eastern Lowlands (Cefn Meiriadog Vale Slopes) LCA	Medium	<p>Gently undulating pastoral lowland of medium scale with cultural heritage interest. Mosaic of irregular and semi-regular medium sized pastures with frequent small broadleaved woodlands and vegetated river valley. Pastoral fields are bound by mature hedgerows that are themselves a characteristic feature that contribute to the short range and contained views that are typical of the locality. Man-made influence is evident in the managed landscape and frequency of dispersed farmsteads and rural properties. Modern development is most notable along the A55, at St. Asaph Business Park and where pylon lines cross the landscape unit.</p> <p>Distinctive skylines of the Clwydian Range lie to the east, but otherwise skylines are not prominent in this landscape unit. Skylines are occasionally punctuated by pylons and other built development. There is frequent road traffic along the Glascoed Road in the north of the character area. Views are typically enclosed and filtered by landform and vegetation (woodland blocks and hedgerow). There are few outward views, other than eastwards</p>	Construction	Eastern Lowlands (Cefn Meiriadog Vale Slopes) LCA would be directly impacted by the construction of the new pylons and removal of existing pylons. There would be some localised disturbance from introduced construction plant and machinery, which would alter the relative tranquillity of the rural landscape. There would also be the localised removal of existing hedgerows to accommodate the overhead line works, resulting in some disintegration of the existing field pattern. However, construction works would be relatively short term and temporary in duration (six-months' duration), with the impacts restricted to a localised section of the landscape.	Minor adverse	Slight adverse
			Operation - year 1	At operation year 1, construction activity associated with the overhead line works would cease, improving the level of tranquillity in the landscape. The LCA would continue to be directly affected by the presence of the four new pylons and overhead lines associated with the proposed development; however, these would not be considered incongruous given the type of energy infrastructure features already present. A slight perceptible loss of hedgerows and field boundary fragmentation would remain, due to the localised vegetation clearance at construction. There would be a perceptible yet characteristic change in the landscape.	Minor adverse	Slight adverse
			Operation - year 15	At operation year 15, reinstated field boundary vegetation is likely to have established sufficiently to help soften the appearance of the proposed development and reintegrate the field boundary	Minor adverse	Slight adverse

Character Area	Sensitivity	Key Characteristics	Assessment Timescale	Description of the change	Magnitude of Change	Level of effect
		towards the Clwydian Range from the higher parts of the character area. There are views to and from important landscapes and cultural heritage features including The Bryniau Clwyd A Dyffryn Dyfrdwy (Clwydian Range and Dee Valley) National Landscape and Bodelwyddan Registered Park and Garden.		network. A perceptible yet characteristic change would remain due to the increase in energy infrastructure within the landscape.		

Appendix Table 8: Visual Effects Table

Viewpoint Location	Sensitivity	View Description	Assessment Timescale	Description of the change	Magnitude of Change	Level of effect
VP2 – PROW behind Residential receptor at Tyddyn Meredydd Approx. dist. from indicative site boundary: 185m	High	Open panoramic views north to coast and Clwydian Range across open fields with hedges and mature boundary trees in middle distance. 4ZB167 pylon is a noticeable feature in the view in the middle distance, a third of which protrudes above the skyline of the hills. The existing GM001 and GM002 pylons are visible in the background of the view, as is the substation which is partially screened by field boundary trees. There are views towards the existing substation, which would be further screened in summer when intervening vegetation is in leaf.	Construction	The construction of the new pylons and removal of existing would be largely visible from this location in short to long distance views for the six-months' duration of the works. The change would be incremental through the stages of dismantling the existing energy infrastructure and erection of the new towers. The works would take up a small part of the whole view.	Minor adverse	Slight adverse
			Operation - year 1	At operation year 1, the proposed new pylons would be a permanent change at a short to long distance in the view. All four new pylons will be noticeable features in the view, 4ZB167A would benefit from screening from the roadside hedges on the hill and the trees in the garden of the residential property. Hedgerow vegetation removed during construction would be slightly perceptible in the middle ground. The overhead lines would be a noticeable feature and increase the balance of energy infrastructure features in the view from the receptor. The new development would represent a change to large part of the view from the conservatory extension.	Minor adverse	Slight adverse
			Operation - year 15	At operation year 15, reinstated hedgerows would have established sufficiently to help soften the appearance of the new pylons and integrate the development into the surrounding landscape. However, the proposed development would remain a noticeable feature in the view.	Minor adverse	Slight adverse
VP2 – Residential receptor	High	The principal views from Tyddyn Meredydd are towards the south-east and north-west. There is also a	Construction	The construction of the new pylons and removal of existing, would be largely visible from this location in middle to long-distance views for the six-months'	Moderate adverse	Moderate adverse

Viewpoint Location	Sensitivity	View Description	Assessment Timescale	Description of the change	Magnitude of Change	Level of effect
Tyddyn Meredydd Approx. dist. from indicative site boundary: 250m		view north-east from a conservatory extension on the east side of the house, which has a narrow view down into the valley across open fields. It is likely that the top of 4ZB167 pylon is visible above the hedgerows at middle distance. It is also likely the GM001 and GM002 pylons, and the existing substation, are partially visible behind intervening field boundary trees and hedges that offer some screening, although the majority of features would be present in the background. Commercial development and energy infrastructure features are a key characteristic of the views.		duration of the works. The change would be incremental through the stages of dismantling and erection of the towers. The works would be a large part of the overall view.		
			Operation - year 1	At operation year 1, the proposed pylons would create a permanent change in the middle to long distance. 4ZB167B, GM1 and GMA1 would become noticeable features in the visual corridor towards the substation. Hedgerow vegetation removed during construction would be slightly perceptible in the middle distance. There are no mature trees in the foreground to provide any screening towards the new features. The overhead lines would be a noticeable feature and alter the balance of elements in the view. The development would be a large part of the view from the conservatory extension.	Moderate adverse	Moderate adverse
			Operation - year 15	At operation year 15, reinstated hedgerows would have established sufficiently to help soften the appearance of the new pylons. However, the proposed development would remain a noticeable feature in the view.	Moderate adverse	Moderate adverse
VP3 – Entrance to PROW off access road to existing Bodelwyddan and Gwynt-y-Môr Offshore	High	Short-distance views across the access road to the large mature trees on the west side of the access road, which screen views of the existing substation and nearby pylons. In summer, there would be more screening when the intervening vegetation is in leaf.	Construction	The tops of the closest pylons would be glimpsed in the middle distance through the mature trees. There would also be short-distance views of the access road and construction traffic for the six months' duration of the works.	Minor adverse	Slight Adverse
			Operation - year 1	The new pylons (GM1 and GMA1) would be slightly visible from this location in winter where glimpsed views are likely to be possible through the trees. In	Negligible adverse	Slight adverse

Viewpoint Location	Sensitivity	View Description	Assessment Timescale	Description of the change	Magnitude of Change	Level of effect
Wind Farm substation				summer, there would likely be more screening effects from the vegetation in leaf.		
Approx. dist. from indicative site boundary: 460m			Operation - year 15	As per operation year 1.	Negligible adverse	Slight adverse
VP4 – From PROW including residence south of Lon Coed Esgob	High	Partially open views south-west above the high hedges from the PROW with distant top of the 4ZB167 pylon visible. The principal views from the residence are south facing. There are large mature screening trees on the western boundary of the property, which would likely filter views south-west to the corner of existing substation and access road from the property's upper storey windows. There are likely to be open views from upper and lower storey south to Burbo bank substation (150m from property), woodland blocks and hills to the south. There are also likely to be views to the existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines and associated pylons above the existing woodland block and against backdrop of hills.	Construction	Oblique glimpsed views of construction traffic on the access road from upper storey of residence. The removal of existing and erection of the new pylons would be partially visible through the screening trees on the western property boundary.	Minor Adverse	Slight adverse
Approx. dist. from indicative site boundary: 560m			Operation - year 1	There would be filtered and oblique medium to long-distance views of the tops of 4ZB167A and 4ZB167B pylons from the upper storey of the residence and the PROW. There would be more screening in summer when the vegetation is in leaf. The development would be a small part of the view with a slight increase in energy infrastructure features.	Minor Adverse	Slight adverse
			Operation - year 15	As per operation year 1.	Negligible adverse	Slight adverse
VP5 – Group of residential	High	From the ground floor of the properties, the views north-east	Construction	Principal views from residences would be filtered by intervening hedgerows and mature trees, resulting in	Minor adverse	Slight Adverse

Viewpoint Location	Sensitivity	View Description	Assessment Timescale	Description of the change	Magnitude of Change	Level of effect
receptors at Pentre Mawr Approx. dist. from indicative site boundary: 90m		include the road and a tall hedge in the short distance, which screens the easterly views. Views become more open as the ground drops away to the north, revealing mature trees, 4ZB166 pylon and existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines in the middle distance. Views from the upper floor of the properties are likely to be open to the east and north-east with partial distant glimpsed views of the existing substation, through the mature hedgerow trees. There are likely to be full upper-storey views of the existing pylons associated with the Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines in the middle distance.		glimpsed medium-long distance views of the construction activities, including removal of existing pylon 4ZB167 and the erection of new pylons.		
			Operation - year 1	At operation year 1, principal views from residences would be filtered by intervening hedgerows and mature trees, resulting in glimpsed views of pylons in the far distance. Pylons are already features in the views from this location and the new features would be set against the backdrop of the sky and the Clywdian Range.	Minor adverse	Slight Adverse
			Operation - year 15	As per operation year 1.	Minor adverse	Slight Adverse
VP6 – Residential receptor The Cottage Villa at Glascoed Road Approx. dist. from indicative site boundary: 810m	High	Principal views south-west are open across the busy Glascoed Road towards the regenerating scrub and agricultural buildings, mature trees and pylon in the middle distance. Views beyond are to the distant hills of fields and woodland. 4ZB167 pylon can be faintly seen in the distance against the backdrop of the hills. The existing substation cannot be seen due to the intervening vegetation, and it is therefore	Construction	Construction traffic may increase; however, the Glascoed Road is already a busy main road and it's likely the increase in traffic would be imperceptible. There would be distant views of the removal of existing pylons and the erection of the new pylons above the vegetation, which screens around 27m of the towers. The duration of works would be for six months.	Minor adverse	Slight adverse
			Operation - year 1	At operation year 1, there would be an increase in the number of taller pylons in the view (from 1 to 4); however, they would be distant and seen mostly against the backdrop of the hills. There would be a	Minor adverse	Slight adverse

Viewpoint Location	Sensitivity	View Description	Assessment Timescale	Description of the change	Magnitude of Change	Level of effect
		unlikely that the proposed extension would be visible from this location.		slight loss in key characteristics of the view with shift in overall balance of industrial elements.		
			Operation - year 15	As per operation year 1.	Minor adverse	Slight adverse
VP7 – Representative view from St. Asaph Business Park (Qioptic Ltd) at Glascoed Road Approx. dist. from indicative site boundary: 510m	Low	Enclosed views south across Glascoed Road to Qioptic Ltd three storey building and small car park in the short distance. In summer, intervening mature trees and vegetation would wholly screen existing substation, which is located immediately to the south. However, there may be glimpsed views through to existing substation in winter when trees are not in leaf. Top of 4ZB167 pylon is visible above the trees. There are likely distant views from third floor to hills to the south, including partial views of existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines and the other associated pylons.	Construction	Open views of some construction activities associated with overhead line works, such as removal of existing pylons and installation of new pylons, would likely be visible from the top floors of some business receptors bordering the southern edge of the business park over the top of the dense screening vegetation. In summer, the activities would be less visible due to the screening effect of the vegetation in leaf.	Minor adverse	Slight adverse
			Operation - year 1	At operation year 1, there would be short-distance views (within 250m from closest receptors) of significant portion of two new 55m pylons (GM1 and GMA1). These new elements would be dominant in the view from upper floors but less so from ground floors. New pylons (GM1 and GMA1) would be visible from Glascoed Road above the business park development.	Minor adverse	Slight adverse
			Operation - year 15	As per operation year 1.	Minor adverse	Slight adverse
VP8 – PROW Faenol Broper Approx. dist. from indicative site	High	Open, long-distance views to hills to the south, across rural grazing and arable fields with hedges, field boundary mature trees and woodland blocks, which are occasionally interrupted by pylons and building rooftops. There is no	Construction	Views towards the construction activities associated with installation of new pylons (GM1 and GMA1) would likely be visible from footpath at this location above the intervening treetops. In summer, the construction activities would be less visible due to the screening effect of the intervening vegetation when in leaf. The change would be incremental through the	Minor adverse	Slight adverse

Viewpoint Location	Sensitivity	View Description	Assessment Timescale	Description of the change	Magnitude of Change	Level of effect
boundary: 1km		view to the existing substation due to layers of intervening vegetation in winter and summer. It is therefore unlikely that the proposed extension would be visible from this location.		stages of dismantling of the existing features and the erection of the new pylons over the six months' duration of the works.		
			Operation - year 1	At operation year 1, there would be long-distance incidental views of permanent change, although these would only be available for a limited part of the route. Pylons GM1 and GMA1 are taller additional features that would likely appear against the backdrop of the sky. 4ZB167A and 4ZB167B would not be as noticeable as one would replace the existing in a similar location and one would be seen against the backdrop of the hills.	Minor adverse	Slight adverse
			Operation - year 15	As per operation year 1.	Minor adverse	Slight adverse
VP9 – PRoW Lon Coed Esgob Approx. dist. from indicative site boundary: 780m	High	Open views above hedges lining PROW to the south-west. Middle-distance views of woodland and long-distance views to hills and fields with more woodland blocks. The existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines, along with their associated pylons, are visible in the middle to long distance of views, often projecting above line of hills in the background. The existing substation is not visible from this location and it is therefore unlikely that the proposed extension would be visible from this location.	Construction	Open views towards the construction activities associated with overhead line works, such as installation of new pylons, would be visible from footpath at this location above the intervening treetops. Slightly more of the towers would be visible in winter. In summer, activities would be less visible due to the screening effect of the vegetation when in leaf. The change would be incremental through the stages of erection of the new pylons over the six months' duration of the works.	Minor adverse	Slight adverse
			Operation - year 1	At operation year 1, there would be Long-distance principal views of permanent change. Views would be available for a moderate part of the linear route. Pylons GM1 and GMA1 would be additional features that would appear much taller than the existing energy infrastructure; however, this would mostly be softened against the backdrop of the hills. 4ZB167A	Minor adverse	Slight adverse

Viewpoint Location	Sensitivity	View Description	Assessment Timescale	Description of the change	Magnitude of Change	Level of effect
				and 4ZB167A would not be seen as they would be screened by an intervening woodland block. Overall, a moderate part the development would form a small part of the view.		
			Operation - year 15	As per operation year 1.	Minor adverse	Slight adverse
VP10 – PROW Hillside Approx. dist. from indicative site boundary: 220m	High	Open panoramic views north-east to distant coast and the hills of the Clwydian Range. Views to the hills and coast are partially screened in the short distance by field boundary trees. Views across arable and grazing fields are often broken up by hedges and mature trees with occasional woodland blocks and settlement. Commercial buildings, substation development and pylons are present in the middle distance. 4ZB166 and 4ZB167 pylons protrude above the skyline of hills and coast. There are long-distance views of pylon GM001, with the existing substation partially visible.	Construction	Open views of construction activities associated with overhead line works, such as removal of existing and installation of new pylons, would be visible from footpath at this location. However, the equipment would be partially screened by intervening trees from other places on the linear route. Slightly more of the activities would be visible during winter due to the screening effect of the vegetation in leaf during the summer. The change would be incremental through the stages of erection of the new pylons over the six months' duration of the works.	Minor adverse	Slight adverse
			Operation - year 1	At operation year 1, there would be middle to long-distance principal views of the permanent change. Views of the development are available for a minor part of the linear route. Pylon GMA1 would be viewed as a noticeably taller additional feature, although it would be seen against the backdrop of the landscape. GMA1 would be partially visible through the intervening trees in winter. New pylons 4ZB167A and 4ZB167B would replace 4ZB167 with an additional element of similar height at a similar location. There would be a very slight reduction in hedgerow field boundary vegetation. Overall, the development would be a small part of the view.	Minor adverse	Slight adverse

Viewpoint Location	Sensitivity	View Description	Assessment Timescale	Description of the change	Magnitude of Change	Level of effect
			Operation - year 15	At operation year 15, views would be as per operation year 1, except that hedgerows would have established sufficiently to reestablish the impacted field boundary network. Due to the heights of the new energy infrastructure, the development would remain visible in a small part of the view.	Minor adverse	Slight adverse
VP11 – PROW Valley Approx. dist. from indicative site boundary: 110m	High	Open panoramic views. Hedges and fields in the short distance with occasional mature trees. Middle-distance views across mainly woodland blocks with occasional low pylons (backgrounded by woods) and energy infrastructure buildings (end of existing substation building and gantries visible). The existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines, along with several pylons, are visible to the south-east in the middle to long distance. 4ZB167 pylon in the middle distance is backgrounded mostly by sky. There are long-distance panoramic views of the Clwydian Range.	Construction	Open views of construction activities associated with overhead line works, such as removal of existing and installation of new pylons, which would be visible from the full length of the footpath route. The change would be incremental through the stages of erection of the new pylons over the six months' duration of the works.	Moderate adverse	Moderate adverse
			Operation - year 1	At operation year 1, there would be middle to long-distance principal views of the permanent change. Views of the development would be available for the whole stretch of this short route (across a field). Pylons GM1 and GMA1 are twice the size of the existing pylon and would appear above the skyline of woods and hills. They would be relatively close together, when viewed from the footpath, which would increase the density of the lattice work and make them appear more visually prominent in views to the east. New pylon 4ZB167A would replace 4ZB167 and would also be present in the view, making a third additional element of approximately 50m in height. The overall scale of the pylons would increase (one full height pylon and two low height pylons would be replaced by four full height pylons) and they would therefore become noticeable features of the view.	Moderate adverse	Moderate adverse

Viewpoint Location	Sensitivity	View Description	Assessment Timescale	Description of the change	Magnitude of Change	Level of effect
			Operation - year 15	As per operation year 1.	Moderate adverse	Moderate adverse
VP12 – Residential receptor at Waen Meredydd Approx. dist. from indicative site boundary: 150m	High	Open principal views south-east to woodland and across fields delineated with hedges, occasional mature trees and farm gates in the short distance. In the middle distance, the existing substation can be seen and the existing GM001 and GM002 pylons protrude slightly above distant woodland block skyline. There are open oblique views south across nearby fields to wooded hills where the 4ZB167 pylon is a dominant feature.	Construction	Open, partially oblique, short to middle-distance views of the construction activities associated with overhead line works, such as removal of the existing pylons and installation of new pylons. Constriction activity would be visible from the receptor in the middle ground for the 6 months duration of the works. The change would be incremental through the stages of the erection of the three replacement pylons in the view.	Moderate adverse	Moderate adverse
			Operation - year 1	At operation year 1, there would be short to middle-distance principal views of permanent change. Pylons GM1 and GMA1 would be twice the size of the existing pylons and would appear above the skyline of woods and hills. New pylon 4ZB167A would replace 4ZB167 and would be in the view, making a third additional element of approximately 50m in height. The scale of the pylons and overhead lines would therefore increase and, due to their proximity to the visual receptor, they would become noticeable features in the view.	Moderate adverse	Moderate adverse
			Operation - year 15	As per operation year 1.	Moderate adverse	Moderate adverse
VP15 – Residential receptor on Groesfford Marli Road	High	Principal view east-west from property. Easterly views open towards distant Clwydian Range. Views across open fields broken up by hedgerows bordering Groesfford Marli Road to settlement of Pentre	Construction	The dismantling of 4ZB167 and the erection of 4ZB167A and 4ZB167B would be visible at long distance above the tops of the intervening trees. The overhead line works associated with these pylons would also be visible in the principal view. However, the pylons would be backgrounded by the landscape,	Minor adverse	Slight adverse

Viewpoint Location	Sensitivity	View Description	Assessment Timescale	Description of the change	Magnitude of Change	Level of effect
<p>Note: No photograph view.</p> <p>Approx. dist. from indicative site boundary: 160m</p>		<p>Mawr in the middle distance. Views to the buildings are partially screened by group of deciduous and evergreen trees to the north of the road. The existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines route can be seen with pylons stretching into the long distance. 4ZB147 pylon is visible but distant and mostly against the backdrop of the Clwydian Range. The existing substation is screened by the group of trees to the north of the road is unlikely to be visible in winter without leaf cover.</p>		<p>which would reduce their overall impact. There would also be some near to middle distance views towards minor construction works for the existing overhead lines to the north. This may include occasional scaffolding around the existing towers to enable the loosening and tightening of the connecting conductors. As a result of the construction activity, there would also be a slight perceptible loss of hedgerows in the middle to long distance resulting from the clearance works. The change would be incremental through the stages of erection of the two replacement pylons over the six months' duration of the works.</p>		
			Operation - year 1	<p>At operation year 1, there would be long-distance view of the permanent change. There would be a relatively small change in the view as one existing pylon would be replaced by two new pylons close to each other. A slight perceptible loss of hedgerow vegetation would remain. The development would form a small part of the overall view, and the change would not alter the overall balance of elements in the view.</p>	Minor adverse	Slight adverse
			Operation - year 15	<p>At operation year 15, the hedgerow removed during construction would be reinstated sufficiently to reestablish the impacted field boundary network. However, the new energy infrastructure would remain a small part of the overall view.</p>	Minor adverse	Slight adverse
<p>VP16 – PROW West</p> <p>Approx. dist. from indicative site</p>	High	<p>Open and long-distance views to the south-west. Large woodland blocks screen views to the north and north-west. Views to the south-west are across fields with hedges and mature trees to the existing Deeside – Pentir</p>	Construction	<p>The dismantling of 4ZB167 and the erection of 4ZB167A and 4ZB167B would be partially visible in the long distance from occasional sections of the route. There would also be views towards the overhead line works associated with these pylons. The pylons would be partially backgrounded by the</p>	Negligible adverse	Slight adverse

Viewpoint Location	Sensitivity	View Description	Assessment Timescale	Description of the change	Magnitude of Change	Level of effect
boundary: 130m		Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines and associated pylons, which are wholly visible across much of the open views. 4ZB167 pylon is visible from sections of the footpath but the existing substation is not. It is therefore unlikely that the proposed extension would be visible from this location. Pylons are a key characteristic of the open views to the south-west.		landscape as they would be partially screened (lower half) by intervening field boundary trees. In summer, the intervening trees would provide more of a screening effect when they are in leaf. The change would be incremental through the stages of the erection of the 2 replacement pylons over six months' duration of the works.		
			Operation - year 1	At operation year 1, there would be long-distance occasional views of the permanent change. There would be a slight increase in scale of the energy infrastructure features in the view as one existing pylon would be replaced by two relatively close to each other. The proposed development would form a small part of the overall view, and the change would not alter the overall balance of elements in the view.	Negligible adverse	Slight adverse
			Operation - year 15	As per operation year 1.	Negligible adverse	Slight adverse
VP18 – Rhuddlan Castle Approx. dist. from indicative site boundary: 4.2km	High	Open views across the Clwyd River floodplain and associated embankments with scattered vegetation in the short distance. Long-distance views south to wooded hills. The existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines and associated pylons are faint elements in the long distance and visible against the backdrop of the hills (other than where two pylons rise up to St. Asaph). The skyline of distant hills is occasionally broken by mature trees	Construction	It is likely that dismantling of one existing pylon and the construction of four new pylons would be faintly perceptible at this distance. The change would be incremental through the stages of the erection of the four new pylons in the view over six months' duration of the works.	Negligible adverse	Slight adverse
			Operation - year 1	At operation year 1, there would be very long-distance view of the permanent change. There would be a slight increase in scale of energy infrastructure features in the view as three existing pylons would be replaced by four new pylons relatively close to each other. However, views towards the new pylons would be backgrounded by the hills and would therefore be barely noticeable. The development would form a	Negligible adverse	Slight adverse

Viewpoint Location	Sensitivity	View Description	Assessment Timescale	Description of the change	Magnitude of Change	Level of effect
		in the middle distance. St. Asaph Cathedral tower is visible in the long distance above trees. Views to the existing substation are screened by intervening vegetation. It is therefore unlikely that the proposed extension would be visible from this location.		very small part of the overall view, and the change would not alter the overall balance of elements in the view.		
			Operation - year 15	As per operation year 1.	Negligible adverse	Slight adverse
VP19 – Residential receptor, Isfryn Farm Approx. dist. from indicative site boundary: 620m	High	Likely principal views north-west from hillside property down into the coastal plains across irregular fields with clearly defined boundary hedge and tree planting. Short-distance views of fields and mature trees that partially screen the middle-distance views of woodland blocks and the existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines and associated pylons. Distant views of coast and Offshore Wind Farm turbines interrupted by pylons and overhead lines. It is unlikely that the existing substation and the proposed substation extension would be visible due to intervening field boundary tree planting; however, the top of 4ZB167 pylon may be visible above trees. Energy infrastructure features are a key characteristic of the view.	Construction	The dismantling of one existing pylon and the construction of two new pylons would be partially visible above the intervening trees in the long distance. The change would be incremental through the stages of construction.	Negligible adverse	Slight adverse
			Operation - year 1	At operation year 1, two new pylons (4ZB167A and 4ZB167B) would replace one existing pylon and these would appear above the skyline, further interrupting the view of the coast beyond. There would be an overall increase in number of energy infrastructure features within the principal view.	Minor adverse	Slight adverse
			Operation - year 15	As per operation year 1.	Minor adverse	Slight adverse
VP20 – PROW at	High	Views south-west over mostly wooded landscape with occasional	Construction	Barely perceptible views at this distance (6.5km).	Negligible adverse	Slight adverse

Viewpoint Location	Sensitivity	View Description	Assessment Timescale	Description of the change	Magnitude of Change	Level of effect
AONB Clwydian Range in Rhuallt off B5429 Approx. dist. from indicative site boundary: 5.9km		fields and rooftops of settlements visible. Telegraph poles and wires and some buildings in Rhuallt are visible in the short distance amongst the mature trees. Long distance faint views to Bodelwyddan Castle and Park and St. Margaret's Church (The Marble Church). In the long distance, the existing Deeside – Pentir Teed Bodewyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines and associated pylons can be faintly seen against the backdrop of the hills and valley to the south-west. The existing substation is not visible from this location, and it is unlikely that the proposed extension would be visible from here, or indeed higher up the Range, due to the intervening screening vegetation. The top of St. Asaph Cathedral is visible in the middle distance.	Operation – year 1	At operation year 1, there would be very long-distance view of the permanent change. There would be an increase in number of energy infrastructure features within the view as three existing pylons would be replaced by four new pylons situated relatively close to each other. However, these new pylon features would be backgrounded by the hills and would therefore be barely noticeable. Vegetation loss would not be perceptible at this distance. The development would form a very small part of the overall view, and the change will not alter the overall balance of elements in the view.	Negligible adverse	Slight adverse
			Operation - year 15	As per operation year 1.	Negligible adverse	Slight adverse
VP22 – PROW near Pentre Mawr residences Approx. dist. from indicative site boundary: 130m	High	Open view north-east to the hills of the Clwydian Range. Short-distance views of fields and hedges with mature field boundary trees. 4ZB166 pylon is a dominant feature in the foreground with the existing Deeside – Pentir Teed Bodelwyddan 1 and Deeside – Pentir Teed Bodelwyddan 2 overhead lines visible across much of the view. GM001 and GM002 pylons can be seen in the middle distance between a break in the	Construction	Construction activities associated with the dismantling of the pylons, and the construction and overhead line works would be partially visible in the long distance. Views would be filtered through intervening field boundary trees during the winter. In summer, visibility would be further reduced due to leaf cover.	Negligible adverse	Slight adverse
			Operation - year 1	At operation, there would be partial views of the new pylons would be experienced in the middle and long distance from this location. 4ZB167A would be hidden by 4ZB167B and both would be partially	Minor adverse	Slight adverse

Viewpoint Location	Sensitivity	View Description	Assessment Timescale	Description of the change	Magnitude of Change	Level of effect
		mature trees. During winter, there are glimpsed views of the existing substation, although views would be mostly screened from in summer. There is a partial view of the 4ZB167 pylon, which can be glimpsed through some intervening scrub in the foreground. Commercial development and energy infrastructure are a key characteristic of the view.		screened by a mature tree in the middle distance and foreground scrub. GM1 would also be mostly screened by a field boundary tree. GMA1 would be mostly visible. There would be a very slight reduction in hedgerow field boundary vegetation in the middle ground. In summer, the screening would be greater with leaf cover on the trees. Overall, a small part of the development would be visible; however, this would not alter the overall balance of elements characteristic of the view.		
			Operation - year 15	At operation year 15, views would be as per operation year 1, except that hedgerows would have established sufficiently to help re-establish the impacted field boundary network. A small part of the development would be visible.	Minor adverse	Slight adverse
VP23 – Residential Properties at Hendy's Farm Approx. dist. from indicative site boundary: 400m	Medium	Access was not sought to residences on private land much higher up the hill, but from desk top studies of aerial photography the principal views from the two residences are to the north-west-south east and the east-west, which are not in the direction of the development. A woodland block, several individual trees and a hedge are to the north and north-east of the properties, providing screening for any non-principal or oblique views.	Construction	Partial long-distance views (non-principal) from a single residence towards the construction activities associated with overhead line works and the new pylon erection and dismantling of the existing energy infrastructure. All new pylons would be partially visible with some filtering by intervening vegetation. In summer, screening would be greater from existing mature trees in near distance when vegetation is in leaf. The change would be incremental through the stages of the erection of the four new pylons in the view over six months' duration of the works.	Minor adverse	Slight adverse
			Operation - year 1	At operation year 1, there would be partial long-distance views (non-principal) from a single residence towards new pylons, which would be filtered by existing intervening vegetation. In summer, screening would be greater from existing mature trees when vegetation is in leaf. Overall, a small part of additional	Minor adverse	Slight adverse

Viewpoint Location	Sensitivity	View Description	Assessment Timescale	Description of the change	Magnitude of Change	Level of effect
				features of the development would be visible in this non-principal view.		
			Operation - year 15	As per operation year 1.	Minor adverse	Slight adverse

Appendix P. Photomontages

EXISTING - WINTER BASELINE



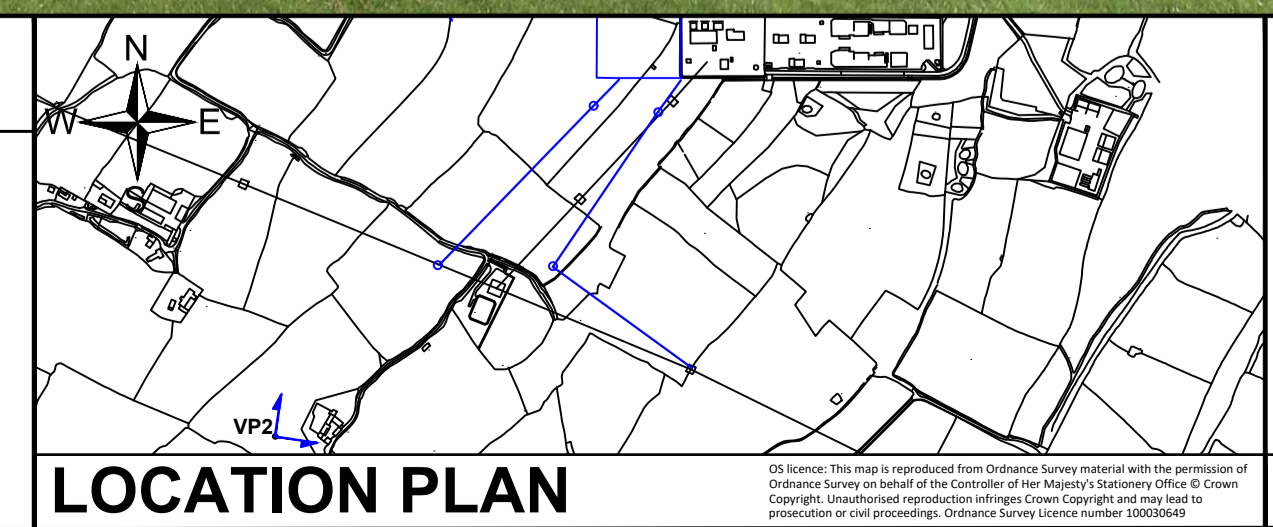
PHOTOMONTAGE - WINTER YEAR 1 OF OPERATION



VIEWPOINT 02: View looking north east from footpath towards Substation

Visualisation type: Type 3 (in accordance with Landscape Institute Visual Representation of Development Proposals Technical Guidance Note 06/19)
 Date and time of photograph: 22/03/22 at 12.05
 Lighting conditions: Bright
 OS grid reference: 301046, 373049
 Viewpoint ground elevation: 86 m
 Projection: Cylindrical
 Sheet size: A1

Enlargement factor: 96% @ A1
 Camera type: Canon EOS 5D MARK III
 Camera lens size: 50 mm
 Camera height above ground level: 1.6 m
 Aperture: F/7.1
 ISO: 200
 Shutter speed: 1/640
 Horizontal field of view: 90°
 Vertical field of view: 27°
 Bearing to centre of panoramic: 50°



NOTES:
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 3) If using this photomontage illustration for landscape context, the figure may be viewed at A3 sheet size.
 4) For larger plans showing all viewpoint locations, refer to Appendix L.

Project	BODELWYDDAN OVERHEAD LINES		Rev. P02	Rev. date AUG 24	Purpose of revision For Planning	Drawn RL	Check'd JP	Rev'd JE	Appr'd DB
Drawing Title	APPENDIX P PHOTOMONTAGE VIEWPOINT 02 WINTER YEAR 1		Rev. P01	Rev. date JUL 22	Purpose of revision For Planning	Drawn RL	Check'd EC	Rev'd JP	Appr'd DB
Jacobs No	B2416603		Drawing Status FOR PLANNING						
Drawing Number	B2416603/BODEL/PHOTO/001		Scale SCALE @ A1						
Client	nationalgrid								

EXISTING - WINTER BASELINE



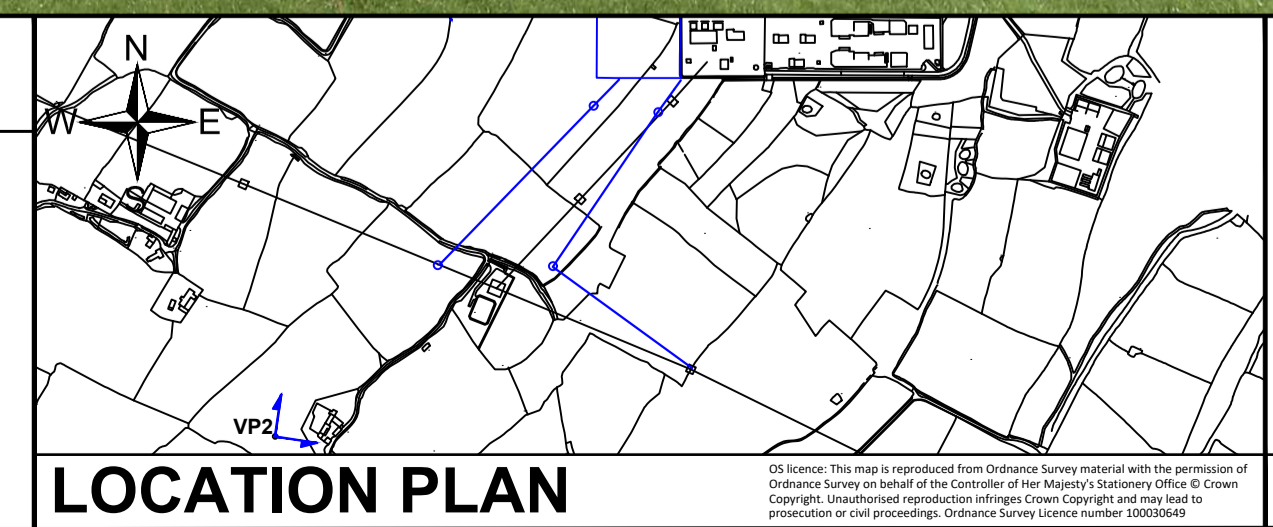
PHOTOMONTAGE - WINTER YEAR 15 OF OPERATION



VIEWPOINT 02: View looking north east from footpath towards Substation

Visualisation type: Type 3 (in accordance with Landscape Institute Visual Representation of Development Proposals Technical Guidance Note 06/19)
 Date and time of photograph: 22/03/22 at 12.05
 Lighting conditions: Bright
 OS grid reference: 301046, 373049
 Viewpoint ground elevation: 86 m
 Projection: Cylindrical
 Sheet size: A1

Enlargement factor: 96% @ A1
 Camera type: Canon EOS 5D MARK III
 Camera lens size: 50 mm
 Camera height above ground level: 1.6 m
 Aperture: F/7.1
 ISO: 200
 Shutter speed: 1/640
 Horizontal field of view: 90°
 Vertical field of view: 27°
 Bearing to centre of panoramic: 50°



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 4) For larger plans showing all viewpoint locations, refer to Appendix L.

Project	BODELWYDDAN OVERHEAD LINES			Rev.	Rev. date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
	P02	AUG 24	For Planning	RL	JP	JE	DB			
	P01	JUL 22	For Planning	RL	EC	JP	DB			
Drawing Title	APPENDIX P PHOTOMONTAGE VIEWPOINT 02 WINTER YEAR 15									
Drawing Status	FOR PLANNING									
Jacobs No	B2416603			Scale	SCALE @ A1					
Drawing Number	B2416603/BODEL/PHOTO/002			Rev	P02					
Client	nationalgrid									

EXISTING - WINTER BASELINE



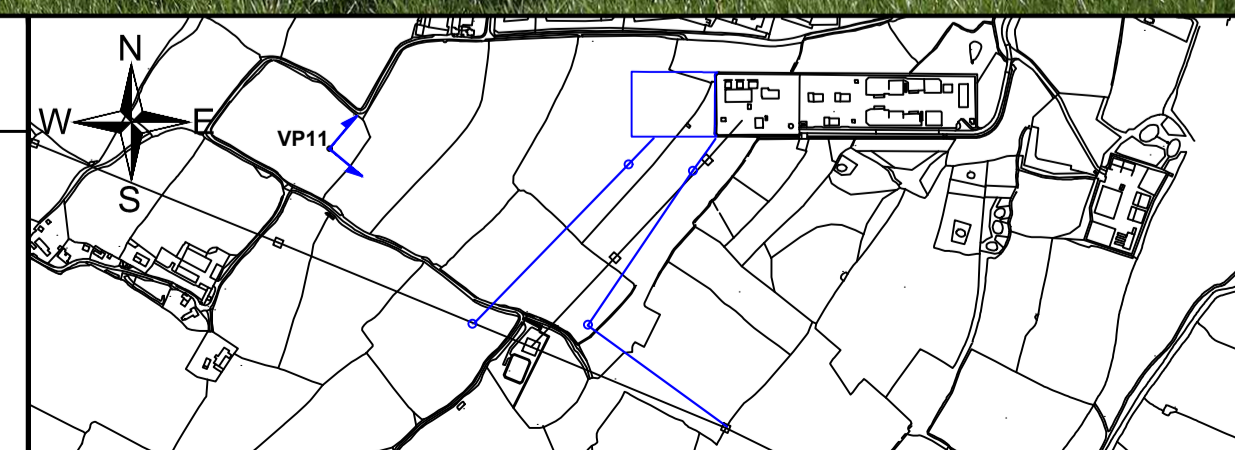
PHOTOMONTAGE - WINTER YEAR 1 OF OPERATION



VIEWPOINT 11: View looking east from footpath towards Substation

Visualisation type: Type 3 (in accordance with Landscape Institute Visual Representation of Development Proposals Technical Guidance Note 06/19)
 Date and time of photograph: 22/03/22 at 11.15
 Lighting conditions: Bright
 OS grid reference: 301059, 373508
 Viewpoint ground elevation: 60 m
 Projection: Cylindrical
 Sheet size: A1

Enlargement factor: 96% @ A1
 Camera type: Canon EOS 5D MARK III
 Camera lens size: 50 mm
 Camera height above ground level: 1.6 m
 Aperture: F/7.1
 ISO: 200
 Shutter speed: 1/800
 Horizontal field of view: 90°
 Vertical field of view: 27°
 Bearing to centre of panoramic: 80°



LOCATION PLAN

NOTES:
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 3) If using this photomontage illustration for landscape context, the figure may be viewed at A3 sheet size.
 4) For larger plans showing all viewpoint locations, refer to Appendix L.

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Project	BODELWYDDAN OVERHEAD LINES				Rev.	Rev. date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
		P02	AUG 24	For Planning	RL	JP	JE	DB			
Drawing Title	APPENDIX P PHOTOMONTAGE VIEWPOINT 11 WINTER YEAR 1				Rev.	Rev. date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
		P01	JUL 22	For Planning	RL	EC	JP	DB			
Jacobs No	B2416603				Drawing Status						
						FOR PLANNING					
Drawing Number	B2416603/BODEL/PHOTO/003				Scale	SCALE @ A1					
					Client	nationalgrid					
					Rev	P02					

EXISTING - WINTER BASELINE



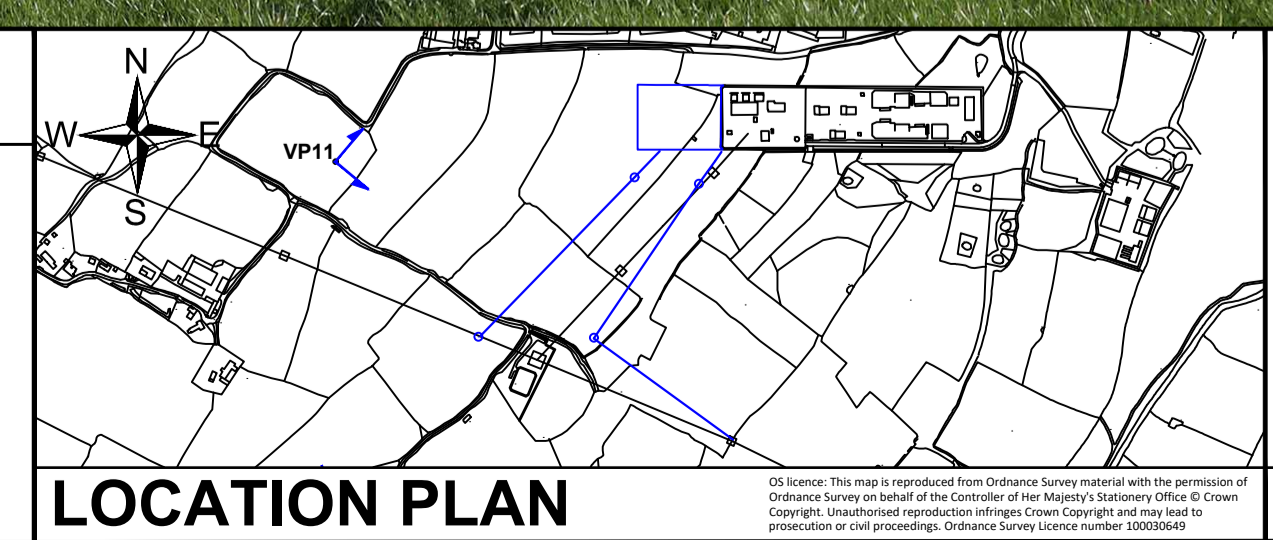
PHOTOMONTAGE - WINTER YEAR 15 OF OPERATION



VIEWPOINT 11: View looking east from footpath towards Substation

Visualisation type: Type 3 (in accordance with Landscape Institute Visual Representation of Development Proposals Technical Guidance Note 06/19)
 Date and time of photograph: 22/03/22 at 11.15
 Lighting conditions: Bright
 OS grid reference: 301059, 373508
 Viewpoint ground elevation: 60 m
 Projection: Cylindrical
 Sheet size: A1

Enlargement factor: 96% @ A1
 Camera type: Canon EOS 5D MARK III
 Camera lens size: 50 mm
 Camera height above ground level: 1.6 m
 Aperture: F/7.1
 ISO: 200
 Shutter speed: 1/800
 Horizontal field of view: 90°
 Vertical field of view: 27°
 Bearing to centre of panoramic: 80°



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 3) If using this photomontage illustration for landscape context, the figure may be viewed at A3 sheet size.
 4) For larger plans showing all viewpoint locations, refer to Appendix L.

Project	BODELWYDDAN OVERHEAD LINES				Rev.	Rev. date	Purpose of revision	Drawn	Check'd	Rev'd	App'd
		P02	AUG 24	For Planning	RL	JP	JE	DB			
		P01	JUL 22	For Planning	RL	EC	JP	DB			
Drawing Title	APPENDIX P PHOTOMONTAGE VIEWPOINT 11 WINTER YEAR 15				Drawing Status						
					FOR PLANNING						
Jacobs No	B2416603				Scale						
					SCALE @ A1						
Drawing Number	B2416603/BODEL/PHOTO/004				Client						
					nationalgrid						
		Rev	P02								

EXISTING - WINTER BASELINE



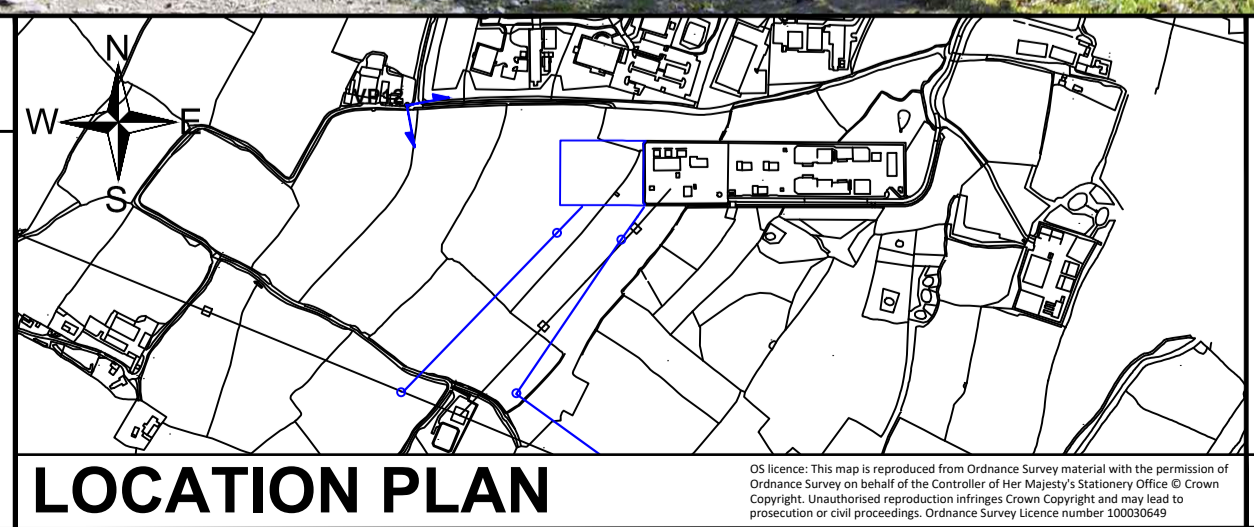
PHOTOMONTAGE - WINTER YEAR 1 OF OPERATION



VIEWPOINT 12: View looking south east from Waen Merydd towards Substation

Visualisation type: Type 3 (in accordance with Landscape Institute Visual Representation of Development Proposals Technical Guidance Note 06/19)
 Date and time of photograph: 22/03/22 at 10.55
 Lighting conditions: Bright
 OS grid reference: 301257, 373658
 Viewpoint ground elevation: 46 m
 Projection: Cylindrical
 Sheet size: A1

Enlargement factor: 96% @ A1
 Camera type: Canon EOS 5D MARK III
 Camera lens size: 50 mm
 Camera height above ground level: 1.6 m
 Aperture: F/7.1
 ISO: 200
 Shutter speed: 1/320
 Horizontal field of view: 90°
 Vertical field of view: 27°
 Bearing to centre of panoramic: 130°



NOTES:
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 3) If using this photomontage illustration for landscape context, the figure may be viewed at A3 sheet size.
 4) For larger plans showing all viewpoint locations, refer to Appendix L.

Project	BODELWYDDAN OVERHEAD LINES			Rev. P02	Rev. date AUG 24	Purpose of revision For Planning	Drawn RL	Check'd JP	Rev'd JE	Appr'd DB
Drawing Title	APPENDIX P PHOTOMONTAGE VIEWPOINT 12 WINTER YEAR 1			Rev. P01	Rev. date JUL 22	Purpose of revision For Planning	Drawn RL	Check'd EC	Rev'd JP	Appr'd DB
Jacobs No	B2416603			Drawing Status FOR PLANNING						
Drawing Number	B2416603/BODEL/PHOTO/005			Scale SCALE @ A1						
Client	nationalgrid			Rev. P02						

EXISTING - WINTER BASELINE



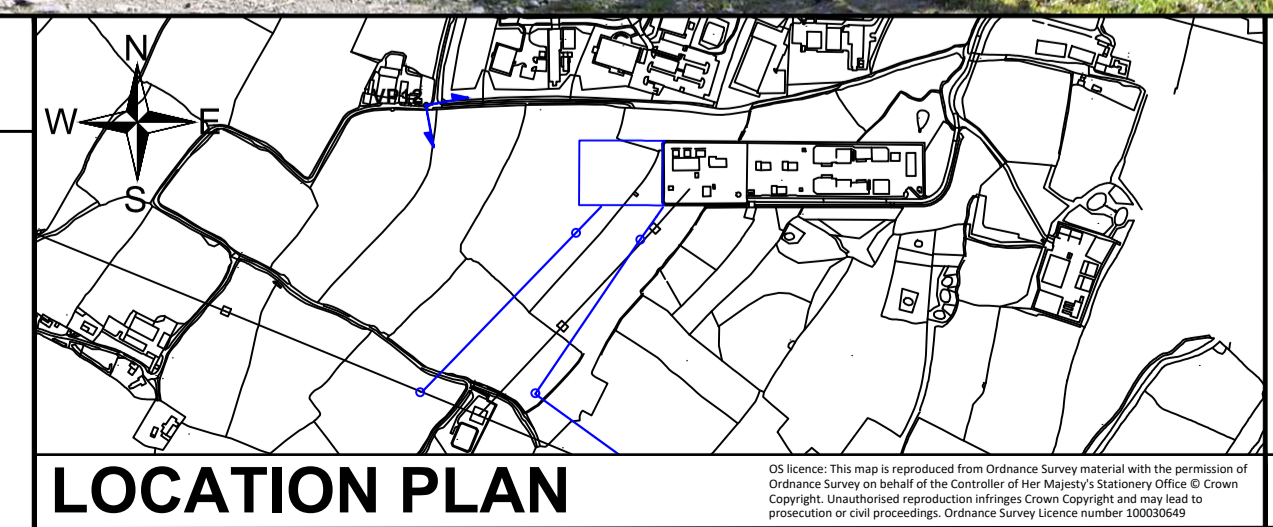
PHOTOMONTAGE - WINTER YEAR 15 OF OPERATION



VIEWPOINT 12: View looking south east from Waen Merydd towards Substation

Visualisation type: Type 3 (in accordance with Landscape Institute Visual Representation of Development Proposals Technical Guidance Note 06/19)
 Date and time of photograph: 22/03/22 at 10.55
 Lighting conditions: Bright
 OS grid reference: 301257, 373658
 Viewpoint ground elevation: 46 m
 Projection: Cylindrical
 Sheet size: A1

Enlargement factor: 96% @ A1
 Camera type: Canon EOS 5D MARK III
 Camera lens size: 50 mm
 Camera height above ground level: 1.6 m
 Aperture: F/7.1
 ISO: 200
 Shutter speed: 1/320
 Horizontal field of view: 90°
 Vertical field of view: 27°
 Bearing to centre of panoramic: 130°



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 3) If using this photomontage illustration for landscape context, the figure may be viewed at A3 sheet size.
 4) For larger plans showing all viewpoint locations, refer to Appendix L.

Project	BODELWYDDAN OVERHEAD LINES			Rev. P02	Rev. date AUG 24	Purpose of revision For Planning	Drawn RL	Check'd JP	Rev'd JE	Appr'd DB
Drawing Title	APPENDIX P PHOTOMONTAGE VIEWPOINT 12 WINTER YEAR 15			Rev. P01	Rev. date JUL 22	Purpose of revision For Planning	Drawn RL	Check'd EC	Rev'd JP	Appr'd DB
Jacobs No	B2416603			Drawing Status FOR PLANNING						
Drawing Number	B2416603/BODEL/PHOTO/006			Scale SCALE @ A1						
Client	nationalgrid			Rev. P02						

EXISTING - WINTER BASELINE



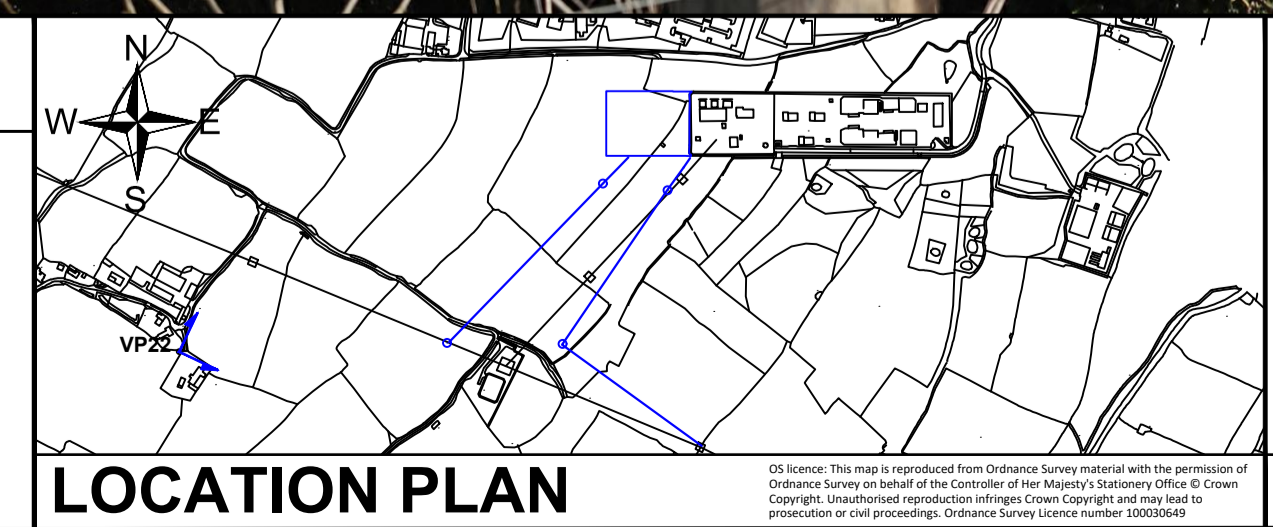
PHOTOMONTAGE - WINTER YEAR 1 OF OPERATION



VIEWPOINT 22: View looking north east from footpath towards Substation

Visualisation type: Type 3 (in accordance with Landscape Institute Visual Representation of Development Proposals Technical Guidance Note 06/19)
 Date and time of photograph: 22/03/22 at 11.45
 Lighting conditions: Bright
 OS grid reference: 300894, 373265
 Viewpoint ground elevation: 81 m
 Projection: Cylindrical
 Sheet size: A1

Enlargement factor: 96% @ A1
 Camera type: Canon EOS 5D MARK III
 Camera lens size: 50 mm
 Camera height above ground level: 1.6 m
 Aperture: F/7.1
 ISO: 200
 Shutter speed: 1/800
 Horizontal field of view: 90°
 Vertical field of view: 27°
 Bearing to centre of panoramic: 60°



NOTES:
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 4) For larger plans showing all viewpoint locations, refer to Appendix L.

Project	BODELWYDDAN OVERHEAD LINES			Rev. P02	Rev. date AUG 24	Purpose of revision For Planning	Drawn RL	Check'd JP	Rev'd JE	Appr'd DB
Drawing Title	APPENDIX P PHOTOMONTAGE VIEWPOINT 22 WINTER YEAR 1			Rev. P01	Rev. date JUL 22	Purpose of revision For Planning	Drawn RL	Check'd EC	Rev'd JP	Appr'd DB
Jacobs No	B2416603			Drawing Status FOR PLANNING						
Drawing Number	B2416603/BODEL/PHOTO/007			Scale SCALE @ A1						
Client	nationalgrid									

EXISTING - WINTER BASELINE



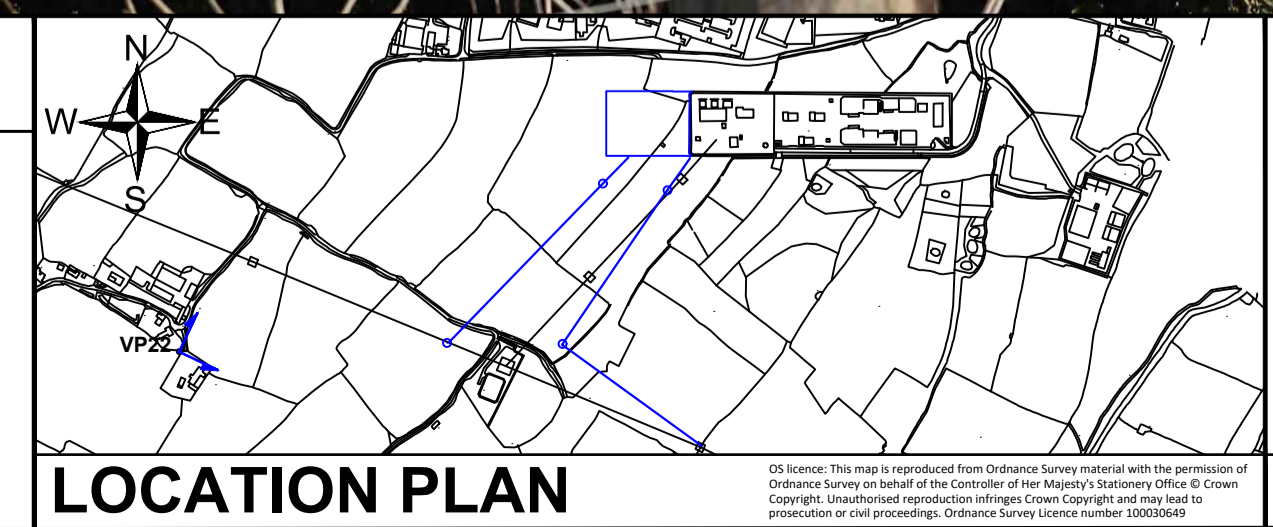
PHOTOMONTAGE - WINTER YEAR 15 OF OPERATION



VIEWPOINT 22: View looking north east from footpath towards Substation

Visualisation type: Type 3 (in accordance with Landscape Institute Visual Representation of Development Proposals Technical Guidance Note 06/19)
 Date and time of photograph: 22/03/22 at 11.45
 Lighting conditions: Bright
 OS grid reference: 300894, 373265
 Viewpoint ground elevation: 81 m
 Projection: Cylindrical
 Sheet size: A1

Enlargement factor: 96% @ A1
 Camera type: Canon EOS 5D MARK III
 Camera lens size: 50 mm
 Camera height above ground level: 1.6 m
 Aperture: F/7.1
 ISO: 200
 Shutter speed: 1/800
 Horizontal field of view: 90°
 Vertical field of view: 27°
 Bearing to centre of panoramic: 60°



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 4) For larger plans showing all viewpoint locations, refer to Appendix L.

Project	BODELWYDDAN OVERHEAD LINES		Rev. P02	Rev. date AUG 24	Purpose of revision For Planning	Drawn RL	Check'd JP	Rev'd JE	Appr'd DB
Drawing Title	APPENDIX P PHOTOMONTAGE VIEWPOINT 22 WINTER YEAR 15		Rev. P01	Rev. date JUL 22	Purpose of revision For Planning	Drawn RL	Check'd EC	Rev'd JP	Appr'd DB
Jacobs No	B2416603		Drawing Status			FOR PLANNING			
Drawing Number	B2416603/BODEL/PHOTO/008		Scale			SCALE @ A1			
Client	nationalgrid								

Appendix Q. Photomontage Methodology

Q.1 Introduction

The text below outlines the methodology used to provide the photomontage representations to inform the extension to Bodelwyddan Substation and the overhead line works.

This methodology document has been undertaken in accordance with the following core guidance documents:

- Landscape Institute Technical Guidance Note 06-19 Visual Representation of Development Proposals (LI TGN 06/19) (Landscape Institute, 2019), herein referred to as LI TGN06/19; and
- Guidelines for Landscape and Visual Impact Assessment, Third Edition (Landscape Institute and Institute of Environmental Management and Assessment, 2013), herein referred to as GLVIA3.

Q.1.1 Viewpoint Locations

The final locations of viewpoints to be presented as Photomontages, are as follows:

- Viewpoint 02: View looking north east from footpath towards Substation;
- Viewpoint 11: View looking east from footpath towards Substation;
- Viewpoint 12: View looking south east from Waen Mereydd towards Substation; and
- Viewpoint 22: View looking north east from footpath towards Substation.

Q.2 Visualisation Determination

LI TGN 06/19 identifies a process of determining the Visualisation Type by way of a proportionate appraisal of project type or scale, likely audience, visualisation purpose and anticipated level of visual effect. This has been undertaken by a suitably qualified Landscape Architect based on the available site and design data at this time, and in accordance with GLVIA3.

The purpose of the visualisations is to illustrate the likely change in view from a proportionate selection of representative viewpoints that may occur as a result of the Proposed Scheme being introduced into that view.

Type 3 Visualisations - Photomontages or Photowires as defined within LI TGN 06/19 have been produced for this project. The objective of a Type 3 visualisation is to present a printed image which gives a realistic impression of appearance, context, form and extent of the proposed development. Type 3 is summarised in TGN06/19 Section 4 – Type 3 Summary as "... appropriate for many planning applications, LVAs and LVIA's, where photomontage is required but a verifiable process and printed scale representation are not needed."

The recommendations from this summary that have been adhered to are as follows:

"Use a Full Frame Sensor camera with 50mm lens or cropped frame sensor camera with 35mm or 28mm fixed lens..."

...The enlargement factor should be stated on each page, together with the label 'Visualisation Type: 3'...

...For very wide linear infrastructure, cylindrical panoramas up to 90° at A1 width, with multiple sheets for very wide panoramas will be produced.

Accompany visualisations with a Technical Methodology. Images will typically be presented with a 100% enlargement (27°@ A3, or 90°@ A1) "

Q.3 Assumptions and Limitations

Every effort has been made to ensure a reasonable level of accuracy was maintained throughout the production of the visualisations and that the scheme is represented accurately. The following assumptions and limitations have been identified below.

- The baseline photographs that form the basis of the photomontage are a flattened 2D representation of what the eye would see (planar projection);
- Accuracy tolerances for survey and data can be determined based on key data (e.g. OS data and handheld GPS units) used to provide references for fixing camera perspectives; and
- Photomontages are assumed to be required to reflect the worst-case effects of the proposed development in operation winter year 1, and the function of mitigation planting in operation winter year 15. For the year 15 photomontages, plant growth will be assumed to reflect a total height of proposed mitigation planting as described in section Q.7.3 below.

Q.4 Type 3 Visualisation Process Methodology

Q.4.1 Photography and Survey Data

At each viewpoint location, the following survey data was collected:

- Ordnance Survey Grid coordinates of the camera location;
- date and time photograph;
- the height of the camera above ground level (1.6m); and
- weather conditions at the time of photography.

Photographs were taken 22nd March 2023. Camera locations were recorded using a hand-held SatMap Active 20 GPS unit and/or iPhone smart phone with Coordinates App.

The baseline photographs were taken using Canon EOS 6D Mark II Digital Single Lens Reflex (DSLR) cameras, both with a fixed 50mm lens. All photographs were taken on a tripod levelled to the vertical and horizontal axes.

Camera settings were standardised for the correct exposure, shutter speed and resolution to enable clean production of panoramic images and high-resolution output.

The panoramic photography was undertaken using a series of photographs taken with a panoramic tripod head set to provide a 60% overlap (15° increments) between frames to reduce barrel distortion. The photographs were taken in a portrait orientation.

Q.5 Panoramic Baseline Images

Photographs were stitched together using PTGui software using cylindrical projection to produce a single panoramic image that was exported to Photoshop at 90° horizontal x 27° vertical.

During this process, only minor improvements, for example, to balance brightness and contrast, were made where necessary due to variable light conditions on site.

Images were then cropped to an 86.5° horizontal and 27° field of view to reflect 96% extent of the 90° horizontal field of view, in accordance with LTGN 06/19, used for the photography. Images were then resized to fit to the

final A1 page plates (820 x 250mm) to enable a comfortable viewing distance is maintained for viewing the figures.

Q.6 Camera Matching Process

To assist the process of matching the baseline photograph with the 3D digital model of the scheme, reference points were identified at each viewpoint location. Reference points are features that could be identified from a topographical survey, Ordnance Survey data or aerial photography that are then imported and modelled into 3D within the existing 3D model. Examples include retained lighting columns, structural steel posts, road restraint barriers etc.

The baseline panoramic images were imported into the 3D modelling software (Autodesk 3DS Max) and used in the camera matching process as backdrops when rendering, using the V-Ray Next 3.70 engine. As part of this process, the 'warped old style camera' settings were used match the cylindrical projection of the baseline panoramic image and allow accurate matching of reference points.

A local grid with a common global shift from OS National Grid was identified to enable the 3D modelling software to operate efficiently and all modelling data was moved using this information.

The base 3D model (existing environment and site context) was produced using information from topographical surveys and 3D information to vertically place reference objects.

In the 3D modelling software, the locations of the viewpoints were added to the model using the survey data. The viewpoints were then used as a starting point for fixing the location of the 3D camera by matching terrain, reference points and other information in the model to the corresponding features in the background image (the 3D camera backdrop).

Once the correct aspect, orientation and any camera roll (potential minor rotation of the camera when photograph taken) were confirmed and checked, the locations were locked for use in rendering.

Q.7 3D Design Modelling

Q.7.1 Existing Site 3D Model

The baseline model was created using the existing 3D lidar and converted to a terrain in 3DS Max.

Q.7.2 Proposed layout design 3D Model

The core design 3D model was provided in a Navisworks file and was exported into Autodesk 3DS Max via .fbx file type transfer. This created large files that needed further work to locate to a local grid. This was necessary for the software to work correctly.

Materials were confirmed with the designers and applied accordingly to the visible elements of the scheme.

Environmental lighting in the combined model was configured to match the date, time and lighting conditions as surveyed on site at the time of the photography.

Q.7.3 Planting Mitigation Details

Operation Year 1

- Hedgerows: a double staggered row of 450 mm tall x 40 mm diameter shelters at 300 mm centres; and

Operation Year 15

- Reinstated hedgerows: as per existing;

Q.8 Compilation of Type 3 Visualisations: Photomontages

Baseline panoramic images were adjusted in Adobe Photoshop to reflect any elements and/or vegetation lost to facilitate the scheme and any retained foreground elements were layered over the top of the rendered layers showing the scheme.

Rendered images were generated from Autodesk 3DS Max Design software for the final production stage in Adobe Photoshop where they were stitched back together across the panoramic base image.

Once all layering and final adjustment to brightness and contrast levels were completed, all panoramic photographs and visualisations were resized to 820 mm x 250 mm at 300 pixels per cm to a reflect a 96% enlargement of 90o horizontal x 27o vertical field of view.

All final images were then framed in AutoCAD with accompanying information as detailed below:

- Visualisation type;
- Date and time of photograph;
- Viewpoint ground elevation;
- OS National Grid Reference and elevation;
- Season within which the photography was taken;
- Site lighting conditions when the photography was taken;
- Camera height above ground;
- Camera lens size;
- Aperture, ISO and shutter speed details;
- Bearing to centre of the panoramic;
- Sheet size;
- Enlargement factor;
- Camera specification;
- Field of view information;
- Direction of view;
- Key notes on use such as details on a comfortable viewing distance from the eye; and
- Inset plans showing the location and orientation of the viewpoints.

Once each viewpoint sheet set was complete, all images were printed to a single pdf document set at high resolution and to 1:1 scale to ensure no loss of image size.

Q.9 Final Output

- PHOTOMONTAGE VIEWPOINT 02 – EXISTING & WINTER YEAR 1 OF OPERATION;
- PHOTOMONTAGE VIEWPOINT 02 – EXISTING & WINTER YEAR 15 OF OPERATION;
- PHOTOMONTAGE VIEWPOINT 11 – EXISTING & WINTER YEAR 1 OF OPERATION;
- PHOTOMONTAGE VIEWPOINT 11 – EXISTING & WINTER YEAR 15 OF OPERATION;
- PHOTOMONTAGE VIEWPOINT 12 – EXISTING & WINTER YEAR 1 OF OPERATION;
- PHOTOMONTAGE VIEWPOINT 12 – EXISTING & WINTER YEAR 15 OF OPERATION;
- PHOTOMONTAGE VIEWPOINT 22 – EXISTING & WINTER YEAR 1 OF OPERATION; and
- PHOTOMONTAGE VIEWPOINT 22 – EXISTING & WINTER YEAR 15 OF OPERATION.

Q.10 References

Landscape Institute (2019), *Landscape Institute Technical Guidance Note 06-19 Visual Representation of Development Proposals* (LI TGN 06/19) – Landscape Institute. Available online https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/09/LI_TGN-06-19_Visual_Representation.pdf [accessed August 2024]

Landscape Institute and Institute of Environmental Management and Assessment (2013), *Guidelines for Landscape and Visual Impact Assessment, Third Edition* – Routledge

Appendix R. Representative Viewpoints

Proposed substation
will be screened by
vegetation.

Proposed 55m
pylons will be
screened by
vegetation.

Proposed 49m
pylons will be
screened by
vegetation.

Pylon to be retained
(three to the west of
4ZB167).



NOTES:

Visualisation type: Type 1
Season: Summer
Date and time: 2nd/3rd August 2022
Projection: Cylindrical
Sheet size: A1

Camera type: Canon EOS 5D MARK II
Horizontal field of view (HfOV): 90°
Direction of view: Looking south east
To be viewed at comfortable arm's length

Jacobs.

1 City Walk, Leeds, LS11 9DX
Tel: +44(0)113 242 6771 Fax: +44(0)113 389 1389
www.jacobs.com

Client: nationalgrid
Project: BODELWYDDAN SUBSTATION

VIEWPOINT 1: View south east from Bodelwyddan Castle
and Park

Scale	NTS	DO NOT SCALE
Jacobs No.	B2416603	
Drawing number	B2416603/BODEL/RV/001	

Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd
1	FEB 2024	FOR PLANNING	JE	JP	TW	KW

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.



NOTES:

Visualisation type: Type 1
 Season: Summer
 Date and time: 2nd/3rd August 2022
 Projection: Cylindrical
 Sheet size: A1

Camera type: Canon EOS 5D MARK II
 Horizontal field of view (HFOV): 90°
 Direction of view: Looking south
 To be viewed at comfortable arm's length

Jacobs.

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 www.jacobs.com

VIEWPOINT 3: Public right of way and access road looking south

Scale	NTS	DO NOT SCALE
Jacobs No.	B2416603	
Drawing number	B2416603/BODEL/RV/001	

Client	nationalgrid
Project	BODELWYDDAN SUBSTATION

Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd
0	FEB 2024	FOR PLANNING	JE	JP	TW	KW

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Proposed replacement of 49m pylon 4ZB167 with 49m pylon 4ZB167A.

Proposed new 55m pylon GM1.

Existing substation.

Proposed new 49m pylon 4ZB167B.

Proposed 55m pylon GMA1 and proposed substation extension.



NOTES:

Visualisation type: Type 1
 Season: Summer
 Date and time: 2nd/3rd August 2022
 Projection: Cylindrical
 Sheet size: A1

Camera type: Canon EOS 5D MARK II
 Horizontal field of view (HFOV): 90°
 Direction of view: Looking south west
 To be viewed at comfortable arm's length

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VIEWPOINT 4: View south west from public right of way, including residence south of Lon Coed Esgob.

Scale	NTS	DO NOT SCALE
Jacobs No.	B2416603	
Drawing number	B2416603/BODEL/RV/001	

Client	nationalgrid
Project	BODELWYDDAN SUBSTATION

Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd
1	FEB 2024	FOR PLANNING	JE	JP	TW	KW

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Temporary works to overhead lines during construction



NOTES:

Visualisation type: Type 1
 Season: Summer
 Date and time: 2nd/3rd August 2022
 Projection: Cylindrical
 Sheet size: A1

Camera type: Canon EOS 5D MARK II
 Horizontal field of view (HFOV): 75°
 Direction of view: Looking north east
 To be viewed at comfortable arm's length

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 www.jacobs.com

Client	nationalgrid
Project	BODELWYDDAN SUBSTATION

VIEWPOINT 5: View north east from residential properties at Pentre Mawr

Scale	NTS	DO NOT SCALE
Jacobs No.	B2416603	
Drawing number	B2416603/BODEL/RV/001	

1	FEB 2024	FOR PLANNING	JE	JP	TW	KW
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.



Existing pylon to be removed.

Existing pylon to be removed.

Location of proposed 49m pylons.

Location of proposed 55m pylons.

Location of proposed substation extension.

Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd
1	FEB 2024	FOR PLANNING	JE	JP	TW	KW

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

NOTES:
 Visualisation type: Type 1
 Season: Summer
 Date and time: 2nd/3rd August 2022
 Projection: Cylindrical
 Sheet size: A1

Camera type: Canon EOS 5D MARK II
 Horizontal field of view (HFOV): 90°
 Direction of view: Looking south west
 To be viewed at comfortable arm's length

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nationalgrid

BODELWYDDAN SUBSTATION

VIEWPOINT 6: View south west from residential receptors on Glascoed Road		
Scale	NTS	DO NOT SCALE
Jacobs No.	B2416603	
Drawing number	B2416603/BODEL/RV/001	

Existing pylon to be retained two pylons to the east of the existing pylon 4ZB167.



Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd
1	FEB 2024	FOR PLANNING	JE	JP	TW	KW

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

NOTES:
 Visualisation type: Type 1
 Season: Summer
 Date and time: 2nd/3rd August 2022
 Projection: Cylindrical
 Sheet size: A1

Camera type: Canon EOS 5D MARK II
 Horizontal field of view (HFOV): 90°
 Direction of view: Looking south
 To be viewed at comfortable arm's length

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Client: nationalgrid
 Project: BODELWYDDAN SUBSTATION

VIEWPOINT 7: View south from St Asaph Business Park on Glascoed Road		
Scale	NTS	DO NOT SCALE
Jacobs No.	B2416603	
Drawing number	B2416603/BODEL/RV/001	



1	FEB 2024	FOR PLANNING	JE	JP	TW	KW
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd

NOTES:
 Visualisation type: Type 1
 Season: Summer
 Date and time: 2nd/3rd August 2022
 Projection: Cylindrical
 Sheet size: A1

Camera type: Canon EOS 5D MARK II
 Horizontal field of view (HFOV): 90°
 Direction of view: Looking south
 To be viewed at comfortable arm's length

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nationalgrid

Client: nationalgrid
 Project: BODELWYDDAN SUBSTATION

VIEWPOINT 8: View south from Public Right of Way at Faelnol Broper		
Scale	NTS	DO NOT SCALE
Jacobs No.	B2416603	
Drawing number	B2416603/BODEL/RV/001	

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Replace existing 27m GM001 pylon with proposed 55m pylon.

Existing 49m pylon behind trees to be replaced with two proposed 49m pylons.

Remove existing 27m GM002 pylon.

Existing substation screened behind trees.

Proposed 55m pylon.



NOTES:

Visualisation type: Type 1
 Season: Summer
 Date and time: 2nd/3rd August 2022
 Projection: Cylindrical
 Sheet size: A1

Camera type: Canon EOS 5D MARK II
 Horizontal field of view (HFOV): 90°
 Direction of view: Looking south west
 To be viewed at comfortable arm's length

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VIEWPOINT 9: View south west from public right of way, Lon Coed Esgob.

Scale	NTS	DO NOT SCALE
Jacobs No.	B2416603	
Drawing number	B2416603/BODEL/RV/001	

Client	nationalgrid
Project	BODELWYDDAN SUBSTATION

1	FEB 2024	FOR PLANNING	JE	JP	TW	KW
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Temporary works to overhead lines during construction.

Proposed 55m pylon behind trees.

Proposed 49m pylon.

Proposed substation extension.

Proposed 49m pylon.

Replace existing pylon with proposed 55m pylon.

Existing pylon to be removed.



NOTES:

Visualisation type: Type 1
 Season: Summer
 Date and time: 2nd/3rd August 2022
 Projection: Cylindrical
 Sheet size: A1

Camera type: Canon EOS 5D MARK II
 Horizontal field of view (HFOV): 90°
 Direction of view: Looking north east
 To be viewed at comfortable arm's length

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VIEWPOINT 10: View north east from public right of way, Hillside

Scale	NTS	DO NOT SCALE
Jacobs No.	B2416603	
Drawing number	B2416603/BODEL/RV/001	

Client	nationalgrid
Project	BODELWYDDAN SUBSTATION

1	FEB 2024	FOR PLANNING	JE	JP	TW	KW
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.



1	FEB 2024	FOR PLANNING	JE	JP	TW	KW
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

NOTES:
 Visualisation type: Type 1
 Season: Summer
 Date and time: 2nd/3rd August 2022
 Projection: Cylindrical
 Sheet size: A1

Camera type: Canon EOS 5D MARK II
 Horizontal field of view (HFOV): 90°
 Direction of view: Looking south
 To be viewed at comfortable arm's length

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Client: nationalgrid
 Project: BODELWYDDAN SUBSTATION

VIEWPOINT 13: Marble Church South		
Scale	NTS	DO NOT SCALE
Jacobs No.	B2416603	
Drawing number	B2416603/BODEL/RV/001	



Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd
1	FEB 2024	FOR PLANNING	JE	JP	TW	KW

NOTES:
 Visualisation type: Type 1
 Season: Summer
 Date and time: 2nd/3rd August 2022
 Projection: Cylindrical
 Sheet size: A1

Camera type: Canon EOS 5D MARK II
 Horizontal field of view (HFOV): 90°
 Direction of view: Looking west
 To be viewed at comfortable arm's length

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nationalgrid

Client: nationalgrid
 Project: BODELWYDDAN SUBSTATION

VIEWPOINT 14: View west from St Asaph Cathedral		
Scale	NTS	DO NOT SCALE
Jacobs No.	B2416603	
Drawing number	B2416603/BODEL/RV/001	

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

4ZB167 49m pylon to be replaced in view with proposed 4ZB167B 49m pylon.

Proposed 4ZB167A pylon.

Public right of way.



NOTES:

Visualisation type: Type 1
 Season: Summer
 Date and time: 2nd/3rd August 2022
 Projection: Cylindrical
 Sheet size: A1

Camera type: Canon EOS 5D MARK II
 Horizontal field of view (HFOV): 90°
 Direction of view: Looking west
 To be viewed at comfortable arm's length

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VIEWPOINT 16: View west from public right of way

Scale	NTS	DO NOT SCALE
Jacobs No.	B2416603	
Drawing number	B2416603/BODEL/RV/001	

Client	nationalgrid
Project	BODELWYDDAN SUBSTATION

Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd
1	FEB 2024	FOR PLANNING	JE	JP	TW	KW

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Existing pylons to be retained
(pylon to the east of 4ZB167),
proposed development not visible.



NOTES:

Visualisation type: Type 1
Season: Summer
Date and time: 2nd/3rd August 2022
Projection: Cylindrical
Sheet size: A1

Camera type: Canon EOS 5D MARK II
Horizontal field of view (HFOV): 90°
Direction of view: Looking west
To be viewed at comfortable arm's length

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Client	nationalgrid
Project	BODELWYDDAN SUBSTATION

VIEWPOINT 17: View west from residential receptors at
Ty'n-y-fford-bach

Scale	NTS	DO NOT SCALE
Jacobs No.	B2416603	
Drawing number	B2416603/BODEL/RV/001	

1	FEB 2024	FOR PLANNING	JE	JP	TW	KW
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

St Asaph Cathedral Tower.

Existing pylons to be replaced by
proposed 49m pylons 4ZB167A
and 4ZB167B and 55m pylons
GM1 and GMA1.



NOTES:

Visualisation type: Type 1
Season: Summer
Date and time: 2nd/3rd August 2022
Projection: Cylindrical
Sheet size: A1

Camera type: Canon EOS 5D MARK II
Horizontal field of view (HFOV): 90°
Direction of view: Looking south west
To be viewed at comfortable arm's length

Jacobs.

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Client	nationalgrid
Project	BODELWYDDAN SUBSTATION

VIEWPOINT 18: View south west from Rhuddlan Castle

Scale	NTS	DO NOT SCALE
Jacobs No.	B2416603	
Drawing number	B2416603/BODEL/RV/001	

1	FEB 2024	FOR PLANNING	JE	JP	TW	KW
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Existing pylon to be retained
(pylon east of 4ZB167).



NOTES:

Visualisation type: Type 1
 Season: Summer
 Date and time: 2nd/3rd August 2022
 Projection: Cylindrical
 Sheet size: A1

Camera type: Canon EOS 5D MARK II
 Horizontal field of view (HFOV): 90°
 Direction of view: Looking north
 To be viewed at comfortable arm's length

Jacobs.

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Client: nationalgrid
 Project: BODELWYDDAN SUBSTATION

VIEWPOINT 19: View north from Isfryn Farm

Scale	NTS	DO NOT SCALE
Jacobs No.	B2416603	
Drawing number	B2416603/BODEL/RV/001	

Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd
1	FEB 2024	FOR PLANNING	JE	JP	TW	KW

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

St Asaph Cathedral Tower.

Bodelwyddan Registered Park and Garden.

Approximate location of proposed development site.

Marble Church.



NOTES:

Visualisation type: Type 1
 Season: Summer
 Date and time: 2nd/3rd August 2022
 Projection: Cylindrical
 Sheet size: A1

Camera type: Canon EOS 5D MARK II
 Horizontal field of view (HFOV): 90°
 Direction of view: Looking south west
 To be viewed at comfortable arm's length

Jacobs.

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Client	nationalgrid
Project	BODELWYDDAN SUBSTATION

VIEWPOINT 20: View south west from public right of way at AONB Ciwydian Range

Scale	NTS	DO NOT SCALE
Jacobs No.	B2416603	
Drawing number	B2416603/BODEL/RV/001	

Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd
1	FEB 2024	FOR PLANNING	JE	JP	TW	KW

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Approximate location of existing
49m pylon 4ZB167.

St Mary's Parish Church.



NOTES:

Visualisation type: Type 1
 Season: Summer
 Date and time: 2nd/3rd August 2022
 Projection: Cylindrical
 Sheet size: A1

Camera type: Canon EOS 5D MARK II
 Horizontal field of view (HFOV): 90°
 Direction of view: Looking north
 To be viewed at comfortable arm's length

Jacobs.

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Client: nationalgrid
 Project: BODELWYDDAN SUBSTATION

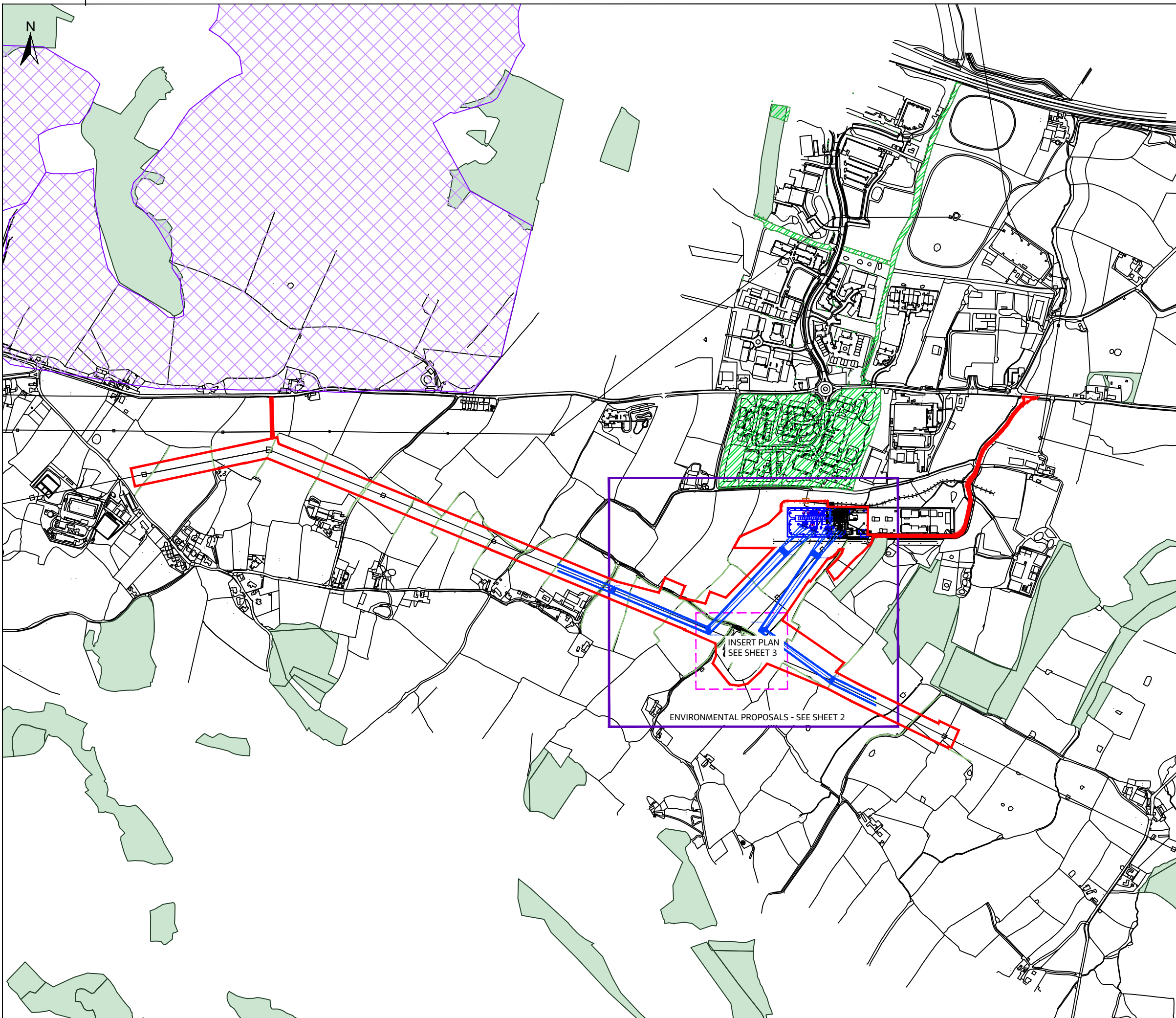
VIEWPOINT 21: View north from St Mary's Church

Scale	NTS	DO NOT SCALE
Jacobs No.	B2416603	
Drawing number	B2416603/BODEL/RV/001	

Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd
1	FEB 2024	FOR PLANNING	JE	JP	TW	KW

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Appendix S. Environmental Masterplan



- Legend**
- Works Boundary
 - ▨ Priority Habitat - Parkland
 - Ancient Woodland
 - ▨ Tree Preservation Order (TPO)
 - Existing retained hedgerows

P03	17/06/2025	WORKS BOUNDARY CHANGE	JP	JE	TW	KW
P02	18/02/2025	SCOPE CHANGE - CSEC UPDATE	JP	JE	TW	KW
P01	14/08/2024	FINAL	JP	RL	JE	KW
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
Scale @ A3		Scale: 1:10,000	DO NOT SCALE			
Jacobs No. B2416603						

Jacobs

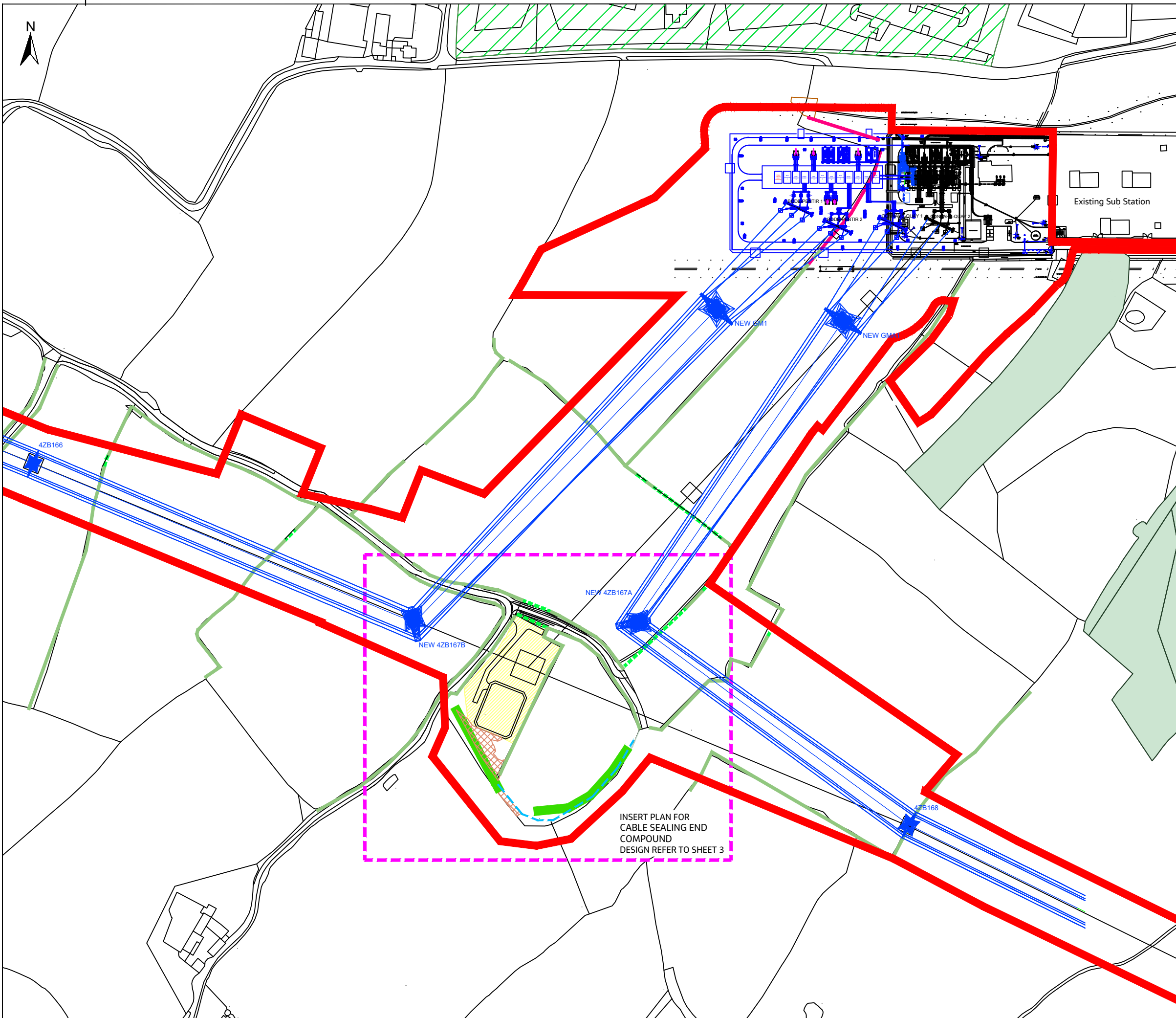
Client **nationalgrid**

Project **BODLEWYDDAN OVERHEAD LINES**

Drawing Title **ENVIRONMENTAL MASTERPLAN
LAYOUT PLAN
SHEET 1 OF 3**

Drawing No. B2416603_BODEL_MAS_001	Drawing Status FINAL
---------------------------------------	-------------------------

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- Legend**
- Works Boundary
 - Ancient Woodland
 - Tree Preservation Order (TPO)
 - Existing retained hedgerows
 - Existing Lines of Trees retained
 - Existing mixed scrub retained
 - Existing ditch retained
 - Existing Substation
 - Proposed Substation Extension
 - Proposed Overhead Line improvements
 - Hedgerows to be removed
 - Hedgerow replacement planting
 - Proposed return to pasture land

P03	17/06/2025	WORKS BOUNDARY CHANGE	JP	JE	TW	KW
P02	18/02/2025	SCOPE CHANGE - CSEC UPDATE	JP	JE	TW	KW
P01	14/08/2024	FINAL	JP	RL	JE	KW
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd

Scale @ A3 Scale: 1:2,500 DO NOT SCALE

Jacobs No. B2416603

Jacobs

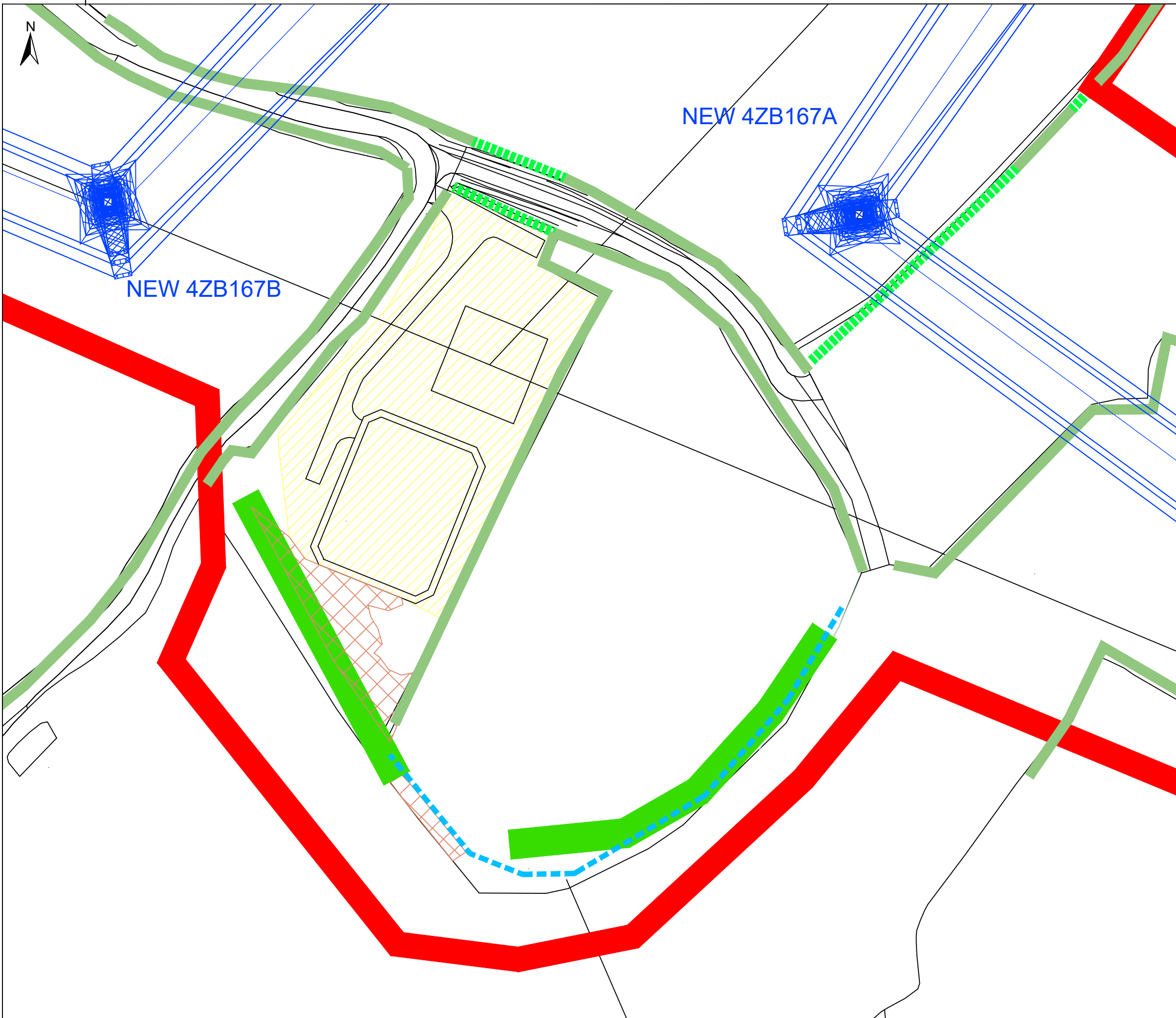
Client
nationalgrid

Project
BODLEWYDDAN OVERHEAD LINES

Drawing Title
ENVIRONMENTAL MASTERPLAN
GENERAL ARRANGEMENT
SHEET 2 OF 3

Drawing No. B2416603_BODEL_MAS_001 Drawing Status FINAL

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- Legend**
- Works Boundary
 - Existing retained hedgerows
 - Existing lines of trees retained
 - Existing mixed scrub retained
 - Existing ditch retained
 - Proposed Overhead Line improvements
 - Proposed hedgerow replacement
 - Proposed return to pasture land

P03	17/06/2025	WORKS BOUNDARY CHANGE	JP	JE	TW	KW
P02	18/02/2025	SCOPE CHANGE - CSEC UPDATE	JP	JE	TW	KW
P01	14/08/2024	FINAL	JP	RL	JE	KW
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd

Scale @ A3 Scale: 1:750 DO NOT SCALE

Jacobs No. B2416603

Jacobs

Client
nationalgrid

Project
BODLEWYDDAN OVERHEAD LINES

Drawing Title
ENVIRONMENTAL MASTERPLAN
CABLE SEALING END COMPOUND
SHEET 3 OF 3

Drawing No. B2416603_BODEL_MAS_001 Drawing Status FINAL

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Appendix T. Heritage Appraisal

Subject	Archaeological Appraisal	Project Name	Bodelwyddan
Attention	[REDACTED]	Project No.	B2416603
From	[REDACTED]		
Date	February 2025		

1. Introduction

This updated Heritage Appraisal has been prepared in support of the extension to the Bodelwyddan substation and associated overhead cable works and hereafter referred to as 'the Scheme'.

The Scheme is located to the immediate west and south-west of the existing substation, approximately centred on National Grid Reference 301049, 373402 and covers an area of 20 hectares, this taking into consideration the existing overhead cable routes into the substation and proposed reconfiguration of these.

The historic environment is defined by Planning Policy Wales (PPW) (Edition 12, February 2024) as follows:

'The historic environment comprises all the surviving physical elements of previous human activity and illustrates how past generations have shaped the world around us. It is central to Wales's culture and its character, whilst contributing to our sense of place and identity. It enhances our quality of life, adds to regional and local distinctiveness and is an important economic and social asset.'

The historic environment is identified to be made up of individual heritage assets (or features) examples of which include designated assets (World Heritage Sites, Scheduled Monuments, Listed Buildings, Conservation Areas, Registered Parks and Gardens, Registered Battlefields and Registered Historic Wrecks) and non-designated assets (for example: locally listed buildings, archaeological sites and monuments and historic landscapes).

Legislation, policy and guidance in respect of the historic environment in Wales includes the following:

- The Ancient Monuments and Archaeological Areas Act 1979 (legislation);
- Planning (Listed Buildings and Conservation Areas) Act 1990 (legislation);
- Historic Environment (Wales) Act 2016 (legislation);
- PPW provides the national planning policy framework for the consideration of the historic environment supplemented by guidance contained in Technical Advice Note 24: The Historic Environment (policy); and
- Cadw, the Welsh Government's historic environment service, provide associated best practice guidance on the historic environment (guidance).

The purpose of this appraisal is to review the available archaeological, built heritage and historic landscape baseline for the Scheme and identify any potential heritage constraints and risks.

2. Methodology

Data used to inform the baseline conditions of this appraisal were accessed from the following sources:

- British Geological Survey (BGS);
- Cof Cymru (National Historic Assets of Wales) for information of designated heritage assets;
- Clwyd Powys Archaeological Trust (CPAT) Historic Environment Record (HER) for information on non-designated archaeological sites and monuments; non-designated historic buildings and previous archaeological investigations;
- Planning Inspectorate for information on consented and current DCO projects being examined in the planning system for information on supporting studies and investigations, for example the Awel y Môr and Mona Offshore Wind Farms;
- Denbighshire County Council for information on consented and ongoing projects within the planning system for information on supporting studies and investigations, for example the proposed Bodelwyddan BESS and Solar Farm;
- Portable Antiquities Scheme (PAS) for information on finds made by metal detectorists;
- National Library of Wales for historic tithe mapping;
- Historic mapping and aerial imagery available online, including the National Library of Scotland; and
- National Resources Wales online for Light Detection and Ranging data (LiDAR)

Assets are referred to in the sections below by their unique Cadw and HER numbers.

The study area has been defined as the footprint of the Scheme (excluding access routes and areas where limited heritage impacts would occur, predominantly the restringing of existing overhead lines) plus a 500m radius surrounding area. The study area for this appraisal is considered appropriate in regard to archaeological remains, historic buildings and the historic landscape due to the nature of the proposed works and anticipated sensitivity of the receiving environment.

The study area allows for a consideration of direct physical impacts to heritage assets within the footprint of the Scheme; assessment of impacts to heritage assets as a result of changes to their settings; and provides an appropriate sample of the known historic environment resource within the area to predict the potential for previously unknown archaeological assets to be impacted (archaeological potential).

The heritage baseline is discussed by three sub-topics: Archaeological Remains, Historic Buildings and Historic Landscapes below.

A figure showing the locations of the heritage assets discussed below is provided at Appendix A and the HER data report is provided at Appendix B.

3. Geology, Soils and Topography

The solid geology of the Scheme comprises mudstone, siltstone and sandstone of the Warwickshire Group in the east. A geological fault runs north-west to south-east across the western part of the Scheme area. To the west of the fault, the solid geology comprises limestone of the Clwyd Limestone Group. Superficial deposits of Devensian glacial till are also recorded across the whole area of the Scheme (BGS 2025).

Soils within the Scheme are identified as slowly permeable, seasonally wet slightly acid but base-rich loamy and clayey soils (Soilscapes 2025).

Topographically, levels across the Scheme grade up gently from north to south and east to west from approximately 43m above Ordnance Datum (aOD) to 51m aOD.

4. Archaeological Remains

4.1 Previous Archaeological Investigations

A programme of archaeological monitoring (watching brief) was undertaken as part of one of the planning conditions (Condition 16) during the construction of the adjacent Gwynt y Mor Offshore Windfarm Substation and existing National Grid substation (Planning Reference 31/2008/1123/PF).

The results of the archaeological works within the footprint of the substation were summarised as follows:

'The footprint was stripped to glacial horizon, exposing a re-brown boulder clay that was uniform across the area. The stripped area was subsequently sealed by geotextile membrane and imported stone gravel. Whilst the stripped area was of a considerable size, no archaeological receptors of note were identified and activity was limited to ceramic field drains and drainage channels. The substation footprint also included the line of existing main that had been removed and backfilled within the diversion area' (GAT, 2012).

Also of relevance to the Scheme is the results of a geophysical survey undertaken to support the Burbo Bank Extension Offshore Windfarm Project (Archaeophysica, 2012). No significant archaeological remains were identified by the survey work along the onshore cable routes.

As part of the assessment work undertaken to support the consented Awel y Môr Offshore Wind Farm, a programme of geophysical survey was also undertaken to the immediate west of the Scheme covering part of the onshore connection (Wessex Archaeology, 2022a). Within areas 8i and 8h, to the west of the Scheme, anomalies related to possible former field systems were identified along with traces of historic ploughing and modern service routes. The supporting desk-based assessment (Wessex Archaeology, 2022b) identified a modest potential for archaeological remains within the area adjacent to the Scheme.

Geophysical survey undertaken for the Mona Offshore Wind Farm, which is currently undergoing examination, covered the whole of the Scheme (Magnitude Surveys, 2023). The survey did not detect any anomalies considered of a possible or probable archaeological origin within the area of the Scheme. No trial trenches have been excavated within the area of the Scheme as part of the subsequent programme of investigation (Oxford Archaeology, 2024).

It is also noted that part of the Bodelwyddan BESS and Solar Farm project (Planning Reference 40/2024/1575/EIA-SCO) falls within the southern extent of the Scheme. This project is currently at the EIA scoping stage and the results of any supporting studies are not currently available.

A further eight previous archaeological interventions are recorded within the 500m study area. Where relevant, the results of these studies will be referred to in the discussion of archaeological potential below.

4.2 Designated Assets

There are no designated archaeological assets (Scheduled Monuments) within the Scheme or study area.

4.3 Non-designated Assets

There is one non-designated archaeological asset recorded within the Scheme (HER 143526) which relates to an area of former medieval ridge and furrow cultivation earthworks identified by CPAT from LiDAR data. Another area of ridge and furrow (HER 143532) lies to the immediate south. As these assets represent relict cultivation features that have already been recorded, they are considered of local archaeological interest at best (low value).

In the study area, a further 33 non-designated assets are recorded. The locations of these assets are shown on Figure 1 in Appendix A. Further details are also provided in the gazetteer at Appendix B.

Of these, 19 assets relate to additional areas of former ridge and furrow cultivation of limited archaeological interest; and seven assets represent the route of the former Roman Road which underlies the existing B5381 Glascoed Road approximately 300m to the north of the Scheme.

Only one prehistoric asset is identified within the study area, this comprises the site of a Bronze Age cairn (HER 101478) at Cae Garnedd approximately 400m to the west of the Scheme.

The remaining assets represent a variety of post-medieval findspots, milestones, lime kilns, wells and the sites of former buildings of local archaeological interest.

4.4 PAS

There are no finds recorded to have been found within the Scheme by the PAS.

In the 500m study area, the only artefact recorded is a post-medieval musket ball (HER 141423) found approximately 340m to the north-west of the Scheme. This asset has been removed from the study area and is therefore attributed a negligible value.

4.5 Historic Mapping and Aerial Imagery

The available Ordnance Survey mapping and aerial imagery shows the Scheme to have comprised part of a number of fields. Since the mid-19th century, the historic mapping records some loss of historic field boundaries. Many of the remaining boundaries are likely to date from at least the medieval period due to their curving form (Plates 4-1 to 4-2).

The construction of the adjacent Gwynt y Môr Offshore Windfarm Substation and Burbo Bank infrastructure is shown in the later satellite imagery (2015 onwards).

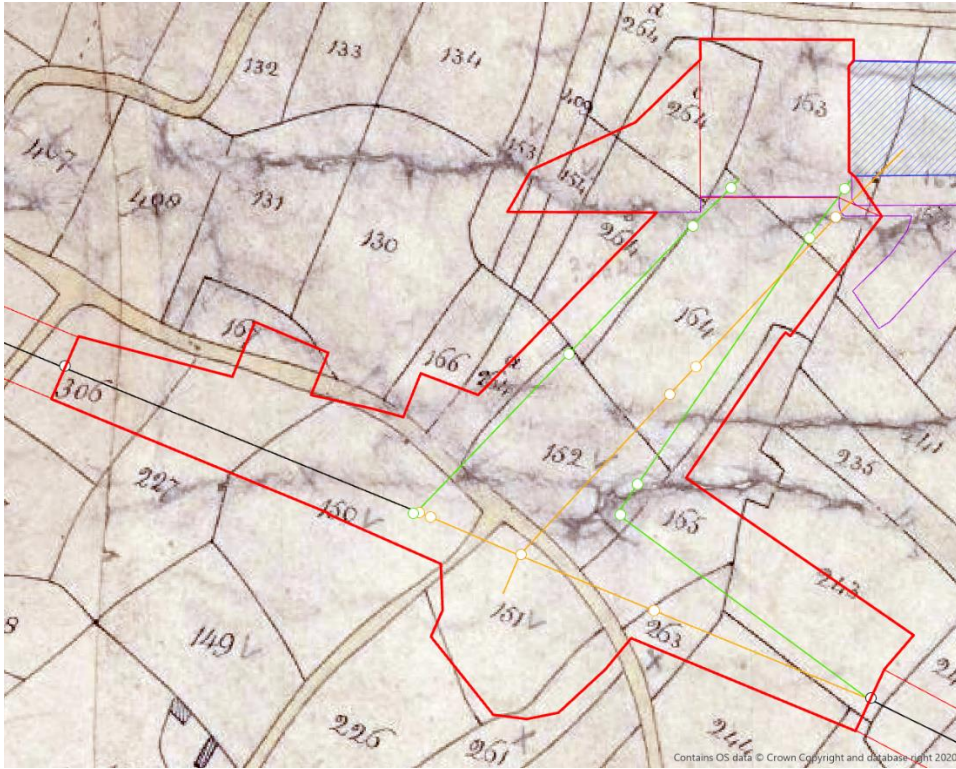


Plate 4-1. Extract from the 1840 St Asaph Tithe Map (National Library of Wales)

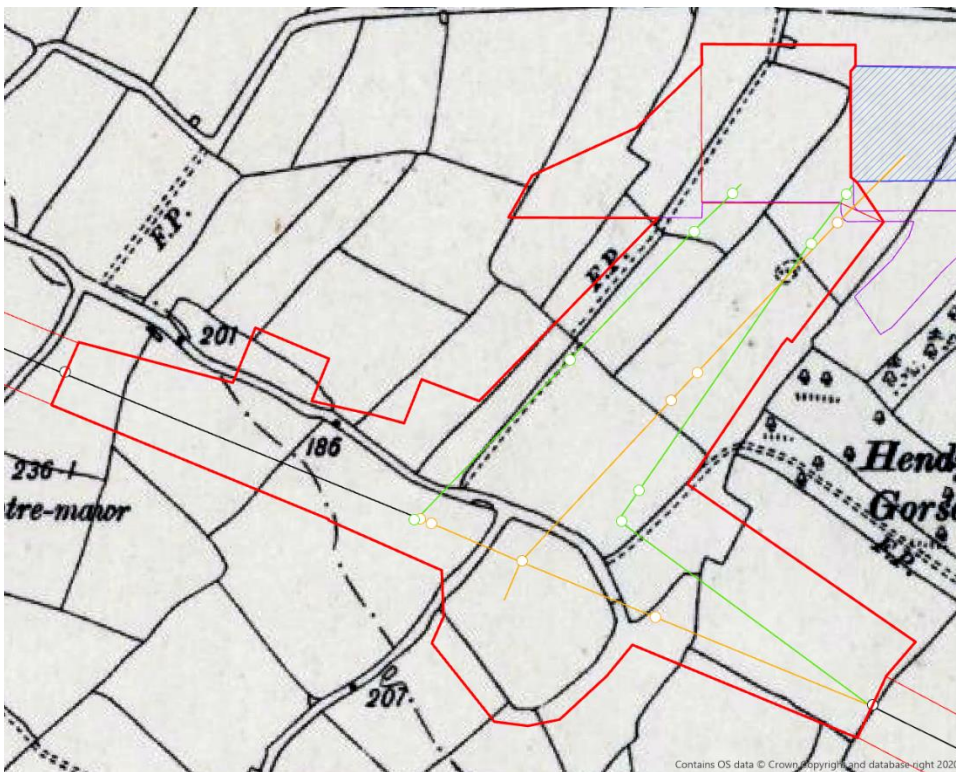


Plate 4-2. 1920 Ordnance Survey Map (National Library of Scotland)

4.6 LiDAR

A plot of the Lidar data for the Scheme is shown in Plate 4-3. The only features of archaeological interest noted are the aforementioned two areas of slight ridge and furrow earthworks in the south-west and to the immediate south of the Scheme.



Plate 4-3. LiDAR data plot (1m DSM – Natural Resources Wales)

4.7 Archaeological Potential

Based on the findings of the previous archaeological investigation undertaken during the construction of the adjacent substation, the absence of any anomalies of potential or probable archaeological interest detected during the geophysical survey work undertaken for Mona Offshore Wind Farm, and taking into consideration the evidence discussed above, the risk of encountering significant previously unknown archaeological remains within the Scheme can reasonably be identified as low.

The Scheme has remained on the periphery of the known settlement cores from at least the medieval period and is likely to have been used as agricultural land. While there is some evidence of earlier prehistoric and Roman activity within the vicinity, no such evidence was found in the adjacent watching brief (GAT 2012) nor is such activity suggested by the results of the geophysical survey (Magnitude Survey 2023).

5. Historic Buildings

5.1 Designated Assets

There are no designated historic building assets (Listed Buildings) within the Scheme.

The Scheme is not located within a Conservation Area and there are no Conservation Areas recorded within the study area.

In the study area, one Grade II Listed Building is present. This comprises a sub-medieval vernacular thatched house (Cadw 19929) located approximately 170m to the south of the Scheme. As a designated Listed Building, this asset is identified to be of high value.

The setting of this asset is predominantly rural with its topographic position allowing for open views towards the existing overhead lines and substation to the north. In this instance setting is considered to make a small positive overall contribution to significance as the asset is a rural building set within a rural agricultural landscape that has undergone limited change.

5.2 Locally Listed Buildings

There are no locally listed building within the Scheme or 500m study area.

5.3 Non-designated Assets

There are no non-designated historic building assets within the Scheme.

In the study area, there are 34 non-designated historic buildings recorded by the HER as shown on Figure 1 in Appendix A. All these assets are post-medieval agricultural buildings (farmhouses and/or barns) of local historical and architectural interest (low value).

6. Historic Landscape

6.1 Designated Assets

There are no designated historic landscape assets (World Heritage Sites, Registered Battlefields of Registered Parks and Gardens) within the Scheme or study area.

6.2 Historic Landscape Character

The Historic Landscape Character (HLC) of the Scheme is identified to be irregular fieldscapes and woodland with hedgerow boundaries. This type of landscape is described as:

'Organic enclosures south and west of St Asaph, fieldscapes which have grown up over time, a predominantly rural environment'

The historic landscape is assessed to be of local (low) value.

7. Conclusion

There are no overarching heritage constraints in respect of the Scheme.

No designated heritage assets would be directly physically affected by the Scheme.

Taking into consideration the location of the Scheme, the distance, topography and presence of existing infrastructure, no significant adverse impacts on any designated assets as a consequence of a change to their wider settings are predicted (Grade II Listed Building located 170m to the south of the Scheme only).

One area of non-designated historic ridge and furrow cultivation earthworks is identified within the south-western part of the Scheme (HER 143526) – outside of the area of the proposed substation extension. This asset is considered of low value and would not be a constraint to any proposed works.

The potential for previously unknown archaeological assets within the Scheme can be reasonably identified as low based on the currently available evidence and survey work undertaken for associated developments.

No non-designated historic building assets would be affected.

While there would be a slight impact to the character of the historic landscape due to the addition of further infrastructure, this would not be a constraint to the Scheme.

8. References

Archaeophysica, 2012, Burbo Bank Extension Offshore Wind Farm Onshore Infrastructure Denbighshire: Geophysical Survey Report. Unpublished

BGS, 2025, Geindex Onshore Viewer available online from: https://mapapps2.bgs.ac.uk/geindex/home.html?_ga=2.22415227.1100002020.1739962424-431993005.1739962424

GAT, 2012, Gwynt y Mor Offshore Windfarm – Archaeological Watching Brief. Unpublished

Magnitude Surveys, 2023, Geophysical Survey Report, Mona Onshore Cable Corridor, North Wales available from: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010137/EN010137-000454-F7.5.3_Mona_ES_Onshore%20Geophysical%20Survey%20Report%20-%20Part%201.pdf

and:

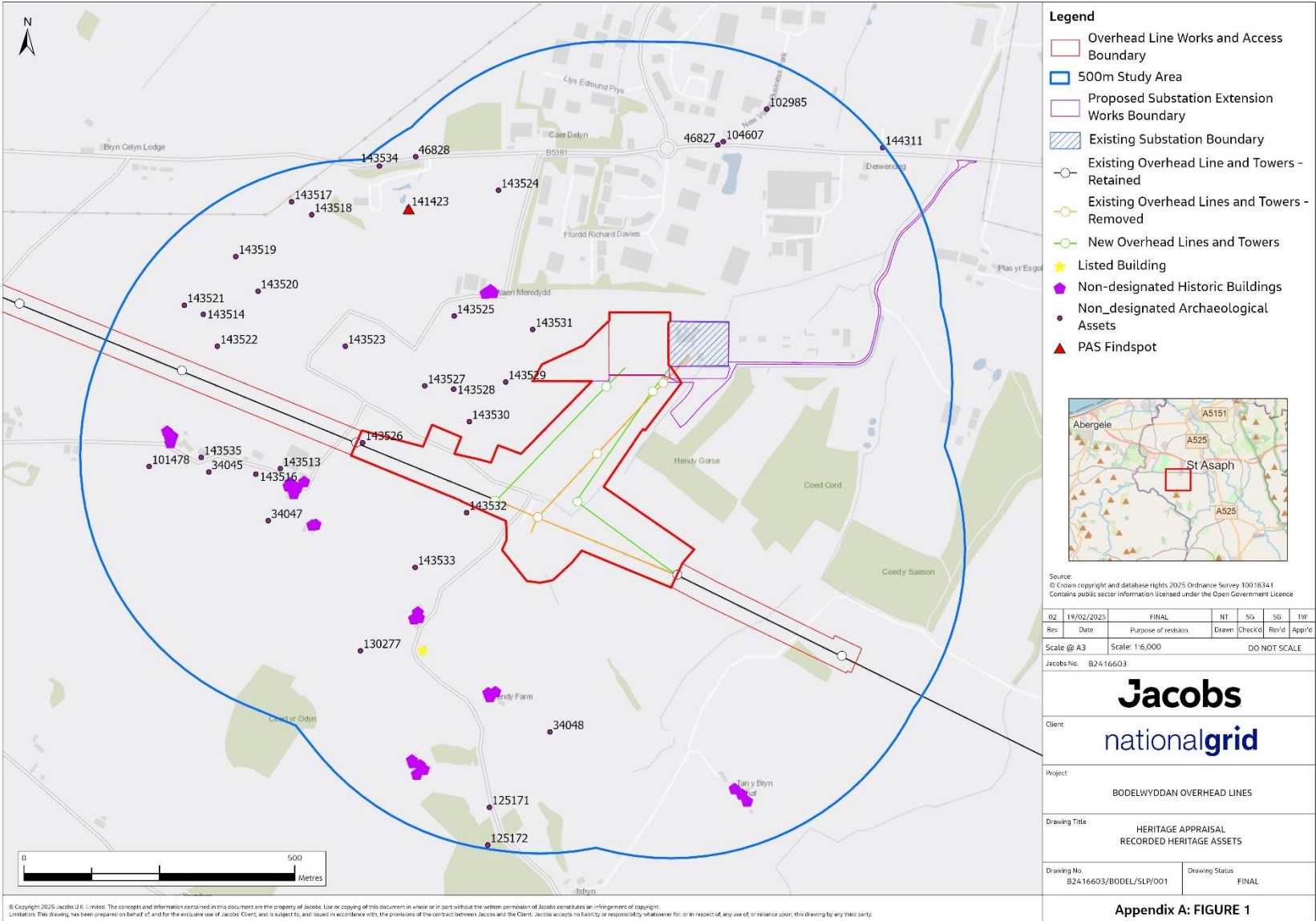
https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010137/EN010137-000455-F7.5.3_Mona_ES_Onshore%20Geophysical%20Survey%20Report%20-%20Part%202.pdf

Oxford Archaeology, 2024, Mona Offshore Wind Project Onshore Cable Route and Substation Abergele, Conwy, to St Asaph, Denbighshire, North Wales Archaeological Evaluation Report available online from: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010137/EN010137-001977-S_D6_7_Mona_Trial%20Trenching%20Report.pdf

Soilscapes, 2025, Soilscapes Map Viewer available online from: <http://www.landis.org.uk/soilscapes/>

Wessex Archaeology, 2022a, Awel y Mor Offshore Wind Farm Detailed Gradiometer Survey Report available online from: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010112/EN010112-000283-6.5.8.3%20AyM%20ES%20Annex%208.3_Detailed_Gradiometer_Report_Final.pdf

Wessex Archaeology, 2022b, Awel y Mor Offshore Wind Farm Archaeological Desk-Based Assessment available online from: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010112/EN010112-000281-6.5.8.1_AyM_ES_Volume5_Annex8.1_Archaeological_Desk-Based_Assessment_Final.pdf



CLWYD-POWYS ARCHAEOLOGICAL TRUST HISTORIC ENVIRONMENT RECORD ENQUIRY REPORT - CORE RECORDS

Enquiry reference number: E6670
Prepared by: G. Duckers, Clwyd-Powys Archaeological Trust
Produced for: Nathan Thomas, Jacobs

The following information has been provided under the terms and conditions of access as detailed on the CPAT HER Enquiry form and in the Welsh Archaeological Trusts Access and Charging Policy. Copyright is reserved on all data supplied from the CPAT HER. All output resulting from the use of the data must acknowledge the source as follows:- **CPAT HER Charitable Trust data copyright and database right and in part Crown, 2021).**

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Search criteria

HER data within user supplied extent

PRN 141423 **NAME** Bodelwyddan, musket ball

NGR SJ0108973817 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, FINDSPOT. Rank: 1

SUMMARY

DESCRIPTION A complete spherical lead alloy ball, probably a musket ball or shot, of Post Medieval dating (17th Century onwards). The lead shot is spherical in shape. A casting seam is present around the mid point of the musket ball. It is a light creamy colour with an uneven surface patina. Abrasion, caused by movement whilst within the plough soil, has resulted in the loss of some of the original surface detail. It has a diameter of 16.2 mm and weighs 24.3 grams. (PAS database)

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES Same as PUBLIC-E32626CPAT140118, CPAT152997

SOURCES

Portable Antiquities Scheme Portable Antiquities Scheme Database

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

1 Lead MUSKET BALL A complete spherical lead alloy ball, probably a musket ball or shot, of Post Medieval dating (17th Century onwards). The lead shot is spherical in shape. A casting seam is present around the mid point of the musket ball. It is a light creamy colour with an uneven surface patina. Abrasion, caused by movement whilst within the plough soil, has resulted in the loss of some of the original surface detail. It has a diameter of 16.2 mm and weighs 24.3 grams. Returned to finder

C14 DATES

PHOTOS

3560-0101

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT141423>

PRN 34045 NAME Cae Capel fieldname

NGR SJ00727333 COMMUNITY Cefnmeiriadog

TYPE POST MEDIEVAL, CHAPEL. Rank: 1

SUMMARY

DESCRIPTION The name "Capel" suggests that the field may be the site of or associated with a chapel. There are no visible remains (Gibson, A M 1996d, 3). On the roadside, a building that on the first two editions of the Ordnance Survey map was termed Pentre-cefn had become Pentre-capel by the time of the 3rd edition in 1913. This building has now gone. While this might hint at a relatively late origin for the name, the assessment report from which this record originates includes the information, not recorded in the HER, that the source for the name is the Tithe map. This is confirmed with two names, one to either side of the road carrying the 'y capel' element. This is insufficient evidence to confirm the existence and position of a medieval chapel site (although there is nothing to indicate a post-medieval foundation) but perhaps enough to hint at its former presence (Silvester et al 2011).

CONDITION Condition: Unknown Description: - Related event: - Date of entry: 1996-12-17 00:00:00

STATUS None recorded

CROSS REFERENCES - -CPAT309400, CPAT123175, CPAT123707, CPAT140118

SOURCES

Gibson, A M 1996 Proposed Cefn Meiriadog Watermains Refurbishment: archaeological assessment CPAT report 180
Clwyd Powys Archaeological Trust 1996 Site visit record - PRN34045
Silvester, R J, Hankinson, R, Owen, W and Jones, N 2011 Medieval and Early Post-Medieval Monastic and Ecclesiastical Sites in East and North-East Wales. The Scheduling Enhancement Programme CPAT report 1090
Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT34045>

PRN 101478 NAME Cae Garnedd cairn

NGR SJ00617334 COMMUNITY Cefnmeiriadog

TYPE BRONZE AGE, ROUND BARROW (CAIRN). Rank: 1

SUMMARY

DESCRIPTION Fieldname implicit of a mound or cairn. The RCAHM after a visit of 1911 believed that a concentration of stones in the north-west corner of the field was the site of the cairn - now destroyed (Gibson, A M 1996d, 3).

CONDITION Condition: Unknown Description: - Related event: - Date of entry: 1980-12-31 00:00:00

STATUS None recorded

CROSS REFERENCES - -CPAT312120, CPAT312121, CPAT35000, CPAT140118

SOURCES

Royal Commission on the Ancient and Historical Monuments of Wales 1914 Inventory of the Ancient Monuments in Wales and Monmouthshire - IV County of Denbigh
Gibson, A M 1996 Proposed Cefn Meiriadog Watermains Refurbishment: archaeological assessment CPAT report 180
Clwyd Powys Archaeological Trust 1996 Site visit record - PRN101478
Clwyd Powys Archaeological Trust 2002 CPAT Project Archive - 715
Jones, N W 1999 Prehistoric Funerary & Ritual Sites: Denbighshire and East Conwy CPAT report 314
Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT101478>

PRN 193979 **NAME** Cae-llwyd farm

NGR SJ0111072790 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, FARM. Rank: -

SUMMARY Farm complex identified on OS 2nd edition 25 inch map. Likely to contain traditional farm buildings (CPAT, Farms and Farmsteads, 2021)

DESCRIPTION

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES Part of 193979

SOURCES

McCullough, A E, Martin, C H R and Bayliss, N, 2021 Polygonisation of Traditional Farm Buildings in Denbighshire and eastern Conwy CPAT report 1784

ARTEFACTS

C14 DATES

PHOTOS

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT193979>

PRN 195701 **NAME** Cae-llwyd farm, farm building

NGR SJ0111772782, SJ0110472773, SJ0109772794, SJ0109572799 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, FARM BUILDING. Rank: -

SUMMARY Traditional farm building, or building now containing a traditional farm building, identified from OS 2nd edition 25 inch map by CPAT Farms and Farmst

DESCRIPTION

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES Part of 193979

SOURCES

McCullough, A E, Martin, C H R and Bayliss, N, 2021 Polygonisation of Traditional Farm Buildings in Denbighshire and eastern Conwy CPAT report 1784

ARTEFACTS

C14 DATES

PHOTOS

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195701>, <http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195702>, <http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195703>, <http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195704>

PRN 125171 NAME Cae-llwyd, limekiln

NGR SJ0123872711 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, LIME KILN. Rank: 1

SUMMARY

DESCRIPTION Lime kiln noted on early Ordnance Survey mapping during Glastir private woodland project

CONDITION Condition: Unknown Description: - Related event: - Date of entry: 2013-10-10 00:00:00

STATUS None recorded

CROSS REFERENCES - -

SOURCES

Ordnance Survey 1874 OS map, first edition, 25 inch, Denbighshire
Ordnance Survey 1899 OS map, second edition, 25 inch, Denbighshire

ARTEFACTS

C14 DATES

PHOTOS

-

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT125171>

PRN 125172 NAME Cae-llwyd, mine shaft

NGR SJ0123572641 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, MINE SHAFT. Rank: 1

SUMMARY

DESCRIPTION Mine shaft noted on early Ordnance Survey mapping during Glastir private woodland project

CONDITION Condition: Unknown Description: - Related event: - Date of entry: 2013-10-10 00:00:00

STATUS None recorded

CROSS REFERENCES - -

SOURCES

Ordnance Survey 1874 OS map, first edition, 25 inch, Denbighshire
Ordnance Survey 1899 OS map, second edition, 25 inch, Denbighshire

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT125172>

PRN 130277 NAME DE HAVILLAND VAMPIRE FB5 WA417

NGR SJ0173 **COMMUNITY** Cefnmeiriadog

TYPE MODERN, AIR CRASH SITE. Rank: 1

SUMMARY

DESCRIPTION The Vampire was one of 320 delivered to the RAF by English Electric, Preston, between May 1950 and August 1951 to contract 6/Acft/2981. Its service life included assignments to 102 FRS/98 and 112 squadrons/5 FTS and 7 FTS. It dived into the ground recovering from a spin 4 miles south of Rhyl, Denbigh on 3/1/1957. (Halley, J J, 2003, Royal Air Force Aircraft WA100-WZ999, 2nd Ed, pg9) Entry 45. Lt J B Taylor. Wing/Squadron/flight: 7FTS. Ship/Station: HMS GOLDCREST. A/C Type: Vampire FB5. AC Number: WA417. Date of Death: 3/1/1957. Place of Death: Anglesey. Notes: HMS GOLDCREST Book of Remembrance. Aircraft accident reported from RAF Valley. A/C crashed into field after hitting cables. (Royal Fleet Air Arm Museum Database, RNAS Yeovilton, RCAHMW Digital Collections [faaroh.wales.htm]) Note discrepancy in reason for crash. (RH 31/7/2013)

CONDITION Condition: Not known Description: - Related event: 132131 Date of entry: 2012-01-12 00:00:00

STATUS None recorded

CROSS REFERENCES same as 515679CPAT132130, CPAT132131

SOURCES

Hankinson, R & Spencer, J 2014 Military Aircraft Crash Sites. Scheduling Enhancement Programme CPAT report 1249
English Heritage 2002 Military Aircraft Crash Sites. Archaeological guidance on their significance and future management

ARTEFACTS

C14 DATES

PHOTOS

-

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT130277>

PRN 193986 **NAME** Groesffordd farm

NGR SJ0064773397 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, FARM. Rank: -

SUMMARY Farm complex identified on OS 2nd edition 25 inch map. Likely to contain traditional farm buildings (CPAT, Farms and Farmsteads, 2021)

DESCRIPTION

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES Part of 193986

SOURCES

McCullough, A E, Martin, C H R and Bayliss, N, 2021 Polygonisation of Traditional Farm Buildings in Denbighshire and eastern Conwy CPAT report 1784

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT193986>

PRN 195717 NAME Groesffordd farm, farm building

NGR SJ0065373397, SJ0064373406, SJ0064973385 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, FARM BUILDING. Rank: -

SUMMARY Traditional farm building, or building now containing a traditional farm building, identified from OS 2nd edition 25 inch map by CPAT Farms and Farmst

DESCRIPTION

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES Part of 193986

SOURCES

McCullough, A E, Martin, C H R and Bayliss, N, 2021 Polygonisation of Traditional Farm Buildings in Denbighshire and eastern Conwy CPAT report 1784

ARTEFACTS

C14 DATES

PHOTOS

-

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195717>, <http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195718>, <http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195719>

PRN 143519 NAME Groesffordd ridge and furrow I

NGR SJ0077073728 **COMMUNITY** Cefnmeiriadog

TYPE MEDIEVAL, RIDGE AND FURROW. Rank: 1

SUMMARY Earthworks of probable medieval ridge and furrow cultivation in fields at Groesffordd Marli, west of St Asaph. Recognised from LiDAR imagery, the extent of the area has been mapped by CPAT.

DESCRIPTION Ridge and furrow identified from 1m LiDAR

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES - -CPAT140118

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

-

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT143519>

PRN 143520 NAME Groesffordd ridge and furrow II

NGR SJ0081173664 **COMMUNITY** Cefnmeiriadog

TYPE MEDIEVAL, RIDGE AND FURROW. Rank: 1

SUMMARY Earthworks of probable medieval ridge and furrow cultivation in fields at Groesffordd Marli, west of St Asaph. Recognised from LiDAR imagery, the extent of the area has been mapped by CPAT.

DESCRIPTION Ridge and furrow identified from 1m LiDAR

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES - -CPAT140118

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT143520>

PRN 143521 **NAME** Groesffordd ridge and furrow III

NGR SJ0067573638 **COMMUNITY** Cefnmeiriadog

TYPE MEDIEVAL, RIDGE AND FURROW. Rank: 1

SUMMARY Earthworks of probable medieval ridge and furrow cultivation in fields at Groesffordd Marli, west of St Asaph. Recognised from LiDAR imagery, the extent of the area has been mapped by CPAT.

DESCRIPTION Ridge and furrow identified from 1m LiDAR

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES - -CPAT140118

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT143521>

PRN 143522 **NAME** Groesffordd ridge and furrow IV

NGR SJ0073673562 **COMMUNITY** Cefnmeiriadog

TYPE MEDIEVAL, RIDGE AND FURROW. Rank: 1

SUMMARY Earthworks of probable medieval ridge and furrow cultivation in fields at Groesffordd Marli, west of St Asaph. Recognised from LiDAR imagery, the extent of the area has been mapped by CPAT.

DESCRIPTION Ridge and furrow identified from 1m LiDAR

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES - -CPAT140118

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT143522>

PRN 143514 **NAME** Groesffordd well

NGR SJ0071073621 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, WELL. Rank: 1

SUMMARY A post-medieval well in fields at Groesffordd Marli, west of St Asaph. Marked on the Ordnance Survey first edition 25" to the mile map of 1874.

DESCRIPTION Well depicted on OS 1st edition 25".

CONDITION Condition: NOT KNOWN Description: Related event: 140118 Date of entry: 2016-09-08 00:00:00

STATUS None recorded

CROSS REFERENCES - -CPAT140118

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT143514>

PRN 193980 **NAME** Hen-dy farm

NGR SJ0123672923 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, FARM. Rank: -

SUMMARY Farm complex identified on OS 2nd edition 25 inch map. Likely to contain traditional farm buildings (CPAT, Farms and Farmsteads, 2021)

DESCRIPTION

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES Part of 193980

SOURCES

McCullough, A E, Martin, C H R and Bayliss, N, 2021 Polygonisation of Traditional Farm Buildings in Denbighshire and eastern Conwy CPAT report 1784

ARTEFACTS

C14 DATES

PHOTOS

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT193980>

PRN 195705 **NAME** Hen-dy farm, farm building

NGR SJ0123972916, SJ0124972925 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, FARM BUILDING. Rank: -

SUMMARY Traditional farm building, or building now containing a traditional farm building, identified from OS 2nd edition 25 inch map by CPAT Farms and Farmst

DESCRIPTION

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES Part of 193980

SOURCES

McCullough, A E, Martin, C H R and Bayliss, N, 2021 Polygonisation of Traditional Farm Buildings in Denbighshire and eastern Conwy CPAT report 1784

ARTEFACTS

C14 DATES

PHOTOS

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195705>, <http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195706>

PRN 34048 **NAME** Hendy Farm ridge and furrow

NGR SJ01357285 **COMMUNITY** Cefnmeiriadog

TYPE MEDIEVAL, RIDGE AND FURROW. Rank: 1

SUMMARY

DESCRIPTION Ridge and furrow noted on AP RAF/501/206 3042 (taken 1948). Not visible at time of visit (Gibson, A M 1996d, 3).

CONDITION Condition: Damaged Description: - Related event: - Date of entry: 1996-12-17 00:00:00

STATUS None recorded

CROSS REFERENCES - -CPAT309402

SOURCES

Gibson, A M 1996 Proposed Cefn Meiriadog Watermains Refurbishment: archaeological assessment CPAT report 180 Clwyd Powys Archaeological Trust 1996 Site visit record - PRN34048

ARTEFACTS

C14 DATES

PHOTOS

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT34048>

PRN 34047 NAME Pentre bach ridge and furrow

NGR SJ00837324 COMMUNITY Cefnmeiriadog

TYPE MEDIEVAL, RIDGE AND FURROW. Rank: 1

SUMMARY

DESCRIPTION Ridge and furrow noted on AP RAF/501/206 3042 (taken 1948). Not visible at time of visit (Gibson, A M 1996d, 3).

CONDITION Condition: Damaged Description: - Related event: - Date of entry: 1996-12-17 00:00:00

STATUS None recorded

CROSS REFERENCES - -CPAT309401, CPAT140118

SOURCES

Gibson, A M 1996 Proposed Cefn Meiriadog Watermains Refurbishment: archaeological assessment CPAT report 180
Clwyd Powys Archaeological Trust 1996 Site visit record - PRN34047
Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT34047>

PRN 143535 NAME Pentre Chapel

NGR SJ0070673357 COMMUNITY Cefnmeiriadog

TYPE MODERN, CHAPEL. Rank: 1

SUMMARY An early 20th century chapel at Cefn Meiriadog south-west of St Asaph.

DESCRIPTION Built during the early 20th century.

CONDITION Condition: INTACT Description: Related event: 140118 Date of entry: 2016-09-08 00:00:00

STATUS None recorded

CROSS REFERENCES Same as 12582CPAT140118

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT143535>

PRN 99661 NAME Pentre Meredydd

NGR SJ0112073000 COMMUNITY Cefnmeiriadog

TYPE POST MEDIEVAL, HOUSE. Rank: 1

SUMMARY

DESCRIPTION Grade II listed house

CONDITION Condition: Unknown Description: - Related event: - Date of entry: 2006-07-01 00:00:00

STATUS listed building 19929 II

CROSS REFERENCES Same as 19929_1, Part of 193981

SOURCES

Cadw 2016 Database of Listed Buildings in Wales

The Handley Partnership 2014ff HAABase built heritage assessment system: Buildings at Risk database

McCullough, A E, Martin, C H R and Bayliss, N, 2021 Polygonisation of Traditional Farm Buildings in Denbighshire and eastern Conwy CPAT report 1784

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT99661>

PRN 193981 NAME Pentre Meredydd farm

NGR SJ0111672999 COMMUNITY Cefnmeiriadog

TYPE POST MEDIEVAL, FARM. Rank: -

SUMMARY Farm complex identified on OS 2nd edition 25 inch map. Likely to contain traditional farm buildings (CPAT, Farms and Farmsteads, 2021)

DESCRIPTION

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES Part of 193981

SOURCES

McCullough, A E, Martin, C H R and Bayliss, N, 2021 Polygonisation of Traditional Farm Buildings in Denbighshire and eastern Conwy CPAT report 1784

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT193981>

PRN 193984 NAME Pentre-bach farm

NGR SJ0091173233 COMMUNITY Cefnmeiriadog

TYPE POST MEDIEVAL, FARM. Rank: -

SUMMARY Farm complex identified on OS 2nd edition 25 inch map. Likely to contain traditional farm buildings (CPAT, Farms and Farmsteads, 2021)

DESCRIPTION

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES Part of 193984

SOURCES

McCullough, A E, Martin, C H R and Bayliss, N, 2021 Polygonisation of Traditional Farm Buildings in Denbighshire and eastern Conwy CPAT report 1784

ARTEFACTS

C14 DATES

PHOTOS

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT193984>

PRN 195712 **NAME** Pentre-bach farm, farm building

NGR SJ0091773234 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, FARM BUILDING. Rank: -

SUMMARY Traditional farm building, or building now containing a traditional farm building, identified from OS 2nd edition 25 inch map by CPAT Farms and Farmst

DESCRIPTION

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES Part of 193984

SOURCES

McCullough, A E, Martin, C H R and Bayliss, N, 2021 Polygonisation of Traditional Farm Buildings in Denbighshire and eastern Conwy CPAT report 1784

ARTEFACTS

C14 DATES

PHOTOS

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195712>

PRN 143523 **NAME** Pentre-cefn ridge and furrow

NGR SJ0097273562 **COMMUNITY** Cefnmeiriadog

TYPE MEDIEVAL, RIDGE AND FURROW. Rank: 1

SUMMARY Earthworks of probable medieval ridge and furrow cultivation in a field between Waen-Meredydd and Pentre-mawr, west of St Asaph. Recognised from LiDAR imagery, the extent of the area has been mapped by CPAT.

DESCRIPTION Ridge and furrow identified from 1m LiDAR.

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES - -CPAT140118

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT143523>

PRN 193985 **NAME** Pentre-mawr farm

NGR SJ0088373302 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, FARM. Rank: -

SUMMARY Farm complex identified on OS 2nd edition 25 inch map. Likely to contain traditional farm buildings (CPAT, Farms and Farmsteads, 2021)

DESCRIPTION

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES Part of 193985

SOURCES

McCullough, A E, Martin, C H R and Bayliss, N, 2021 Polygonisation of Traditional Farm Buildings in Denbighshire and eastern Conwy CPAT report 1784

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT193985>

PRN 195713 **NAME** Pentre-mawr farm, farm building

NGR SJ0089673313, SJ0087773291, SJ0086773305, SJ0087073311 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, FARM BUILDING. Rank: -

SUMMARY Traditional farm building, or building now containing a traditional farm building, identified from OS 2nd edition 25 inch map by CPAT Farms and Farmst

DESCRIPTION

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES Part of 193985

SOURCES

McCullough, A E, Martin, C H R and Bayliss, N, 2021 Polygonisation of Traditional Farm Buildings in Denbighshire and eastern Conwy CPAT report 1784

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195713>, <http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195714>, <http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195715>, <http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195716>

PRN 143513 NAME Pentre-mawr limekiln

NGR SJ0085273336 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, LIME KILN. Rank: 1

SUMMARY A post-medieval limekiln beside the lane between Pentre-cefn and Pentre-mawr, west of St Asaph. Marked on the Ordnance Survey first edition 25" to the mile map of 1874. Possibly associated with a nearby quarry (PRN143516).

DESCRIPTION Limekiln depicted on OS 1st edition 25".

CONDITION Condition: NOT KNOWN Description: - Related event: 140118 Date of entry: 2016-09-08 00:00:00

STATUS None recorded

CROSS REFERENCES - -CPAT140118

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT143513>

PRN 143516 NAME Pentre-mawr quarry

NGR SJ0080773326 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, QUARRY. Rank: 1

SUMMARY A post-medieval stone quarry between Pentre-cefn and Pentre-mawr, west of St Asaph. Marked on the Ordnance Survey first edition 25" to the mile map of 1874. Possibly associated with a nearby limekiln (PRN143513).

DESCRIPTION Quarry depicted on OS 1st edition 25".

CONDITION Condition: NOT KNOWN Description: Related event: 140118 Date of entry: 2016-09-08 00:00:00

STATUS None recorded

CROSS REFERENCES - -CPAT140118

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT143516>

PRN 143526 **NAME** Pentre-mawr ridge and furrow

NGR SJ0100473384 **COMMUNITY** Cefnmeiriadog

TYPE MEDIEVAL, RIDGE AND FURROW. Rank: 1

SUMMARY Earthworks of probable medieval ridge and furrow cultivation in the field north-east of Pentre-mawr west of St Asaph. Recognised from LiDAR imagery, the extent of the area has been mapped by CPAT.

DESCRIPTION Ridge and furrow identified from 1m LiDAR

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES - -CPAT140118

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT143526>

PRN 143532 **NAME** Pentre-Meredydd ridge and furrow I

NGR SJ0119673255 **COMMUNITY** Cefnmeiriadog

TYPE MEDIEVAL, RIDGE AND FURROW. Rank: 1

SUMMARY Earthworks of probable medieval ridge and furrow cultivation in the field north-east of Tyddyn Meredydd, west of St Asaph. Recognised from LiDAR imagery, the extent of the area has been mapped by CPAT.

DESCRIPTION Ridge and furrow identified from 1m LiDAR.

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES - -CPAT140118

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT143532>

PRN 143533 **NAME** Pentre-Meredydd ridge and furrow II

NGR SJ0110173154 **COMMUNITY** Cefnmeiriadog

TYPE MEDIEVAL, RIDGE AND FURROW. Rank: 1

SUMMARY Earthworks of probable medieval ridge and furrow cultivation in the field immediately north of Tyddyn Meredydd, west of St Asaph. Recognised from LiDAR imagery, the extent of the area has been mapped by CPAT.

DESCRIPTION Ridge and furrow identified from 1m LiDAR

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES - -CPAT140118

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS**C14 DATES****PHOTOS**

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT143533>

PRN 144311 **NAME** Roman Road

NGR SJ0196473929 **COMMUNITY** St Asaph

TYPE ROMAN, ROAD. Rank: -

SUMMARY Possible section of the Varae-Kanovium Roman road. Revealed through excavation in 2018.

DESCRIPTION The watching brief produced evidence for a former, early road surface in the form of a stony deposit sealed beneath the existing modern carriageway of Glascoed Road. The surface was traced for almost the entire length of the modern carriageway where this was cut back for the widening works within the site; a length of at least 180m. The early road had been constructed using waterworn rounded gravel and cobble, laid directly onto the natural clay. No associated ditch was encountered running alongside the road, but any such feature, had it existed, may have been removed during insertion of the modern footpath (Earthworks Archaeology, 2018). No datable material was recovered during excavation. However, given the form and location of the feature, it is likely the Varae-Kanovium Roman road (PRN:46900 & 104607).

CONDITION Condition: DAMAGED Description: - Related event: 144310 Date of entry: 2018-06-18 00:00:00

STATUS None recorded

CROSS REFERENCES - -CPAT144310

SOURCES

Dodd, L 2018 New Access Road at St Asaph Business Park, Galscoed Road St. Asaph, Denbighshire Earthworks Archaeology E1405

ARTEFACTS**C14 DATES****PHOTOS**

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ARCHWILIO URL

PRN 46827 **NAME** St Asaph - Caerhun

NGR SJ0166073934, SJ0110273912, SJ0097073913, SJ0092173915 **COMMUNITY** Bodelwyddan

TYPE POST MEDIEVAL, ROAD. Rank: 1
ROMAN, ROAD. Rank: 2
ROMAN, ROAD. Rank: 1

SUMMARY

DESCRIPTION Proposed line of roman road. Fossilised form. Modern road, raised up to 0.8m, probably on the line (JHW) (CPAT Roman Roads project, 2002-03)

CONDITION Condition: Unknown Description: - Related event: - Date of entry: 2002-11-21 00:00:00
Condition: Near destroyed Description: - Related event: - Date of entry: 2002-11-21 00:00:00

STATUS None recorded

CROSS REFERENCES part of 46800CPAT140118, CPAT152997,

SOURCES

Ordnance Survey undated Annotated record map
Clwyd Powys Archaeological Trust 2003 CPAT Project Archive
Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT46827>, <http://archwilio.org.uk/arch/query/page.php?watprn=CPAT46828>, <http://archwilio.org.uk/arch/query/page.php?watprn=CPAT46829>, <http://archwilio.org.uk/arch/query/page.php?watprn=CPAT46830>

PRN 193977 **NAME** Tan-y-bryn farm

NGR SJ0170472736 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, FARM. Rank: -

SUMMARY Farm complex identified on OS 2nd edition 25 inch map. Likely to contain traditional farm buildings (CPAT, Farms and Farmsteads, 2021)

DESCRIPTION

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES Part of 193977

SOURCES

McCullough, A E, Martin, C H R and Bayliss, N, 2021 Polygonisation of Traditional Farm Buildings in Denbighshire and eastern Conwy CPAT report 1784

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

PRN 195698 **NAME** Tan-y-bryn farm, farm building

NGR SJ0171472723, SJ0169172746 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, FARM BUILDING. Rank: -

SUMMARY Traditional farm building, or building now containing a traditional farm building, identified from OS 2nd edition 25 inch map by CPAT Farms and Farmst

DESCRIPTION

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES Part of 193977

SOURCES

McCullough, A E, Martin, C H R and Bayliss, N, 2021 Polygonisation of Traditional Farm Buildings in Denbighshire and eastern Conwy CPAT report 1784

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195698>, <http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195699>

PRN 143534 **NAME** Ty-cnap milestone

NGR SJ0103573895 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, MILESTONE. Rank: 1

SUMMARY A post-medieval (probably 18th century) milestone two miles west of St Asaph.

DESCRIPTION Milestone depicted on OS 1st edition 25" - Abergele 5, St Asaph 2

CONDITION Condition: NOT KNOWN Description: - Related event: 140118 Date of entry: 2016-09-08 00:00:00

STATUS None recorded

CROSS REFERENCES - -CPAT140118, CPAT152997

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT143534>

PRN 143524 **NAME** Ty-cnap ridge and furrow

NGR SJ0125573850 **COMMUNITY** Cefnmeiriadog

TYPE MEDIEVAL, RIDGE AND FURROW. Rank: 1

SUMMARY Earthworks of probable medieval ridge and furrow cultivation in a field at Ty-cnap, west of St Asaph. Recognised from LiDAR imagery, the extent of the area has been mapped by CPAT.

DESCRIPTION Ridge and furrow identified from 1m LiDAR

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES - -CPAT140118

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprm=CPAT143524>

PRN 143517 **NAME** Ty-cnap ridge and furrow I

NGR SJ0087373829 **COMMUNITY** Cefnmeiriadog

TYPE MEDIEVAL, RIDGE AND FURROW. Rank: 1

SUMMARY Earthworks of probable medieval ridge and furrow cultivation in a field at Ty-cnap, west of St Asaph. Recognised from LiDAR imagery, the extent of the area has been mapped by CPAT.

DESCRIPTION Ridge and furrow identified from 1m LiDAR.

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES - -CPAT140118

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprm=CPAT143517>

PRN 143518 **NAME** Ty-cnap ridge and furrow II

NGR SJ0091073805 **COMMUNITY** Cefnmeiriadog

TYPE MEDIEVAL, RIDGE AND FURROW. Rank: 1

SUMMARY Earthworks of probable medieval ridge and furrow cultivation in a field at Ty-cnap, west of St Asaph. Recognised from LiDAR imagery, the extent of the area has been mapped by CPAT.

DESCRIPTION Ridge and furrow identified from 1m LiDAR

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES - -CPAT140118, CPAT152997

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprm=CPAT143518>

PRN 193982 **NAME** Tyddyn Meredydd farm

NGR SJ0110873062 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, FARM. Rank: -

SUMMARY Farm complex identified on OS 2nd edition 25 inch map. Likely to contain traditional farm buildings (CPAT, Farms and Farmsteads, 2021)

DESCRIPTION

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES Part of 193982

SOURCES

McCullough, A E, Martin, C H R and Bayliss, N, 2021 Polygonisation of Traditional Farm Buildings in Denbighshire and eastern Conwy CPAT report 1784

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprm=CPAT193982>

PRN 195707 **NAME** Tyddyn Meredydd farm, farm building

NGR SJ0109973060, SJ0110673072 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, FARM BUILDING. Rank: -

SUMMARY Traditional farm building, or building now containing a traditional farm building, identified from OS 2nd edition 25 inch map by CPAT Farms and Farmst

DESCRIPTION

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES Part of 193982

SOURCES

McCullough, A E, Martin, C H R and Bayliss, N, 2021 Polygonisation of Traditional Farm Buildings in Denbighshire

and eastern Conwy CPAT report 1784

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195707>, <http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195708>

PRN 193987 **NAME** Tyddyn-eos farm

NGR SJ0046773368 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, FARM. Rank: -

SUMMARY Farm complex identified on OS 2nd edition 25 inch map. Likely to contain traditional farm buildings (CPAT, Farms and Farmsteads, 2021)

DESCRIPTION

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES Part of 193987

SOURCES

McCullough, A E, Martin, C H R and Bayliss, N, 2021 Polygonisation of Traditional Farm Buildings in Denbighshire and eastern Conwy CPAT report 1784

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT193987>

PRN 195720 **NAME** Tyddyn-eos farm, farm building

NGR SJ0046673355, SJ0045973372, SJ0047573374 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, FARM BUILDING. Rank: -

SUMMARY Traditional farm building, or building now containing a traditional farm building, identified from OS 2nd edition 25 inch map by CPAT Farms and Farmst

DESCRIPTION

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES Part of 193987

SOURCES

McCullough, A E, Martin, C H R and Bayliss, N, 2021 Polygonisation of Traditional Farm Buildings in Denbighshire and eastern Conwy CPAT report 1784

ARTEFACTS

C14 DATES

PHOTOS

-

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195720>, <http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195721>, <http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195722>

PRN 104607 **NAME** Varae-Kanovium Roman Road RR67b

NGR SJ01677394 **COMMUNITY** St Asaph

TYPE ROMAN, ROAD. Rank: 1

SUMMARY

DESCRIPTION ROMAN ROAD THOUGHT TO LIE BENEATH PRESENT B5381 ROAD. A RIDGE RUNS FROM SJ02657389 TO SJ02507390 0.2M HIGH 5M WIDE. OS BELIEVES TOO NARROW TO BE ROMAN ROAD. ALSO PROMINENT RIDGE AT SJ02927387 MAY BE ROAD REMAINS.;

CONDITION Condition: Unknown Description: - Related event: - Date of entry: 1983-10-31 00:00:00

STATUS None recorded

CROSS REFERENCES part of 46900CPAT315276, CPAT140118

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1
Dodd, L 2018 New Access Road at St Asaph Business Park, Galscoed Road St. Asaph, Denbighshire Earthworks Archaeology E1405

ARTEFACTS

C14 DATES

PHOTOS

-

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT104607>

PRN 193983 **NAME** Waen Meredydd farm

NGR SJ0124073663 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, FARM. Rank: -

SUMMARY Farm complex identified on OS 2nd edition 25 inch map. Likely to contain traditional farm buildings (CPAT, Farms and Farmsteads, 2021)

DESCRIPTION

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES Part of 193983

SOURCES

McCullough, A E, Martin, C H R and Bayliss, N, 2021 Polygonisation of Traditional Farm Buildings in Denbighshire and eastern Conwy CPAT report 1784

ARTEFACTS

C14 DATES

PHOTOS

-

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT193983>

PRN 195709 **NAME** Waen Meredydd farm, farm building

NGR SJ0124073667, SJ0123173661, SJ0124573662 **COMMUNITY** Cefnmeiriadog

TYPE POST MEDIEVAL, FARM BUILDING. Rank: -

SUMMARY Traditional farm building, or building now containing a traditional farm building, identified from OS 2nd edition 25 inch map by CPAT Farms and Farmst

DESCRIPTION

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES Part of 193983

SOURCES

McCullough, A E, Martin, C H R and Bayliss, N, 2021 Polygonisation of Traditional Farm Buildings in Denbighshire and eastern Conwy CPAT report 1784

ARTEFACTS

C14 DATES

PHOTOS

-

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195709>, <http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195710>, <http://archwilio.org.uk/arch/query/page.php?watprn=CPAT195711>

PRN 143525 **NAME** Waen-Meredydd ridge and furrow

NGR SJ0117373618 **COMMUNITY** Cefnmeiriadog

TYPE MEDIEVAL, RIDGE AND FURROW. Rank: 1

SUMMARY Earthworks of probable medieval ridge and furrow cultivation in the field immediately south of Waen-Meredydd, west of St Asaph. Recognised from LiDAR imagery, the extent of the area has been mapped by CPAT.

DESCRIPTION Ridge and furrow identified from 1m LiDAR

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES - -CPAT140118

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

-

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT143525>

PRN 143527 NAME Waen-Meredydd ridge and furrow I

NGR SJ0111973489 **COMMUNITY** Cefnmeiriadog

TYPE MEDIEVAL, RIDGE AND FURROW. Rank: 1

SUMMARY Earthworks of probable medieval ridge and furrow cultivation in the field immediately south of Waen-Meredydd, west of St Asaph. Recognised from LiDAR imagery, the extent of the area has been mapped by CPAT.

DESCRIPTION Ridge and furrow identified from 1m LiDAR

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES - -CPAT140118

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

-

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT143527>

PRN 143528 NAME Waen-Meredydd ridge and furrow II

NGR SJ0117273483 **COMMUNITY** Cefnmeiriadog

TYPE MEDIEVAL, RIDGE AND FURROW. Rank: 1

SUMMARY Earthworks of probable medieval ridge and furrow cultivation in the field immediately south of Waen-Meredydd, west of St Asaph. Recognised from LiDAR imagery, the extent of the area has been mapped by CPAT.

DESCRIPTION Ridge and furrow identified from 1m LiDAR

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES - -CPAT140118

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

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ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT143528>

PRN 143529 NAME Waen-Meredydd ridge and furrow III

NGR SJ0126873496 **COMMUNITY** Cefnmeiriadog

TYPE MEDIEVAL, RIDGE AND FURROW. Rank: 1

SUMMARY Earthworks of probable medieval ridge and furrow cultivation in the field immediately south of Waen-

Meredydd, west of St Asaph. Recognised from LiDAR imagery, the extent of the area has been mapped by CPAT.

DESCRIPTION Ridge and furrow identified from 1m LiDAR

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES - -CPAT140118

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT143529>

PRN 143530 **NAME** Waen-Meredydd ridge and furrow IV

NGR SJ0120173423 **COMMUNITY** Cefnmeiriadog

TYPE MEDIEVAL, RIDGE AND FURROW. Rank: 1

SUMMARY Earthworks of probable medieval ridge and furrow cultivation in the field immediately south of Waen-Meredydd, west of St Asaph. Recognised from LiDAR imagery, the extent of the area has been mapped by CPAT.

DESCRIPTION Ridge and furrow identified from 1m LiDAR

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES - -CPAT140118

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT143530>

PRN 143531 **NAME** Waen-Meredydd ridge and furrow V

NGR SJ0131873593 **COMMUNITY** Cefnmeiriadog

TYPE MEDIEVAL, RIDGE AND FURROW. Rank: 1

SUMMARY Earthworks of probable medieval ridge and furrow cultivation in the field immediately south of Waen-Meredydd, west of St Asaph. Recognised from LiDAR imagery, the extent of the area has been mapped by CPAT.

DESCRIPTION Ridge and furrow identified from 1m LiDAR.

CONDITION Condition: Description: - Related event: - Date of entry:

STATUS None recorded

CROSS REFERENCES - -CPAT140118

SOURCES

Jones, N. W 2016 North Wales Wind Farm Connections: cultural heritage assessment CPAT Report No. 1423-1

ARTEFACTS

C14 DATES

PHOTOS

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT143531>

PRN 102985 **NAME** Wernglodd Y Palmant Fieldname

NGR SJ01757400 **COMMUNITY** St Asaph

TYPE ROMAN, ROAD. Rank: 1

SUMMARY

DESCRIPTION FIELDNAME ON 1846 TITHE MAP SUGGESTING THE SITE OF A PAVEMENT OR ROAD. ROMAN ROAD 67B FROM VARAE TO KANOVIUM RUNS ADJACENT TO THE S EDGE OF THIS FIELD SO THE NAME PROB RELATES TO THAT.;

CONDITION Condition: Unknown Description: - Related event: - Date of entry: 1983-10-31 00:00:00

STATUS None recorded

CROSS REFERENCES - -CPAT313718

SOURCES

Clwyd Archaeology Service 1981 Site visit record - PRN102985

ARTEFACTS

C14 DATES

PHOTOS

ARCHWILIO URL

<http://archwilio.org.uk/arch/query/page.php?watprn=CPAT102985>

08.13.21 (10:08) - HTML file produced from CPAT HER, CPAT file number 1585.
Clwyd-Powys Archaeological Trust, The Offices, Coed y Dinas, Welshpool, SY21 8RP.
tel (01938) 553670, fax (01938) 552179, email her@cpat.org.uk, website <http://www.cpat.org.uk> target="_blank">www.cpat.org.uk

Please note that the sites listed above are only the sites of which we are aware at the current time and there may be others that have yet to be discovered.

While the Regional Historic Environment Record contains information on all of the following, we do not hold the definitive data for Listed Buildings, Scheduled Ancient Monuments, Registered Parks and Gardens or Registered Historic Landscapes, and it is recommended that you contact Cadw to ensure you have the most up to date data for these monuments - particularly if you require digital polygons showing the full extents of Registered or Scheduled areas. Similarly, there may also be additional sites in the area in the National Monuments Record of Wales, held by the Royal Commission on the Ancient and Historical Monuments of Wales, and again you are advised to contact them directly to obtain such information.

If your enquiry relates to a commercial development, and if you haven't already done so, please contact Mr Mark Walters (markwalters@cpat.org.uk), the Development Control Archaeologist for Clwyd and Powys who will provide further advice regarding best practice in mitigating against damage to any archaeological or historical remains which might exist within the area of the proposed works.

Enquirers are required to provide a copy (paper or digital) of any document or published report that makes use of information obtained from the HER for incorporation into the record.

Enquirers are required to include the following acknowledgement in any document or published report that makes use of information obtained from the HER: - *Information obtained from the Regional Historic Environment Record curated by the Clwyd-Powys Archaeological Trust* and the HER Enquiry Number.

Appendix U. Construction Noise Statement

ENN/544/NOTE2023

Construction Noise Statement for Proposed National Grid Bodelwyddan New Overhead Power lines

Document no: B2416603/BODEL/CNA/002
Version: 01

National Grid Electricity Transmission
B2416603

Bodelwyddan Substation Extension
29 November 2023

ENN/544/NOTE2023

Construction Noise Statement for Proposed National Grid Bodelwyddan New Overhead Power lines

Client name: National Grid Electricity Transmission
Project name: Bodelwyddan Substation Extension
Client reference: B2416603 **Project no:** B2416603
Document no: B2416603/BODEL/CNA/002 **Project manager:** [REDACTED]
Version: 01 **Prepared by:** [REDACTED]
Date: 29 November 2023 **File name:** B2416603/BODEL/CAN/002
Bodelwyddan New Overhead Power Lines

Document status: First Draft

Document history and status

Version	Date	Description	Author	Checked	Reviewed	Approved
01	29/11/23	First draft	FR	RS	AB	KW

Distribution of copies

Version	Issue approved	Date issued	Issued to	Comments

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1. Introduction

National Grid is proposing to construct an extension to National Grid's existing Bodelwyddan 400 kilovolt (400kV) substation located at Glascoed Road, St Asaph, Denbighshire, LL17 0LL. The extension would be to the west of the existing substation and would approximately double the footprint of National Grid's operational land. The substation extension will be the subject of a planning application to Denbighshire County Council. National Grid is proposing to make changes to the overhead line connecting to the extended substation. The changes involve removing a single circuit existing overhead line and forming two double circuit overhead line connections to the extended substation. This report considers the removal of the existing connection and the replacement with new overhead power lines.

A description of the project is provided in the Environmental Report prepared to accompany the applications for consent for the new overhead lines under Section 37 of the Electricity Act 1989 to be submitted to the Secretary of State for the Department of Energy Security and Net Zero (DESNZ).

This statement considers the potential from the proposed works to the overhead lines(OHLs). A statement of potential operational noise is provided separately.

This assessment of construction noise is based on guidance contained within British Standard 5228:2009+A1:2014 – Code of practice for noise and vibration control on construction and open sites, Part 1 – Noise (British Standards Institution, 2014a) and Part 2 – Vibration (British Standards Institution, 2014b)

A desk-based review of the layouts of the proposed works and location map has been undertaken in the first instance to inform the identification of potential noise sensitive receptors. Receptors that are potentially sensitive to construction noise comprise residential dwellings, educational establishments, hospitals or places of worship.

A radius of 300m around the proposed construction works is considered sufficient for assessing construction noise impacts, and a radius of 100m for construction vibration impacts.

2. Description of Area

The area of the works is rural with no major noise sources nearby, such as major trunk roads or railway lines. As such, existing baseline noise levels are expected to be relatively low.

Figure 2-1 shows the location of the existing substation in the context of the surrounding area. The proposed extension is immediately to the west of the existing substation. The closest potentially noise sensitive receptors are also indicated.

The closest noise sensitive receptors to the project are the following:

- Esgob Farm (closest distance to works: 260 from the Compound Construction).
- Waen Meredydd (closest distance to works: 220 from Pylon Foundation).
- Sguboriau (closest distance to works: 120m from the Haul Routes).
- Tyddyn Meradydd (closest distance to works: 210 from the Haul Routes).

There are no sensitive receptors within 100m of the works, and so vibration from construction is not considered further.



Figure 2-1: Location of surrounding receptors

3. Assessment Methodology

This assessment of construction noise and vibration is based on guidance contained within British Standard 5228:2009+A1:2014 – Code of practice for noise and vibration control on construction and open sites, Part 1 – Noise (BS5228-1) (British Standards Institution, 2014a).

3.1 Construction noise

A desk-based review of the layouts of the proposed works and location maps has been undertaken in the first instance to inform the identification of potential noise sensitive receptors. Receptors that are potentially sensitive to construction noise comprise residential dwellings, educational establishments, hospitals or places of worship.

A radius of 300m around the proposed construction works is considered sufficient for assessing construction noise impacts.

The significance of noise impacts caused by construction activities can be evaluated according to the methods described in Annex E of the BS 5228-1. Annex E describes methods for evaluating the potential significant impact of construction noise depending on the existing noise level at the site. The Annex presents the ABC method which considers that a potential adverse effect is indicated when the noise from construction exceeds the value listed in an ABC category which is dictated by the existing noise level (see Table 1).

Table 1: ABC Method for assessing construction noise at dwellings.

Reference Period	Threshold value $L_{Aeq,T}$ dB		
	Category A ¹	Category B ²	Category C ³
Daytime weekday (07:00-19:00) and Saturdays (07:00-13:00)	65	70	75
Evening's weekday (19:00-23:00), Saturdays (13:00-23:00) and Sundays (07:00-23:00)	55	60	65
Night-time (23:00-07:00)	45	50	55
¹ Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values. ² Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values. ³ Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.			
Note 1: A potential significant effect is indicated if the L_{Aeq} , daytime noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.			

There is no baseline noise survey data available but given the rural nature of the area the lowest category A is considered to be suitable for this assessment.

Noise predictions from construction are undertaken using known noise levels from the various items of plant that would be used during the OHL removal and installation. The works will be carried out during a number of consecutive phases. These phases are summarised in Table 2, together with the construction plant and equipment that is expected to be used.

For the times of operation of the construction works, activity time has been assumed to be 80% during each shift, allowing for breaks. Daytime working hours are assumed to be 07:00 to 19:00 hours between Monday and Friday, and 07:00 and 13:00 on Saturday. No night-time or out of hours weekend working is expected. The acoustic on-time is the period of operation of the plant item where it is working within 3dB of its acoustic maximum.

Table 2 Construction equipment to be used.

Phase of Construction	Plant Description	No.	Acoustic on-time	Lw dB
Compound Construction	Tracked excavator (15t) 71 kW	1	30%	101
	Lorry (4-axle wagon)	1	25%	108
	Vibratory roller 20 3 t	1	25%	95
	Lorry with lifting boom 50 kW (6t)	1	25%	105
OHL Removal	Tracked excavator (22t) 107 kW	1	35%	99
	JCB 540 Telehandler	1	35%	107
	Lorry (4-axle wagon)	1	10%	108
Pylon Removal	Mobile telescopic crane 280 kW (100t)	1	30%	99
	Tracked excavator (22t) 107 kW	1	25%	99
	Lorry (4-axle wagon)	1	30%	108
	Skip Wagon	1	20%	106
	Lorry 313kW 44t	1	20%	107
	Impact Wrench	1	20%	110
	JCB 540 Telehandler	1	35%	107
	Hand-held gas cutter 230 bar	1	20%	93
Pylon Foundation	Tracked excavator (22t) 107 kW	1	25%	99
	Hand-held circular saw (cutting paving slabs) 1.5 7.6 kg / 235 mm diameter	1	10%	112
	Concrete mixer truck (discharging) & pump (pumping) 26t capacity	1	30%	103
	Poker vibrator 2.2 kW	1	20%	97
	JCB 540 Telehandler	1	35%	107
Pylon Erection	Mobile telescopic crane 280 kW (100t)	1	30%	99
	Tracked excavator (22t) 107 kW	1	25%	99
	Lorry (4-axle wagon)	1	30%	108
	Lorry* 313kW 44t	1	20%	107
	Impact Wrench	1	20%	110
	JCB 540 Telehandler	1	35%	107
OHL Installation	Mobile telescopic crane 280 kW (100t)	1	30%	99
	Tracked excavator (22t) 107 kW	1	25%	99
	Cable Winch from EU Max	1	30%	93
	General 4x4	1	25%	108
Foundation Removal	Tracked excavator (15t) 71 kW	1	30%	101
	Pulveriser mounted on excavator (30t) 147 kW	1	25%	104
	Lorry (4-axle wagon)	1	20%	108
Haul Routes	Tracked excavator (30t) 170 kW	1	40%	103
	Tracked excavator (15t) 71 kW	1	40%	101
	Articulated dump truck 196 kW (25t)	1	30%	109
	Roller (rolling fill) (18t) 145 kW	1	30%	107
	Dozer (20t) 142 kW	1	25%	109

3.2 Construction Deliveries

Throughout construction, deliveries of equipment and materials will be required, and workers will access the site daily. The assessment of noise from construction traffic has been carried out using the Haul Route calculation methodology from Appendix F.2.5.2 of BS 5228-1. A sound pressure level is predicted from numbers of mobile plant and vehicles passing along a haul route at a rate per hour.

Table 3 indicates the number of vehicles expected to access the site per day monthly through the construction period.

Table 3 Projected number of vehicles during construction.

Vehicle Type	Average number of vehicles per day in month							
	1-3	4-6	7-17	18	19	20-22	23	24
Month								
Cars	5	5	5	5	5	5	5	5
Vans	20	20	20	34	54	39	21	4
HGVs	9	4	1	6	2	1	1	0

The peak month for vehicular access is the 19th month of the works when a total of 61 vehicles will access the site. Calculations have been carried out to demonstrate the hourly noise level from these vehicles, based on a 10-hour working day.

4. Measures to Avoid or Reduce Impacts

The use of Best Practicable Means (BPM) during construction will be adopted on-site in order to minimise construction noise levels. This is standard sector practice in accordance with British Standard 5228-1. Examples of BPM are as follows:

- Appropriate selection of plant and construction methods: only plant conforming with or better than relevant national or international standards, directives or recommendations on noise or vibration emissions will be used. Construction plant will be maintained in good condition with regard to minimising noise and vibration output.
- Construction plant will be operated and maintained appropriately, following manufacturer's written recommendations or using other appropriate operation and maintenance programmes that reduce noise and vibration emissions.
- Audible reversing warning systems used on mobile plant and vehicles will be of a type which, whilst ensuring that they give proper warning, have a minimum noise impact.
- Stationary equipment e.g. pumps, compressors, generators, will be situated as far as practical from receptors, and where appropriate acoustic screens are erected around them.
- Equipment known to emit noise strongly in one direction, where practical, will be orientated so that noise is directed away from noise sensitive areas.
- Screens will be used around piling equipment (if any piling is needed) and plant will be maintained in good operational condition with all engines covered and noise control measures as provided in place.
- Equipment will be shut down when not in use.
- Haul roads will be well maintained and avoid, where feasible, the use of steep gradients.
- All site employees will be reminded of their obligation to minimise noise on site.
- Where possible, the contractor will consider the use of the quietest commercially available plant that is suitable for each specific operation.

5. Potential Impacts

5.1 Construction noise

Table 4 presents the predicted construction noise levels for a position 1m from the façade at the four identified closest sensitive receptors to the works.

Table 4 Predicted construction noise, $L_{Aeq,T}$ dB

Phase of Construction	1. Plas Yr Esgob Farm	2. Waen Meredydd	3. Sguboriau	4. Tyddyn Meredydd
Compound construction	47	38	34	34
OHL removal	39	45	43	48
Pylon removal	44	50	48	52
Pylon foundation	41	51	47	51
Pylon erection	44	53	50	53
OHL installation	38	48	44	48
Foundation removal	39	44	43	47
Haul routes	46	50	58	53

At the closest residential dwellings to the OHLs removal and installation, the predicted daytime construction noise is below the threshold level of 65 dB.

The impact of noise during the removal and installation of OHLs is therefore considered to be **not significant**.

5.2 Delivery Traffic

Table 5 presents the predicted construction noise levels from vehicles using the haul route during the peak traffic month of the works at receptors.

Table 5 Predicted vehicle noise on access route L_{Aeq} 1-hour dB

Receptor	Predicted hourly vehicle noise $L_{Aeq,T}$ dB
Plas Yr Esgob Farm	40
Waen Meredydd	36
Sguboriau	40
Tyddyn Meredydd	38

Predicted levels of noise from vehicles using the site access route during the peak construction traffic month are below the daytime construction noise threshold of 65 dB. As fewer vehicles are expected to access the site in the other months of the 24-month construction period, noise from construction traffic will be lower during these periods. These predicted noise levels are low compared to those from the works and would not contribute to increase the predicted levels shown in Table 4. The impact of noise from construction vehicles is therefore considered to be not significant.

5.3 Cumulative Assessment

There is the potential for cumulative impacts from other nearby developments, where construction works are carried out consecutively within 300m of the receptors considered in this assessment. A review of nearby developments has been undertaken, and only the works associated with the construction of the substation extension would be within 300m of the study area associated with this scheme. No other developments are within 300m of the receptors considered in this assessment.

There will be some overlap of the works carried out to construct the overhead lines, as outlined in this report, and for the substation extension at two receptors. The highest calculated construction noise levels for these receptors during the substation extension works have been taken from the associated report B2416603/BODEL/CAN/001 and combined with the highest calculated construction noise level during the OHL construction works to determine the worst case cumulative construction noise level, as indicated in Table 6.

Table 6 Predicted construction noise, $L_{Aeq,T}$ dB

Predicted $L_{Aeq,T}$ dB	Receptor	
	Waen Meredydd	Plas Yr Esgob Farm
Substation construction	58	55
Overhead line construction	53	47
Combined construction noise level	58	55

At the closest residential dwellings to the combined construction works for the substation and overhead lines the predicted daytime construction noise is below the threshold level of 65 dB.

The impact of cumulative construction noise therefore considered to be **not significant**.

6. Summary and Conclusions

This statement considers the potential for adverse impact during the construction phase of the proposed OHL removal and installation at Bodelwyddan substation.

The proposed construction noise threshold level of 65 dB for the works is not predicted to be exceeded at any receptor during the works, and also from construction traffic. This is based on the assumption that the works will be carried out during daytime working hours (07:00 to 19:00).

It is therefore concluded that construction noise from the proposed OHL removal and Installation to Bodelwyddan site would be **not significant**.

Cumulative construction noise levels from the substation extension works occurring consecutively has been considered. Cumulative construction noise would be below construction noise threshold levels at residential receptors, and therefore **not significant**.

Appendix A. Acoustic Terminology

A sound wave travelling through the air is a regular disturbance in ambient atmospheric pressure. These pressure fluctuations, when of frequencies within the audible range, are detected by the human ear which passes nerve responses to the brain, producing the sensation of hearing. The audible range is generally quoted as 20 Hz to 20 kHz frequency range.

Noise has been defined in a variety of ways and is very much dependent on factors such as the listener's attitude to the source of the sound and their environment but is essentially any sound that is unwanted by the recipient.

It is impossible to measure the degree of nuisance caused by noise directly, as this is essentially a subjective response of the listener, but it is possible to measure the "loudness" of that noise. Loudness is related to both the sound pressure (the magnitude of the maximum excursion of the pressure wave around the ambient atmospheric pressure) and the frequency, both of which can be measured.

The human ear is sensitive to a wide range of sound levels; the sound pressure level of the threshold of pain is over a million times that of the quietest audible sound. In order to reduce the relative magnitude of the numbers involved, a logarithmic scale of decibels (dB) based on a reference level of the lowest audible sound is used.

The response of the human ear is not constant over all frequencies. It is therefore usual to weight the measured sound level per frequency to approximate human response. This is achieved by using filters to vary the sound contribution at different frequencies of a measured signal. The "A-weighting" network is the most commonly used and has been shown to correlate closely to the non-linear and subjective response of humans to sound. The use of this weighting is denoted by a capital A in the unit abbreviation (i.e. L_{Amax} , L_{Aeq} , L_{A90} etc.) or a capital A in brackets after a dB level (i.e. 3 dB(A)).

Sound Pressure Level: The sound pressure level (L_p or SPL) is the instantaneous acoustic pressure and is measured in decibels (dB). Since the ear is sensitive to variations in pressure, rather than source power or intensity, the measurement of this parameter gives an indication of the impact on people. The SPL is defined as:

$$SPL = 10 \log_{10} \left(\frac{p^2}{p_{ref}^2} \right) \quad \text{or} \quad SPL = 20 \log_{10} \left(\frac{p}{p_{ref}} \right)$$

where:

p is the rms pressure of the sound in question (in pascals)

p_{ref} is the reference sound pressure, defined as the limit of human audibility (2×10^{-5} Pa)

Sound Power Level: The sound power level (LW or PWL) is a measure of the acoustic energy output of a source and is a property of the source itself. The PWL is also measured in dB and is given by:

$$PWL = 10 \log_{10} \left(\frac{W}{W_0} \right)$$

Where:

W is the sound power of the source (in watts)

W₀ is the reference sound power (10-12 watts)

Broadband: When the broadband term is used in conjunction with an acoustic measure (i.e. broadband sound pressure level) it reflects that the value of this measure is representative of the entire audible range.

Background Sound Level L_{A90 T}: A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.

Equivalent continuous A-weighted sound pressure level L_{Aeq T}: The L_{Aeq T} is defined as the equivalent continuous sound level and is the most widely used parameter for assessing environmental noise. Since this descriptor is a type of average level, it must by definition have an associated time period over which the measurement is referring to. This is often included in the abbreviation in the form L_{Aeq, T}, where T is the time period (i.e. L_{Aeq, 5 min}). The formula for calculating the L_{eq} is:

$$L_{eq} = 10 \log_{10} \left(\frac{1}{t_2 - t_1} \int_{t_1}^{t_2} \frac{p^2}{p_{ref}^2} .dt \right)$$

Ambient Sound: Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far.

Free-Field: The term “free-field” refers to sound levels that have been measured or predicted in the absence of any influence of reflections from nearby surfaces. In practice, a measurement is considered to be free field if it was taken at a distance of over 3.5 m from reflecting surfaces to the side of the source. Where a reflecting surface is perpendicular to the line between sound source and receptor/measurement position, a greater distance to the reflecting surface is required (around 10 m) for truly free-field conditions.

Facade Level: The term façade level refers to the sound level adjacent to a building that is assumed to be reflective to sound. Typically for a fully reflective façade a correction of 3dB would be added linearly to the predicted free field level to account for the sound energy reflected from the façade.

Appendix B. References

- British Standards Institution. 2014a. BS 5228-1: 2009 + A1: 2014 - Code of practice for noise and vibration control on construction and open sites – Part 1: Noise.
- British Standards Institution. 2014b. BS 5228-2: 2009 + A1: 2014 - Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration.

Appendix V. Operation Noise Statement

EEN/544/NOTE2024

Audible Noise Statement for Proposed National Grid Bodelwyddan Substation Extension

National Grid

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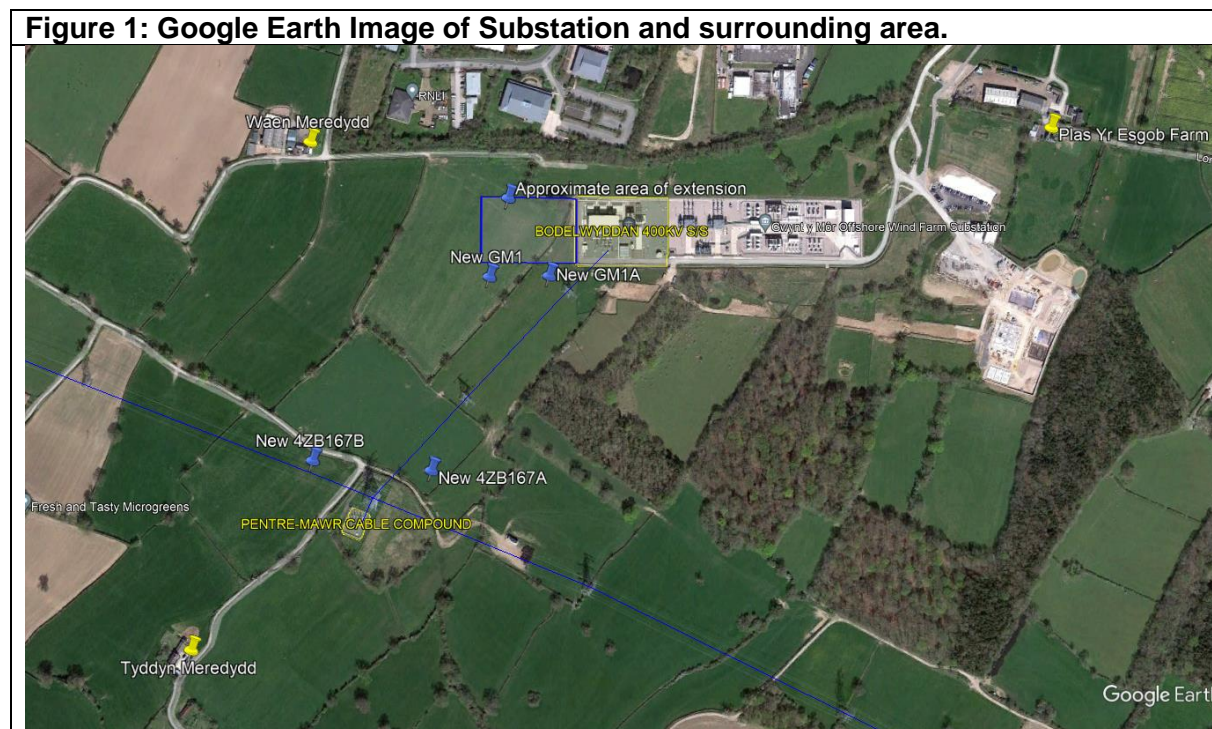
1.0 INTRODUCTION

National Grid is proposing to extend the existing Bodelwyddan 400 kilovolt (400kV) substation located at Glascoed Road, St Asaph, Denbighshire, LL17 0LL. The proposed extension will facilitate the addition of twelve additional connection bays to connect new green energy to the transmission system. The connections include the BP & EnBw Mona offshore windfarm, RWE's Awel-y-Mor offshore and the proposed MaresConnect interconnector. The twelve bays include provision for additional feeder bays to accommodate the reconfiguration of the circuits connecting the substation to the transmission network. A full description of the project is provided in the Environmental Report accompanying the substation works planning application.

None of the proposed new infrastructure to be installed as part of the extension would be classified as significant noise sources. This Technical Note has therefore been prepared by National Grid Electricity Transmission's Environmental Engineering Team as good practice, for completeness and to provide the necessary information to demonstrate this.

2.0 DESCRIPTION OF AREA

Figure 1 below shows the location of the existing and proposed substation in the context of the surrounding area. The boundary of the proposed extension is indicated by the blue rectangle. Immediately to the east of this, highlighted in yellow and occupying approximately the same land area, is the existing National Grid 400kV substation. The facility to the east of the National Grid substation is the Gwynt y Mor Offshore Wind Farm Substation, this is not owned or operated by National Grid.



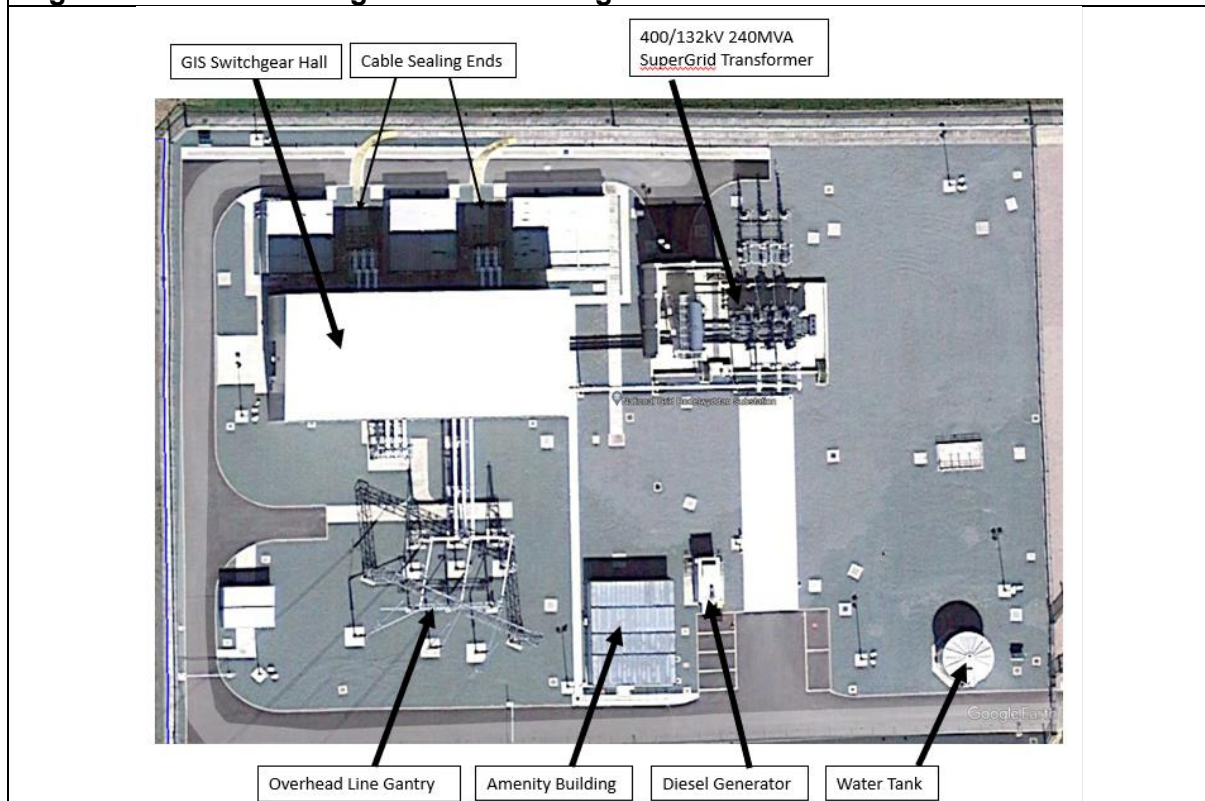
National Grid's 400kV '4ZB' overhead line (OHL) passes east-west to the south of the substation and connects to the existing substation via the short 'GM' overhead line and underground cabled circuit, both indicated by the blue lines. The single GM overhead line and cabled circuit would be replaced by two new double circuit overhead lines, requiring the construction of new and relocated pylons as indicated by the blue pushpins.

The nearest residential receptors to the project are Waen Meredydd which would be approximately 220 m west-northwest of the substation extension, and Tyddyn Meredydd, which lies approximately 250 m from the nearest point of the new OHL connections and 550 m from the substation extension. Immediately to the north of the existing and proposed substation extension lies a commercial area.

3.0 EXISTING NATIONAL GRID SUBSTATION AND INFRASTRUCTURE

The existing substation was constructed in 2014 and the principal equipment comprises: a substation building containing gas insulated switchgear (GIS), integral voltage and current transformers, circuit breakers, disconnectors and protection equipment. Externally there is one 400/132kV 240MVA supergrid transformer (SGT) with associated cooler, a standby diesel generator and a terminal overhead line (OHL) gantry which receives a single circuit high voltage connection from the 400kV '4ZB' overhead line which passes approximately 350 metres to the south of the substation. Other auxiliary equipment is generally contained within rooms either inside or outside the main GIS building, these include a telecommunications room, control room, relay room, battery room and low voltage alternating current (LVAC) room. There is also a small car park and utilities room on the site. The site is not permanently manned. Figure 2 below details the general arrangement of the existing substation.

Figure 2: General Arrangement of Existing Substation



Items of equipment generally termed 'reactive plant', which includes SGTs, are usually the only significant sources of noise on high voltage substations. Reactive plant is the source of the tonal 'hum' that is the noise most commonly associated with substations. The existing SGT operates continuously and is therefore the most significant noise source on the existing substation. The new substation would not include any additional reactive plant, hence there

would be no additional equipment of this type that would require noise assessment as part of the proposed development.

The next most significant noise source on the existing substation is the standby diesel generator, which under normal conditions operates only for 1 or 2 hours per month, daytime only, for routine testing purposes. Operation for extended periods of time would be on a temporary basis under emergency conditions only. The existing standby generator would remain in place and will provide emergency low voltage electricity supplies to both the existing site and the proposed substation extension on an emergency basis only.

The main GIS building houses switchgear which incorporates circuit breakers, disconnectors/isolators and current/voltage transformers. Switchgear noise is generated by the operation of circuit breakers and isolators. Switchgear is likely to operate very infrequently, typically only a few times a year for outages and maintenance, and in emergencies to protect the substation and electricity network infrastructure from lightning strikes or faults. Noise from switchgear is impulsive in character (i.e., of very short duration). Modern switchgear of the type installed at Bodelwyddan operates with a dull 'thud' while isolators would operate with a 'click'. No significant effects on noise sensitive receptors are anticipated due to the low noise level, infrequency of operation and the fact that the equipment is located within a building that provides acoustic attenuation. Other equipment located with the GIS building include voltage and current transformers, these are passive in operation and do not make noise.

The existing energised air insulated (AIS) components, which include: the short single circuit connection from the nearby 4ZB OHL, the terminal OHL span into the substation, insulators and air insulated bus bars, will under certain conditions 'crackle' or 'fizz' due to the occurrence of a phenomenon called corona discharge. Corona discharge occurs when the voltage gradient (or electrical stress) on the surface of energised components and fittings exceeds the corona inception level which is a function of the insulating properties of the surrounding air. Energised components are designed to operate below this level, however in certain conditions such as damp or wet weather and following long dry spells when surface contamination may build up, the corona inception level may be exceeded meaning corona discharge may occur. Corona discharge may be audible when close to the substation, but it is not continuous and not considered significant.

All other equipment on the existing substation, including the gas insulated bus bars (GIB), cable sealing ends and underground cables can be described as passive in operation, being either quiet in operation or not audible beyond the site boundary. All substation functions are fully automated meaning personnel do not need to be attendance for normal safe operation of the substation.

4.0 PROPOSED SUBSTATION EXTENSION

The substation extension would include the installation of ‘passive’ equipment to facilitate the addition of twelve additional connection bays. As stated above, the single GM overhead line and cabled circuit would be replaced by two new double circuit overhead lines.

As stated in the introduction, the proposed substation extension would not include any significant noise sources, for example reactive plant (such as SGTs) or any additional standby diesel generators.

The proposed general arrangement of the substation extension is shown below in Figure 3. The alignment of the proposed overhead line connections is shown in Figure 4.

Figure 3: Proposed General Arrangement of Substation Extension (shown in red)

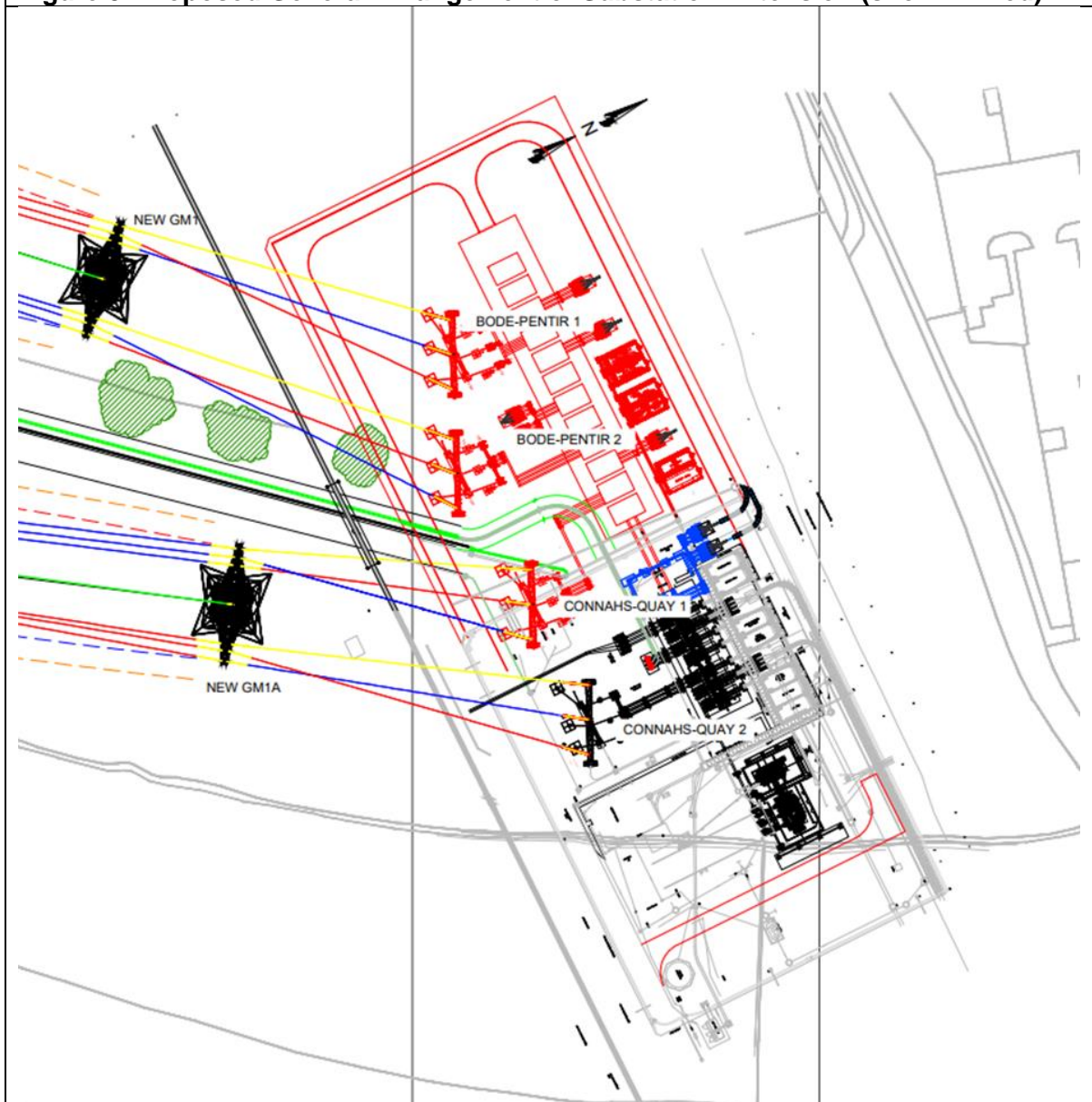
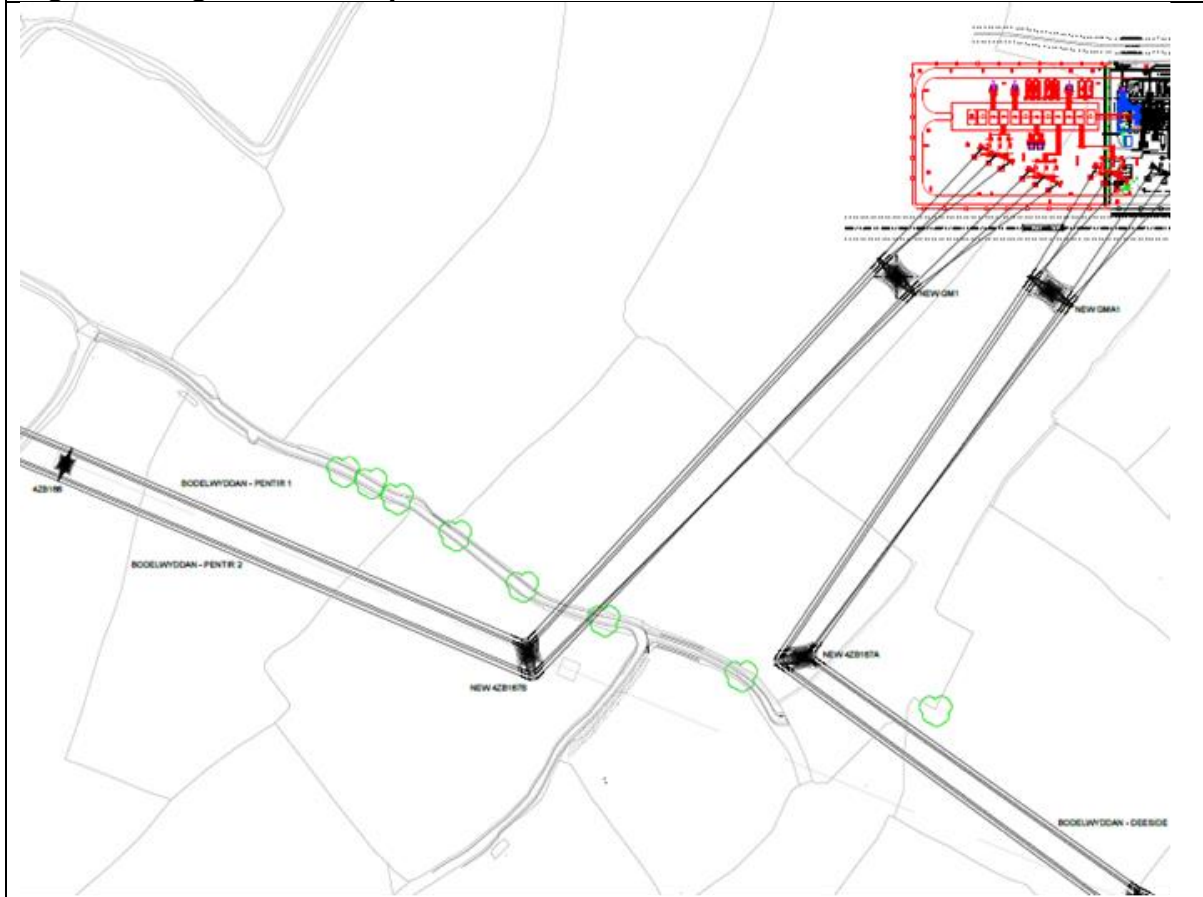


Figure 4: Alignment of Proposed Overhead Line Connections



All proposed equipment and their acoustic characters are described in detail in the following sections.

4.1 Proposed Auxiliary, Control and Security Equipment

Table 1 lists the auxiliary, control and security equipment likely to be on the proposed new substation and describes their general noise characteristics. These items do not make significant noise, with the exception of the site alarm which would operate under emergency conditions only.

Table 1: Auxiliary, control, and security equipment

Item	Equipment	Function	Noise Characteristics	Further info
A1	Telecoms room	Communications between control room and other substations	Quiet in operation	N/A
A2	Relay room	Substation bus bar protection and control	Quiet in operation	N/A
A3	Relay room	OHL and cable feeder protection houses the protection	Quiet in operation	N/A
A4	Control room	Houses the relays, protection and control panels	Quiet in operation	N/A
A5	Battery room	facility used to house batteries for backup or	Quiet in operation	N/A

		uninterruptible power systems		
A6	LVAC room	Low voltage alternating current for site supply	Quiet in operation	N/A
A7	Site lighting / fencing / gates	Safety and security	Quiet in operation	N/A
A8	Alarm / Siren	Security	Audible instruction Siren or claxon (Emergency use)	N/A

4.2 Proposed Energised Equipment

Table 2 lists energised equipment likely to be present on the substation extension and OHL connection to the existing National Grid 4ZB OHL. This equipment would connect to and would form part of the electricity transmission network and would facilitate connection of third-party infrastructure.

Item	Equipment	Function	Noise Characteristics	Further info.
E1	Switchgear	Circuit breakers, switches and isolators are located within the main GIS building. Isolate equipment in emergency and for planned maintenance and switching in and out connections as required.	Equipment is passive for the vast majority of the time. When it operates noise is an impact noise best described as a thud or 'clack'.	See below
E2	GIB bus bars	Gas insulated bus bars. Carry the electrical current through the substation	Do not make noise	N/A
E3	Underground Cables	Carry the electrical current through the substation	Do not make noise	N/A
E4	Cable sealing ends	The connection point between GIS or AIS bus bars or conductors	Do not make noise	N/A
E6	OHL connection and line entries into substation on terminal gantries	Connects the existing substation and the proposed substation to the existing 400kV 4ZB OHL which passes approximately 350 metres to the south.	Energised OHL components may 'crackle' or 'fizz', especially during damp or wet weather. In certain conditions this may be accompanied by a 'hum'	See below

Switchgear

Switchgear noise is generated, in the main, by the operation of circuit breakers which would be located inside the main GIS building. Modern switchgear operates with a dull 'thud'. Switchgear of this type is already present on the existing substation and hence the presence of additional switchgear would not constitute a change in noise character compared to the existing infrastructure.

Switchgear operations would be very infrequent, typically a few 10's of activations during a year across the whole site. The main purpose of the switchgear is to protect the substation and overhead line infrastructure in the event of faults or events such as lightning strikes.

Noise due to the operation of switchgear is therefore considered **not significant**.

Audible Noise from High Voltage OHLs

Noise from high voltage transmission lines is primarily due to a phenomenon called corona discharge. Line noise is generated when the conductor surface voltage gradient (electric stress, or E_{max} expressed in kilovolts per centimetre (kV/cm)) exceeds the inception level for corona discharge activity which is released as acoustic energy and radiates into the air as sound. In UK conditions the corona inception level is regarded to occur when electric stress is in the range 17 to 20 kV/cm. Whilst most high voltage lines are designed to operate below this level, those that operate close to this may produce audible noise when enhancement of conductor surface electric stress occurs due to rainfall (wet noise) or the presence of conductor surface contamination (dry noise). Lines that operate significantly below the corona inception level are much less likely to produce audible noise.

When it occurs, OHL noise can be described as a 'crackle', which is sometimes accompanied by a tonal 'hum' in wet conditions. The highest noise levels generated by an OHL generally occur during rainfall. Hum, if it occurs, is typically more annoying than crackle alone and therefore the occurrence of wet noise is considered worst-case.

The proposed new OHL would carry a 'triple Araucaria' conductor system on lattice pylons, a similar design to the existing 4ZB 400kV OHL, which currently carries a 'quad Zebra' conductor system which is due to be replaced with the triple Araucaria system. Due to its geometrical configuration the triple Araucaria design is the least electrically stressed conductor system that National Grid uses. The maximum conductor surface electrical stress level of triple Araucaria on a lattice pylon is approximately 12 kV/cm when operated at 400kV. This is significantly below the corona inception level and is the best design available for reducing the effects of dry and wet noise from the proposed OHL during operation.

Where National Grid is proposing to construct new OHLs of this design in other parts of the UK operational noise assessment has been scoped out of the Environmental Impact Assessment.

OHL Connection and line entries

The single circuit overhead line connection would be replaced by two double circuit connections requiring the existing connection to be removed requiring one existing pylon (4ZB167) to be replaced with two new pylons (to be called 4ZB167A and 4ZB167B) and the existing low-height single circuit pylons (GM01 and GM02) to be replaced with two new full height twin circuit pylons (to be called GM1 and GM1A).

The new OHL connections would be constructed of lattice pylons carrying a 'triple Araucaria' conductor system. Triple Araucaria is the quietest conductor system that National Grid

operates at 400 kV. This is because the design operates under very low electrical stresses due to its physical size and geometry.

The nearest noise sensitive receptor is Waen Meredydd which is located approximately 250m to the northwest of the nearest line entry point to the proposed substation extension.

Annex 1 provides the technical basis to demonstrate that audible noise from this design of overhead line would be negligible given the distances to the surrounding noise sensitive receptors which are all more than 200 metres from the project.

Noise due to the operation of the OHL connections is therefore considered **not significant**.

5.0 SUMMARY AND CONCLUSIONS

This statement considers the potential for adverse impact due to operational noise from the proposed extension to Bodelyyddan 400 kV substation and associated double-circuit 400 kV OHL connections. The noise characteristics of each item of proposed equipment is described. There would not be any significant noise sources introduced due to the proposed development.

It is therefore concluded that there would not be an adverse effect due operational noise from the proposed extension to Bodelyyddan substation and the proposed OHL connections and therefore any operational noise impact would be negligible and **not significant**.

Annex A Bodelwyddan Substation Extension

Supporting Technical Information on Operational Audible Noise from the Proposed 400kV Overhead Line Turn-ins.

1.0 INTRODUCTION

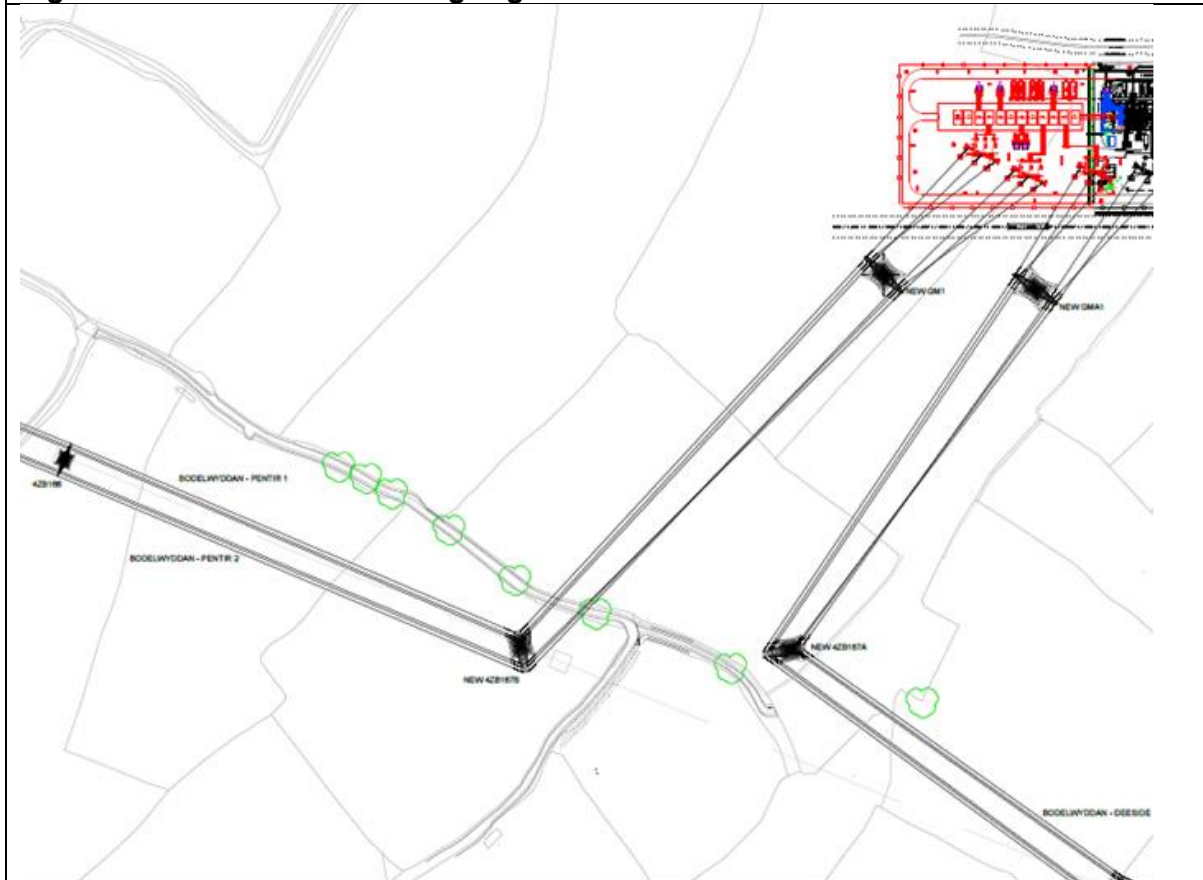
National Grid Electricity Transmission plc (here on referred to as National Grid) is proposing to construct an extension to National Grid’s existing Bodelwyddan 400 kilovolt (400kV) substation located at Glascoed Road, St Asaph, Denbighshire, LL17 0LL.

The existing 400kV substation is connected to the nearby ‘4ZB’ overhead line by the single-circuit ‘GM’ overhead line and a cabled circuit. The would be replaced by two new double circuit overhead lines, requiring the construction of new and relocated pylons as indicated by the blue pushpins in Figure 1 below.

This Annex presents the results of an assessment to demonstrate that the overhead line turn-ins would not result in significant noise levels at the nearest noise sensitive receptors. Chapter 2 of this appendix presents background assumptions and the existing policy and guidance that applies to designs of high voltage overhead lines.

This Annex provides the technical basis for the scoping out of operational noise from the proposed OHL turn-ins and provides information to demonstrate that any noise that may occur during the operation of the new 400kV OHL circuits would not be significant.

Figure A1: Aerial View showing alignment of OHL turn-ins



2.0 BACKGROUND

2.1 Noise from Overhead Lines

Noise from high voltage overhead lines is primarily due to a phenomenon called corona discharge. Line noise is generated when the conductor surface voltage gradient (electric stress, or E_{max} expressed in kilovolts per centimetre (kV/cm)) exceeds the inception level for corona discharge activity which is released as acoustic energy and radiates into the air as sound. In UK conditions the corona inception level is regarded to occur when electric stress is in the range 17 to 20kV/cm. Whilst most high voltage overhead lines are designed to operate below this level, those that operate close to this may produce audible noise when enhancement of conductor surface electric stress occurs due to rainfall (wet noise) or the presence of conductor surface contamination (dry noise). Overhead lines that operate significantly below the corona inception level are much less likely to produce audible noise.

When it occurs, overhead line noise can be described as a ‘crackle’, which is sometimes accompanied by a tonal ‘hum’ in wet conditions. The highest noise levels generated by an overhead line generally occur during rainfall. Hum, if it occurs, is typically more annoying than crackle alone and therefore the occurrence of wet noise is considered worst-case.

2.1 Embedded Measures

The proposed new OHL would carry a ‘triple Araucaria’ conductor system on lattice pylons, a similar design to the existing 4ZB 400kV OHL onto which the new turn-ins would connect. Due to its geometrical configuration the triple Araucaria design is the least electrically stressed conductor system that National Grid uses. The maximum electrical stress level of triple Araucaria on a lattice pylon is approximately 12 kV/cm when operated at 400kV.

This is significantly below the corona inception level and is the best design available for reducing the effects of dry and wet noise from the proposed OHL during operation.

3.0 NATIONAL GRID TECHNICAL GUIDANCE

National Grid has a suite of three documents relating to the management of audible noise from its OHLs. These documents are described in Table 1 below.

Table 1: National Grid Technical Guidance Documents

Document	Description
Policy Statement PS(T)134 ⁱ - Operational Audible Noise Policy for Overhead Lines (Issue 2, June 2021)	Applies to environmental noise due to the operation of new OHLs, reconductoring, diversion and uprating projects for OHLs operated at 275kV and 400kV. The policy describes a three-tier assessment process and sets noise impact criteria against which predicted levels of noise from operational OHLs can be assessed.
Technical Report TR(E)564 ⁱⁱ - Development of Method for Assessing the Impact of Noise from Overhead Lines (New Build, Reconductoring, Diversion and Uprating)	Explains how the noise criteria presented in PS(T)134 were developed, taking into account the UK noise policy context and UK national and international guidance, including World Health Organisation guidelines and evidence for health effects.

Document	Description
(Issue 1, February 2021)	
Technical Guidance Note TGN(E)322 ⁱⁱⁱ - Operational Audible Noise Assessment Process for Overhead Lines (New Build, Reconductoring, Diversion and Uprating) (Issue 2, June 2021)	Provides guidance on the practical implementation of PS(T)134 and on noise impact and significance of effect for EIA's submitted as part of planning applications.

PS(T)134 describes a method for predicting the environmental impact due to audible noise caused by new, reconducted, diverted or uprated overhead transmission lines. The method uses internationally recognised line noise prediction methodology to calculate noise emission levels based on operating voltage, conductor design and pylon geometry. PS(T)134 also sets out noise criteria against which predicted levels of noise from operational OHLs can be assessed.

The PS(T)134 criteria apply a +6dB character correction to wet noise effects to account for the additional 'hum' generated during worst-case wet weather conditions and a +3dB correction to dry noise effects to account for the 'crackle. This means that the assessment method is consistent with the guidance contained in section 9 of BS4142:2014+A1:2019^{iv}, 'Methods for rating and assessing industrial and commercial sound' (here on referenced as 'BS 4142:2014') which takes account of acoustic features by applying a character correction to the specific sound level to calculate a BS4142 rating level.

The OHL noise assessment process set out in PS(T)134 follows a three-tier 'screening' approach based on predicted source noise level and receptor distance. If predicted worst case wet-noise levels fail the Tier 1 test, a Tier 2 assessment would be undertaken and if predicted noise levels fail the Tier 2 test, a Tier 3 assessment would be undertaken. The three-tier approach comprises the following steps which are designed to screen out of further assessment receptors where there would be no adverse impact:

- **Tier 1:** A primary screening step based on 'worst-case' absolute wet noise effects and the pre-determined assessment criteria set out in PS(T)134.
- **Tier 2:** A further screening step based on combined absolute wet noise and dry noise effects and recalculated assessment criteria. This step takes account of the fact that wet noise occurs only during periods of wet weather and therefore does not occur all the time; and
- **Tier 3:** Full assessment following the principles of BS 4142:2014 for both wet noise and dry noise.

Noise criteria have been set taking account of the UK policy context and evidence from multiple sources, including the World Health Organisation^{v, vi, vii} and BS4142:2014, for noise and associated health impacts. The criteria have been developed by National Grid based on health impact data associated with the night-time period. The night-time period is considered more sensitive than the daytime as background sound levels are normally lower and people are trying to sleep. National Grid Technical Report TR(E)564 explains the reasoning behind the noise criteria set out in PS(T)134.

4.0 ASSESSMENT

4.1 Tier 1 Assessment for Proposed 400kV Overhead Lines

Tier 1 Assessment Criteria

The Tier 1 Assessment criteria set out in PS(T)134 are shown in Table 2. The 'No Adverse Impact' criteria applicable to residential receptors for worst-case wet weather noise is 34dB(A). In the case of the Tier 1 assessment, this includes a +6dB character correction to account for the occurrence of transmission line 'hum' in wet weather. The criteria for receptors that may be regarded as highly sensitive to noise (for example vulnerable subgroups as defined by the World Health Organisation) is 5dB lower, while the criteria for receptors that may be regarded as less sensitive to noise (for example those not used at night and those used for commercial purposes) is 5dB higher.

Table 2: Tier 1 Noise Impact Criteria (Wet Noise), from PS(T)134

Use	No Adverse Impact	Further Assessment Necessary
	Screened out	Tier 2 Assessment required
Vulnerable subgroups	< 29dBA	≥ 29dBA
Residential	< 34dBA	≥ 34dBA
Schools and Hotels	< 39dBA	≥ 39dBA

For the purposes of the Tier 1 assessment, 34dBA is considered to be the Lowest Observed Adverse Effect Level (LOAEL) for residential NSR used for sleeping at night. These levels are free-field and apply at the façade of an NSR. Where vulnerable subgroups are present, the LOAEL is 29dBA

Tier 1 Wet Noise Prediction

Worst-case wet noise levels for the proposed triple Araucaria conductor system have been predicted using the proprietary line noise prediction software EFC-400^{viii}. This software is widely used across the electricity industry to calculate conductor surface electrical stress, to assess compliance with Electric & Magnetic Field (EMF) guidelines and to predict transmission line noise levels under a range of weather conditions.

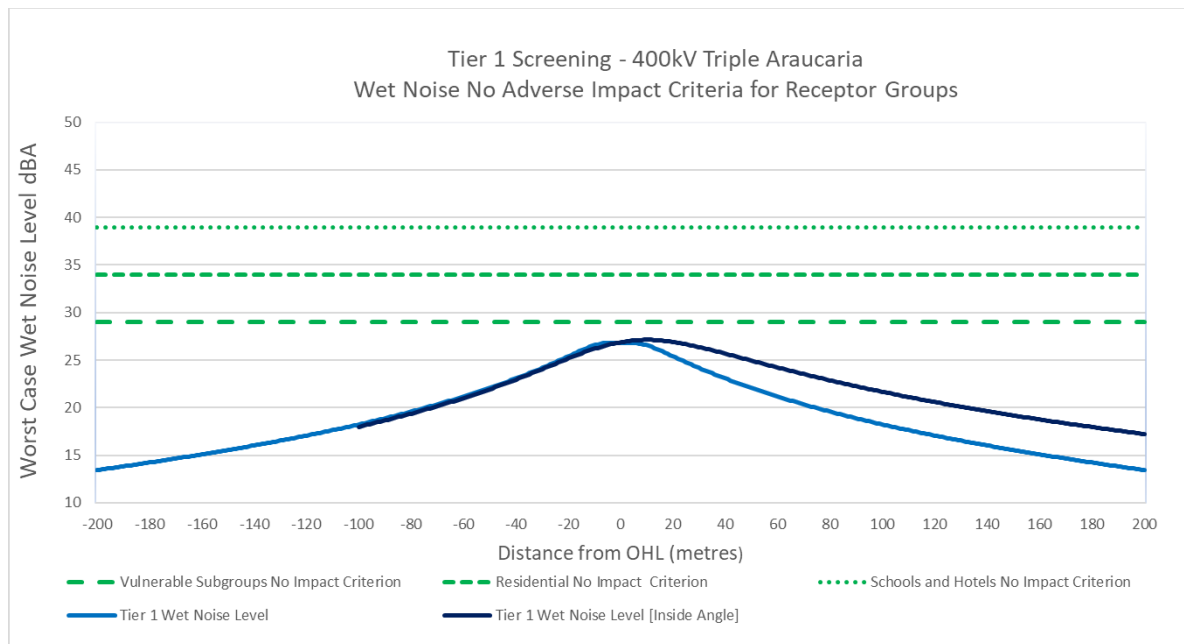
OHL noise source prediction is calculated by EFC-400 using the internationally recognised Electrical Power Research Institute (EPRI) method^{ix}. Propagation either side of a modelled line is calculated according to ISO 9613-2 Acoustics – Attenuation of sound during propagation outdoors^x. Modelling assumptions include:

- A normalised wet noise third octave spectrum which contains 'hum' at 100Hz and 200Hz, harmonics of the electricity supply frequency of 50Hz.
- Air temperature = 10°C
- Relative humidity = 90%
- Downwind propagation
- Porous ground = 1.0

Figure 1 shows the predicted worst-case wet noise levels at distances up to 200 metres either side of a proposed OHL centreline. Two scenarios are considered: a straight section of line (blue curve) and an angled section of line (dark blue curve). For the angled section, the inside of the angle is shown on the right of the chart. The consideration of an inside angle accounts for a receptor that may receive a greater combined effect from adjacent OHL spans due to the OHL deviating around the receptor and is the relevant curve in this case as the turn-ins will join the existing overhead line at approximately a 90° angle.

Figure 2 also shows the Tier 1 No Adverse Impact assessment criteria for each of the three receptor groups (green dashed lines).

Figure 2: EFC-400 Worst Case Tier 1 Wet Noise Prediction for Proposed OHL



The predicted noise levels are significantly below the No Adverse Impact Criteria for all three receptor categories.

This assessment is worst case as it assumes wet noise and hence hum would occur 100% of the time. In reality, these worst-case conditions are predicted to occur for approximately 8% of the year¹ in the project area.

The nearest receptor to the proposed overhead line turn-in is Waen Meredydd, approximately 250 metres distant from the nearest point of the new overhead line turn-ins. This receptor would potentially receive a noise contribution from both turn-ins (the second being over 300 meters distant) and a negligible contribution from the existing 4ZB overhead line which passes approximately 350 metres to the south. Even when allowing for two twin-circuit turn-ins by logarithmic addition of the two noise sources at 200 metres (+3dB if both sources are the same), plus a smaller contribution from the existing line (represented by the light blue curve), it can clearly be seen that the combined effect at distances over 200 metres the No Adverse Impact Criteria for all receptor groups are not exceeded.

¹ In the project area the historical annual average rainfall duration is 600 to 750 hours per year, or approximately 6.8 to 8.6% of the time, based on Met Office rainfall data for the period 2001 to 2010.

The nearest receptor to the south of the project is Tyddyn Meredydd which is approximately 260 metres south of the point where the turn-ins would join the existing line. A similar argument could be applied here where adding together negligible contributions from the existing line and the two new turn-ins (which would run directly away from this receptor), the No Adverse Impact Criteria for all receptor groups are not exceeded.

The Tier 1 assessment therefore concludes that the predicted worst-case noise rating level for operational noise at all potentially noise sensitive receptors due to the proposed new OHL turn-in OHL would be significantly below the 'No Adverse Impact' assessment criteria set out in PS(T)134.

As the worst-case wet noise from the triple Araucaria conductor design on lattice pylons is below the Tier 1 No Adverse Impact criteria for all receptor groups, there is no requirement to undertake a Tier 2 or Tier 3 assessment.

Operational noise from the proposed new OHL would therefore be Not Significant. It is therefore justified that operational noise from the proposed overhead line turn-ins is scoped out of the noise assessment.

4.2 OHL Fixtures and fittings

To be approved for use on the National Grid high voltage electricity transmission network, each fitting design must be Type Registered. Type registration comprises a series of tests on the fitting in question to ensure compliance with the relevant technical specification. These tests include performance requirements for corona inception and audible noise on all fittings along with wind tunnel testing of insulators for audible tones generated by Aeolian mechanisms.

Once the fitting has been type registered and approved for use, a number of further tests are also carried out post-manufacture in the form of Sample Testing. This ensures the fitting design conforms to the specification in the type registration document.

The Technical Specification and Type Registration processes reduce the potential for audible noise and tones to occur from all types of fittings, including insulators. Where noise does occur, it is likely to be localised and of short duration. If due to a fault, actions can be taken to rectify it. Where noise from fittings does occur, which results in a complaint, appropriate actions can be taken to seek to remedy the cause of the noise, usually through cleaning or replacement of the relevant fitting.

Therefore, noise from fixtures and fittings is scoped out of assessment.

5.0 CONCLUSION

This report presents the technical background to demonstrate that operational audible noise from the proposed new 400 kV overhead transmission line turn-ins to connect the proposed Bodelwyddan substation extension would be **Not Significant** due to the very low predicted noise levels even under worst-case wet noise conditions.

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-
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Appendix W. Flood Consequences Assessment

Bodelwyddan Overhead Line Works Flood Consequences Assessment

Document no: B2416603/BODEL/FCA/001
Revision: P02

National Grid Electricity Transmission
B2416603

Bodelwyddan Line Turn-Ins
18 June 2025



Bodelwyddan Overhead Line Works Flood Consequences Assessment

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Document no: B2416603/BODEL/FCA/001 **Project manager:** KW
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Bodelwyddan Overhead Line Works
FCA

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Executive summary

National Grid Electricity Transmission have commissioned Jacobs to prepare a Flood Consequences Assessment for the construction of two overhead lines which will connect the Bodelwyddan substation to the existing 4ZB overhead line to the south of the substation and proposed extension.

This Flood Consequences Assessment has reviewed a range of sources of flood risk. It has considered risk to the site of the proposed construction and operational works, as well as the risk arising to third parties from the works interacting with flood sources. The proposed works have been considered in the context of the Planning Policy Wales Edition 12 information with additional information from Technical Advice Note 15, which was released in March 2025.

The proposed works were found to be at negligible risk from tidal, fluvial, sewers, reservoirs and canals. The proposed works were found to be at low risk from groundwater flooding and flooding from surface water and small watercourses.

The construction phase of the proposed works lie partially in surface water flood extents though no permanent assets are in flood extents and there is no detriment over the existing arrangement. NGET has confirmed that appropriate mitigation will be provided in the construction management plan.

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Acronyms and abbreviations

AEP	Annual Exceedance Probability
DCWW	Dŵr Cymru Welsh Water
FCA	Flood Consequences Assessment
LDP	Local Development Plan
mAOD	Meters Above Ordnance Datum (meters above sea level)
NGET	National Grid Electricity Transmission
RMA	Risk Management Authority
SAB	SuDS Drainage Approval Board
TAN-15	Technical Advice Note 15

1. Introduction

1.1 Context and Overview

This Flood Consequences Assessment (FCA) has been prepared on behalf of National Grid Electricity Transmission (NGET) to accompany two applications to the Secretary of State for Energy Security and Net Zero under Section 37 of The Electricity Act 1989 for consent to build and operate two overhead lines which will connect to the proposed extended Bodelwyddan substation. This FCA complies with the requirements of the Planning Policy Wales.

This FCA screens a range of flood risk sources. It considers the risk to the site, as well as the risk arising to third parties as a consequence of the proposed construction and operational works interacting with local flood sources. Jacobs have requested flooding information from statutory consultees (Natural Resources Wales, Denbighshire County Council, Dŵr Cymru Welsh Water (DCWW)), as well as using publicly available sources of information.

1.2 Aims and objectives

The aim of this FCA is to provide an assessment of flood risk to and arising from the proposed works, setting out appropriate mitigation measures where necessary. This has been achieved by:

- Liaising with local flood Risk Management Authorities (RMAs) for any information they hold in relation to flood risk and requirements they may have of new development with regards to the management of flood risk to and arising from the proposed works;
- Reviewing information available in the public domain from various websites (Natural Resources Wales's Flood Map for Planning (Natural Resources Wales, 2025), Technical Advice Note 15 (TAN-15) guidance (Welsh Government, 2025a), British Geological Survey GeoIndex) in combination with information on local planning policy and data provided by NGET and returned from consultation with RMAs;
- Undertaking a qualitative assessment of flood risk to and arising from the proposed works accounting for information supplied and gathered; and
- Where necessary identifying measures to mitigate for flood risk to and arising from the proposed works.

1.3 Synopsis

The FCA is structured as follows:

- Section 2 describes the setting of the site in relation to local features significant for the assessment of flood risk and the options currently under assessment for managing flood risk;
- Section 3 outlines the planning policies relevant to the proposed works with respect to flood risk;
- Section 4 presents information on the flood risk to the proposed works;
- Section 5 assesses how flood risk may change in the surrounding area as a result of any interaction of the proposed works with local flood sources;
- Section 6 describes the measures proposed to mitigate unacceptable flood risks; and
- Section 7 summarises this FCA and outlines recommendations.

2. Proposed Overhead Line Works and Site Setting

This section provides details on the existing site relevant to the assessment of flood risk, and the details of the proposed works.

2.1 Proposed Overhead Line Works

The proposed works involve building new overhead lines connecting to the substation, replacing the present double circuit 'turn-in' off the existing 4ZB Connah's Quay to Pentir overhead line which will be removed.

The overhead line works and substation extension are required together for the new connections. A separate FCA has been produced to accompany the Town and Country Planning Act application for the permanent works associated with the substation extension.

Appendix A shows a stage-by-stage sequencing plan of the proposed works. The extent of the permanent areas relating to the works equates to approximately 63 square metres, with this relating only to stubs and foundations associated with the tower bases. This is therefore a reduction in impermeable areas over the existing scenario as the cable sealing end compound and associated access road will be removed as part of the works, returning approximately 1,000 square metres to pastoral grassland.

In terms of need, NGET has identified an extension to the existing Bodelwyddan 400 kilovolt substation as an appropriate response to connection requests made.

2.2 Site Setting

2.2.1 Site Location

The works are proposed 2 kilometres (km) west of St. Asaph, south of the existing Bodelwyddan substation and associated proposed extension centred at Ordnance Survey Grid Reference SJ017735. The site will be accessed from the existing substation access road off Glascoed Road (B5381) and from a gate to the northwest off Ffordd Rufeining (B5381). The proposed locations of the overhead line works and works boundary are shown in Figure 2-1.

The proposed overhead line pylons would be sited on land the southwest of the existing Bodelwyddan substation. The land is primarily used as farmland.

Bodelwyddan Overhead Line Works Flood Consequences Assessment

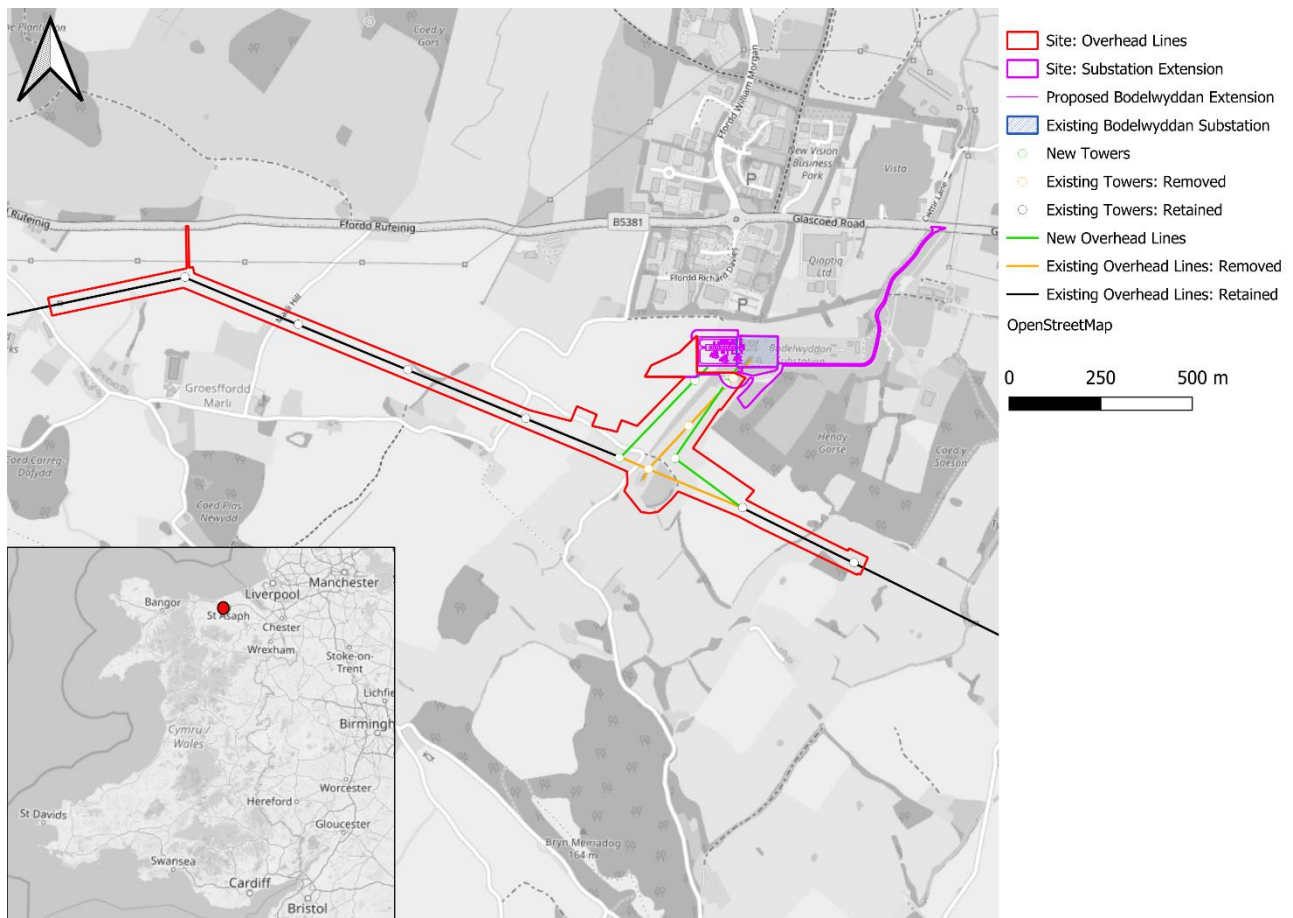


Figure 2-1. Site plan for the proposed works (Jacobs, 2025)

The site is bordered to the northeast by Bodelwyddan substation with the rest of the site being bordered by arable and wooded land.

The elevation of the site extends from 45 metres Above Ordnance Datum (metres above sea level) (mAOD) in the northeast to 105mAOD in the west as seen in the digital terrain model in Figure 2-2. The surrounding area is relatively flat with elevation slightly increasing in the southwest. The digital surface model in Figure 2-3 shows the surrounding buildings and wooded areas.

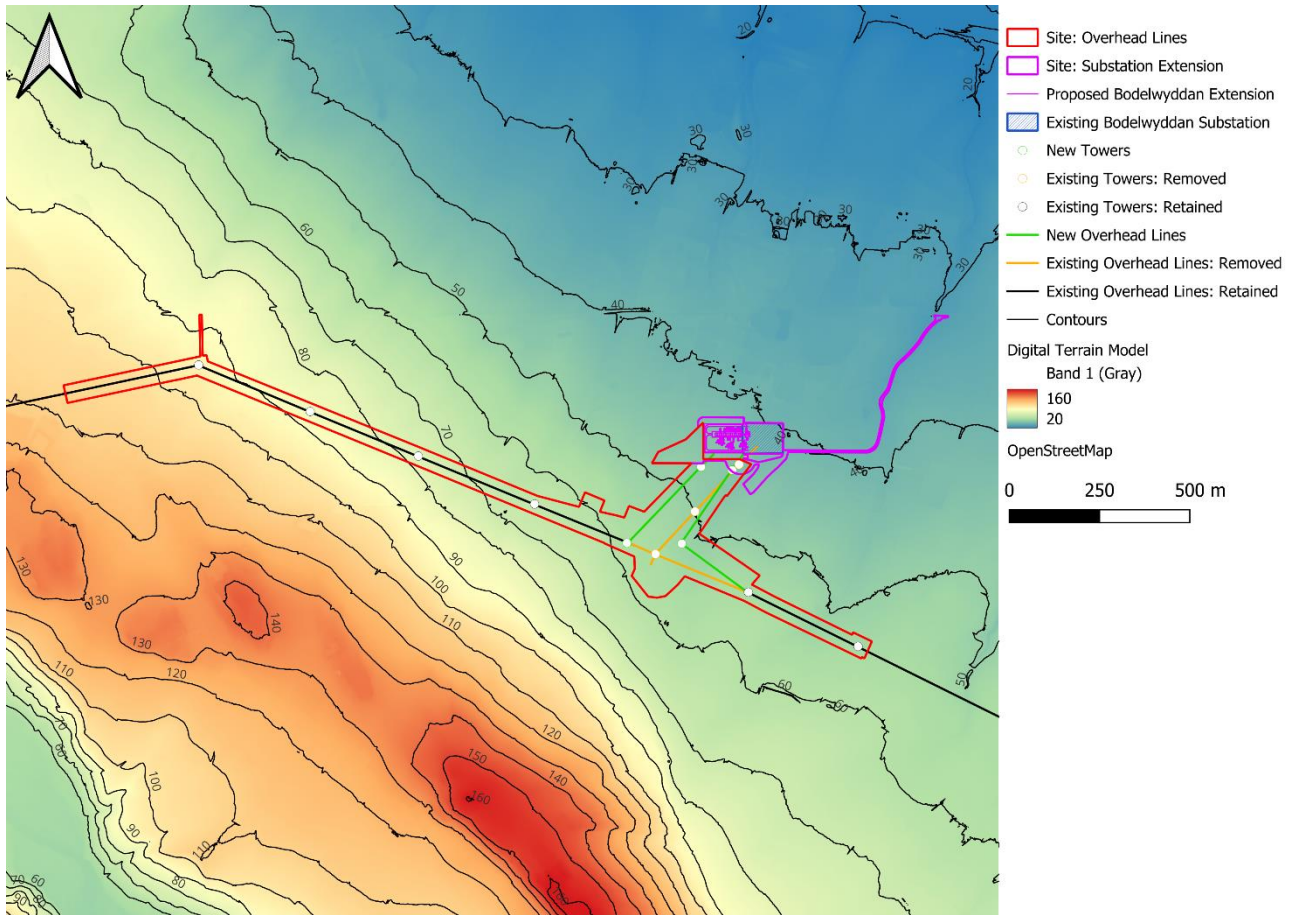


Figure 2-2. Digital Terrain Model of the site and surrounding area (Jacobs, 2025; Welsh Government, 2024a)

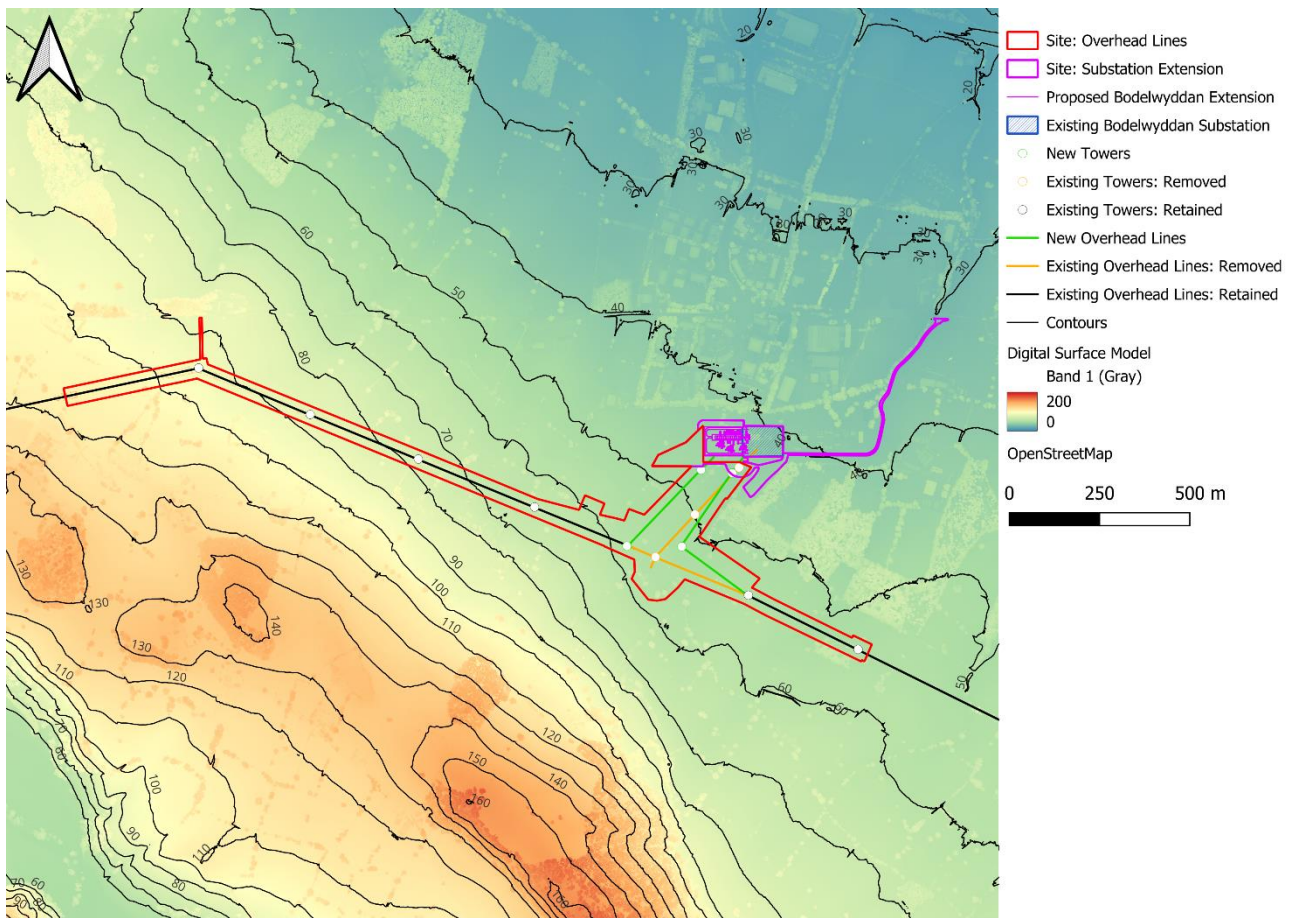


Figure 2-3. Digital Surface Model of the site and surrounding area (Jacobs, 2025; Welsh Government, 2024a)

2.2.2 Hydrology

The closest Main River to the proposed works is the River Elwy approximately 2.25km to the south and to the east as shown in Figure 2-4. Main Rivers in the surrounding are. There is a small ordinary watercourse to the northeast of the existing substation, approximately 400 metres (m) from the site, which conveys flows north towards the River Clwyd. This location sits in the Gele Operational Catchment area (Welsh Government, 2015).

Bodelwyddan Overhead Line Works Flood Consequences Assessment

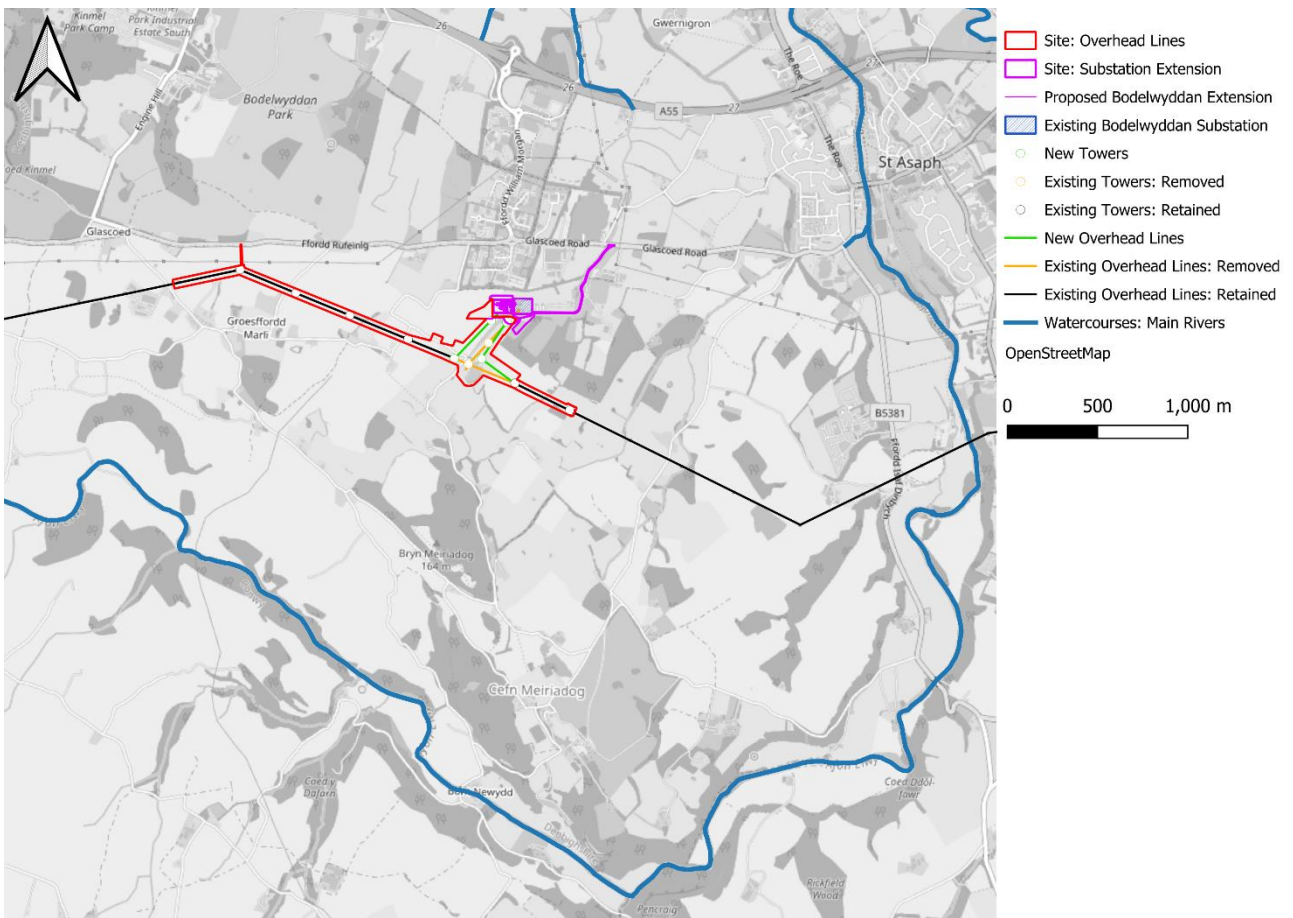


Figure 2-4. Main Rivers in the surrounding area (Jacobs, 2025; Welsh Government, 2022)

There is a small ditch along the border of the southern boundary of the existing Bodelwyddan substation as seen in Figure 2-5. This appears to subsequently drain north and ultimately converge with the River Clwyd and its tributaries.

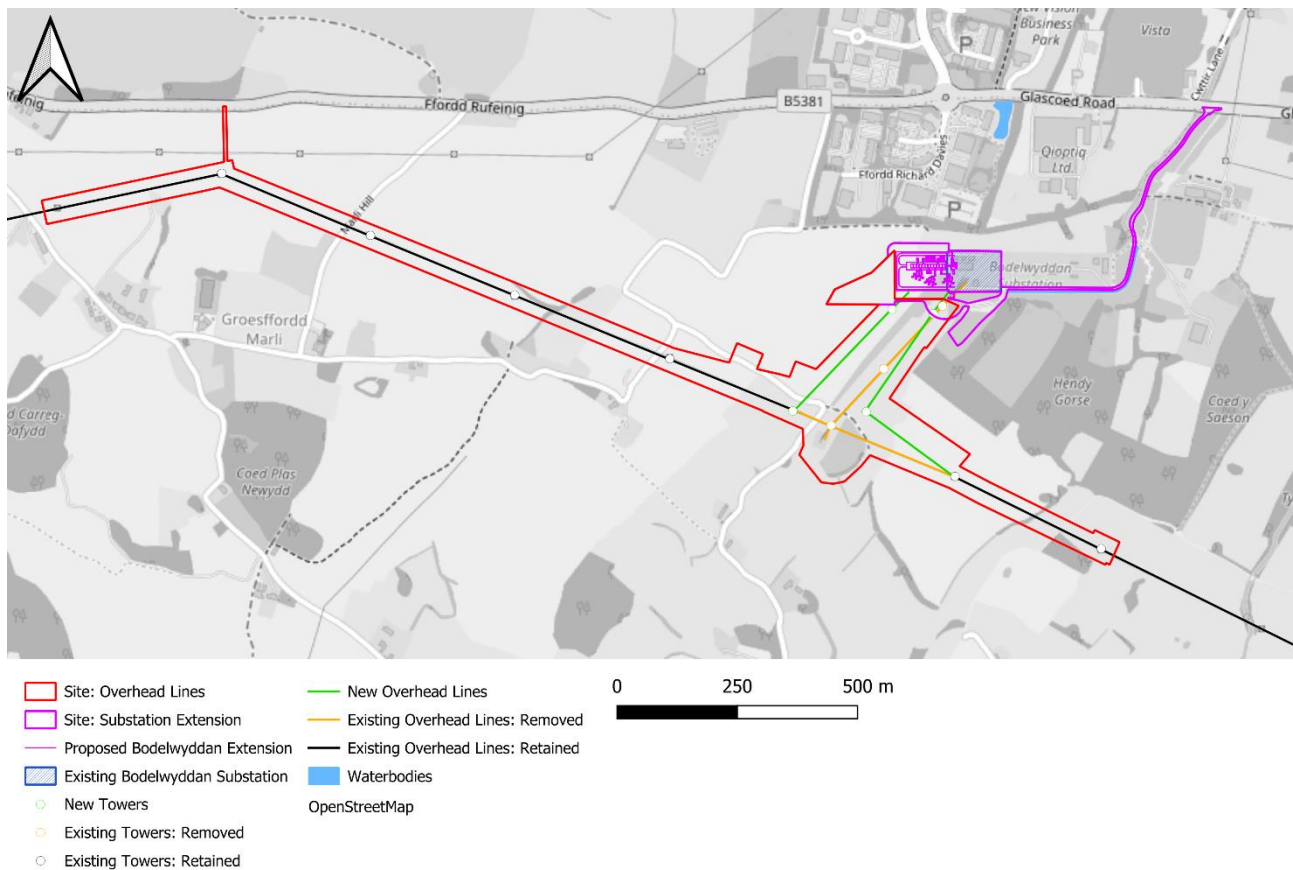


Figure 2-5. Local water bodies in proximity of the site (Jacobs, 2025; Welsh Government, 2021a)

2.2.3 Geology and hydrogeology

The GeolIndex geology map from British Geological Survey (2025a) shows that the surrounding area around Bodelwyddan substation lies on Warwickshire group bedrock which comprises of mudstone, siltstone and sandstone. The area also includes Till superficial deposits which derived from a glacial parent unit (British Geological Survey, 2025b).

According to Natural Resources Wales’s Source Protection Zones map (Welsh Government, 2024b), the site is not in a source protection zone. The groundwater vulnerability in this area is classed as low vulnerability (on a three-risk category scale: high, medium and low) over secondary aquifers (British Geological Survey, 2025a). This means that this area is categorised as having the highest protection to groundwater from pollution.

2.2.4 Existing Flood Defences

There are pre-existing flood defences in the St. Asaph area to the east of Bodelwyddan substation. These defences consist of embankments, walls and culverts that protect St. Asaph from the River Elwy (Welsh Government, 2025b) as seen in Figure 2-6. Despite these defences being relatively local, the site is not in the area that benefits from these defences.

Bodelwyddan Overhead Line Works Flood Consequences Assessment

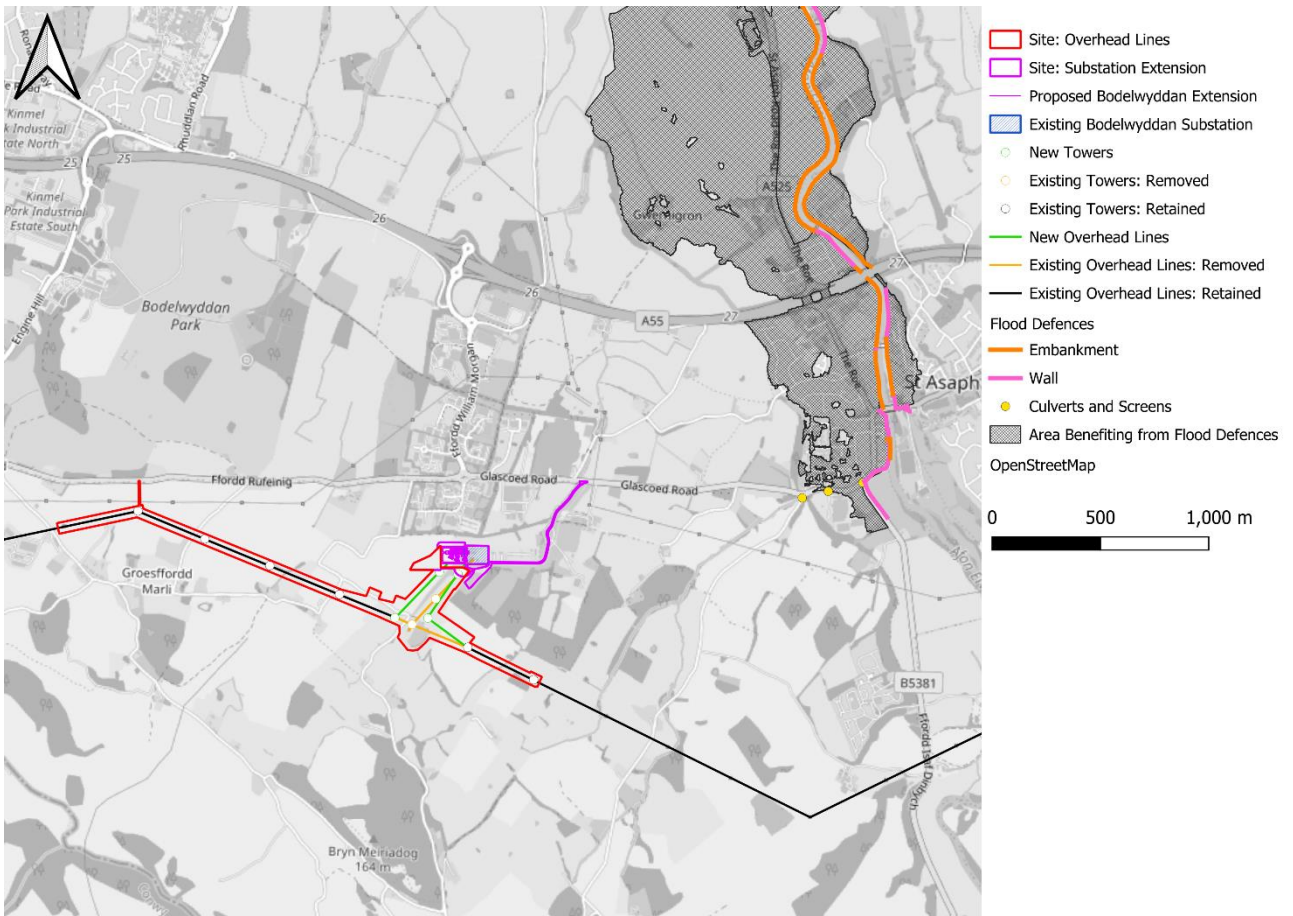


Figure 2-6. Local flood defences and the respective area that is protected (Jacobs, 2025; Welsh Government 2025b; Welsh Government 2025c)

3. National Planning Policy, Guidance and Standards

3.1 Planning Context

Planning Policy Wales sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes, Welsh Government Circulars, and policy clarification letters.

TAN-15 introduced by the Welsh Government in 2004, provides technical guidance relating to development planning and flood risk in Wales. The initial requirements of TAN-15 are to identify the vulnerability classification(s) and flood zones relevant to a proposed development, and to apply this information to the application of the justification tests.

An update for TAN-15 was released on 31st March 2025 and replaces the previous version with immediate effect. TAN-15 refers to Flood Zones from Natural Resources Wales’s Flood Map for Planning as opposed to the previous Development Advice Zones. Additionally, the flood zones include flood risk from rivers, the sea, surface water and ordinary watercourses and include an allowance for climate change based on the central allowance over 100 years.

3.2 Climate Change

Climate change in the UK is expected to increase the frequency and intensity of rainfall, increasing the risk of fluvial and surface water flooding. The Welsh Government provides a range of climate change allowances based on geographic location.

The programme anticipates delivery of the overhead line works in late 2028 or early 2029, which would allow the new connections into the substation (subject to the connecting projects securing all required consents) and accommodation of the additional load on the revised overhead lines arrangements following completion of the substation extension. The construction works are therefore unlikely to be affected by climate change.

The peak river flow and rainfall allowances relevant to the site provided by the Welsh Government (2021b) have been summarised in Table 3-1 and Table 3-2.

Table 3-1. Peak river flow allowances for the West Wales river basin district (using 1961 to 1990 baseline)

West Wales River Basin	Total potential change anticipated by the 2020s	Total potential change anticipated by the 2050s	Total potential change anticipated by the 2080s
Upper end estimate	25%	40%	75%
Central factor or central estimate	15%	25%	30%
Lower end estimate	5%	10%	15%

Table 3-2. Change to extreme rainfall intensity that applies across Wales (compared to a 1961-1990 baseline)

Applies across all of Wales	Total potential change anticipated for 2020s (2015-2039)	Total potential change anticipated for 2050s (2040-2069)	Total potential change anticipated for 2080s (2070 to 2115)
Upper estimate	10%	20%	40%
Central estimate	5%	10%	20%

The Welsh Government also provides estimated mean sea level rise by 2100 and 2120; however, the works are not close enough to the coast for this to impact the site. Additionally, there are no main rivers or ordinary watercourses that will impact the permanent works.

3.3 Vulnerability Classifications

TAN-15 assigns one of three flood risk vulnerability classifications to a development as shown in Table 3-3. The proposed works are considered to be highly vulnerable as an ‘especially vulnerable industrial development’. This means that the proposed works must be flood free in the 1%+Climate Change for rivers and 0.5%+Climate Change for sea. Additionally, the tolerable flood depth and velocity conditions when assessed against the 0.1% event should not exceed 600 millimetres in depth and 0.15 metres per second in velocity.

Table 3-3. TAN-15 development vulnerability classifications (Welsh Government, 2025a)

Development Category	Types
Highly vulnerable development	All residential premises, schools and childcare establishments, colleges and universities, hospitals and GP surgeries, especially vulnerable industrial development, emergency services, buildings used to provide emergency shelter in time of flood.
Less vulnerable development	General industrial, employment, commercial and retail development, transport and utilities infrastructure, car parks, mineral extraction sites and associated processing facilities, public buildings, places of worship, cemeteries, equipped play areas, renewable area generation facilities.
Water compatible development	Boatyards, marinas, development associated with canals, flood defences and management infrastructure, open spaces, hydro renewable energy generation.

3.4 Local Planning Policy

The Denbighshire Local Development Plan (LDP) 2018-2033 is currently in its Draft Preferred Strategy stage. The previous LDP expired in 2021. The Draft Preferred Strategy outlines the aims for the LDP until 2033 which includes ensuring that ‘new development is directed away from flood risk areas and that the longer term implications of climate change are considered’ (Denbighshire County Council, 2019).

3.5 Consultations

The following flood RMAs were contacted for information relevant to flooding in the area:

- Natural Resources Wales;
- Denbighshire County Council; and,
- DCWW.

Discussions were undertaken with Denbighshire County Council in relation to the proposed surface water drainage arrangements to inform the SuDS Drainage Approval Body (SAB) approval (where SuDS refers to sustainable drainage system). Given that the construction works associated with the reconfiguration are less than 100 square metres, SAB approval is not required for the overhead line works.

No responses on data requests have been received to date from Natural Resources Wales or DCWW.

3.6 National Grid Development Standards

NGET requires that there is no flooding on site for the 3.33% Annual Exceedance Probability (AEP) storm event (National Grid, 2016). It also requires no flooding to operational areas of the site for the 1% AEP storm event. Furthermore, NGET requires that the level of standing water on the site does not affect critical equipment during an extreme 0.1% (1 in 1000) AEP rainfall event.

Additionally, Section 4 of Technical Specification 2.01 Substations (National Grid, 2021) states that:

“Substation primary equipment shall have an anticipated asset life of not less than 40 years unless an alternative value is agreed with National Grid prior to installation & commissioning”.

The minimum design life of 40 years for the substation assets takes it into the 2070s epoch. Therefore, the appropriate allowance for accounting for the effects of climate change over the design life is a peak rainfall allowance of 40%.

4. Flood Risk to the Overhead Line Works

4.1 Tidal Flood Risk

Tidal flooding is flooding that arises from normal or adverse tidal conditions. Tidal flooding is limited to coastal areas and low-lying land in open connection to the coast. The proposed works are approximately 7.5km inland, 2.3km from the nearest tidal flood risk area (Welsh Government, 2025d) and between 45 to 105mAOD which further reduces risk. There is no area of tidal risk defined in the vicinity of the site, as shown in Figure 4-1. Natural Resources Wales Flood Zones 2 and 3 for tidal flood risk (Jacobs, 2025; Welsh Government, 2025d)

Due to the distance from the coast and nearest tidal flood risk area, the risk to the proposed works is negligible and no mitigation measures are necessary.

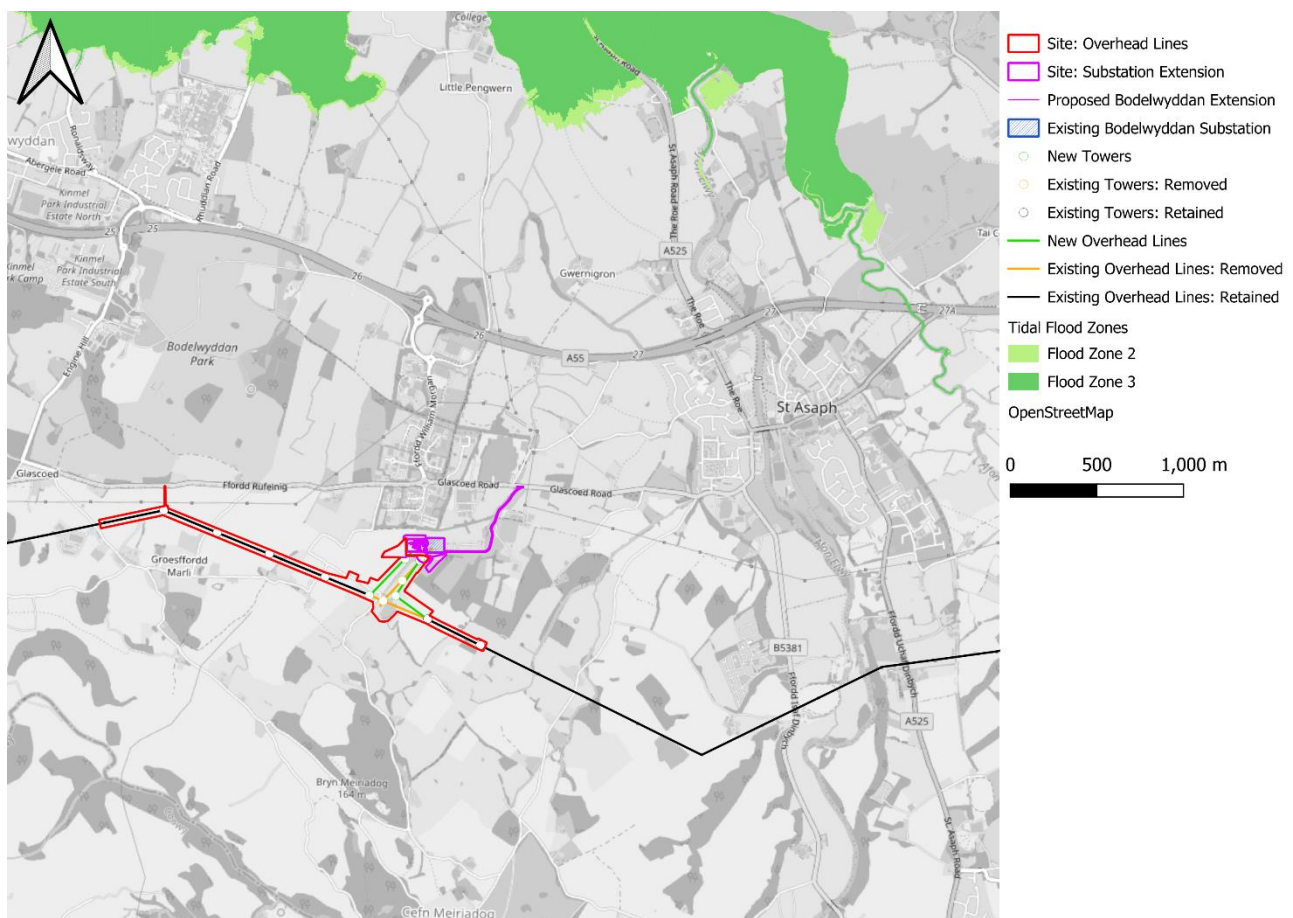


Figure 4-1. Natural Resources Wales Flood Zones 2 and 3 for tidal flood risk (Jacobs, 2025; Welsh Government, 2025d)

4.2 Fluvial Flood Risk

Natural Resources Wales’s (2025) Flood Map for Planning shows that the site is not in a fluvial flood risk zone. The nearest area of fluvial flood risk is approximately 0.9km south of the west arm as shown in Figure 4-2. To the east, the closest area of fluvial flood risk is approximately 1.5km northeast from the east arm. Additionally, the proposed works do not cross or interact with any mapped ordinary watercourses.

Consequently, the risk to the proposed works is negligible and no mitigation measures are necessary.

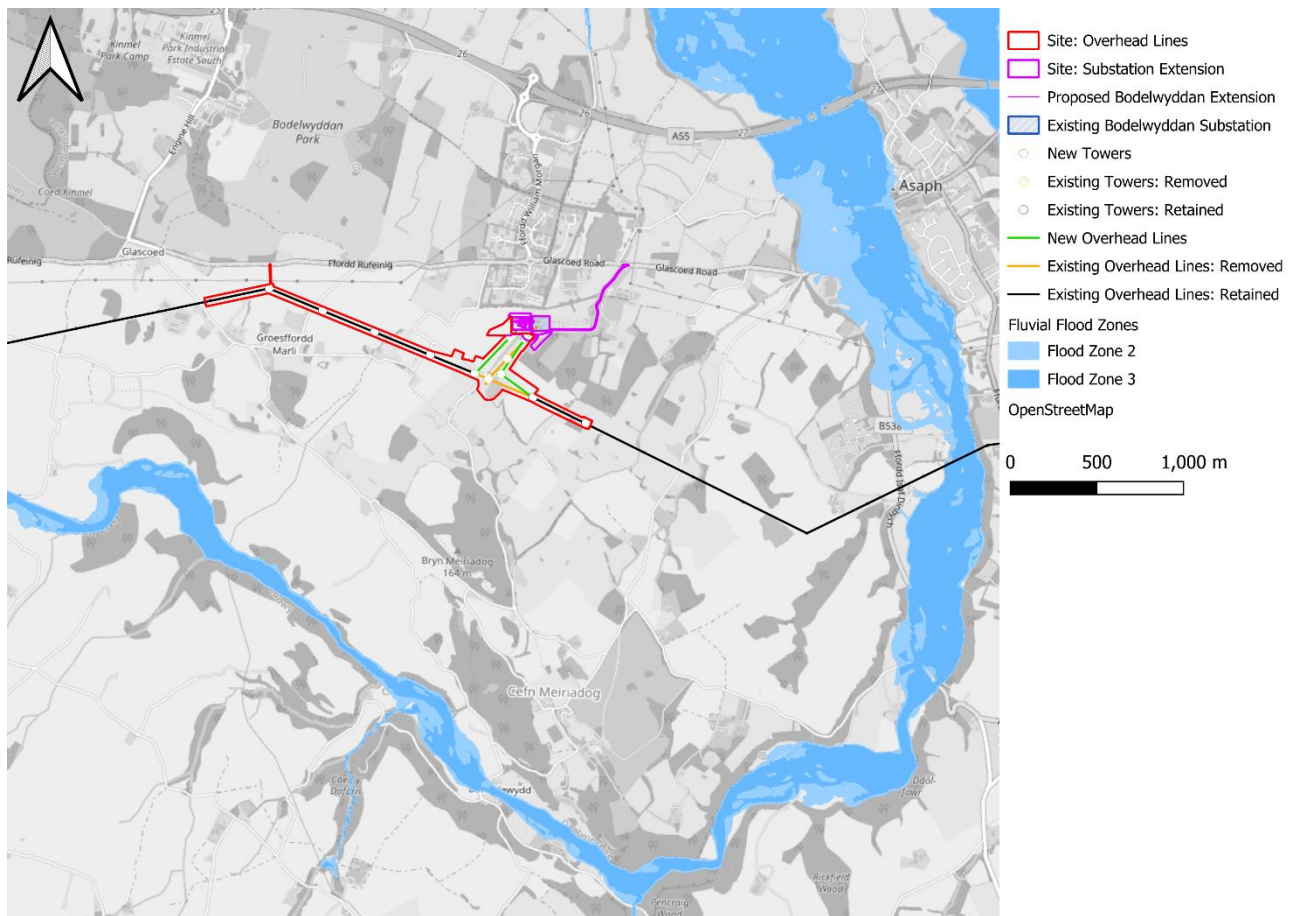


Figure 4-2. Natural Resources Wales Flood Zones 2 and 3 for fluvial flood risk (Jacobs, 2025; Welsh Government, 2025d)

4.3 Surface Water Flood Risk

Surface water flooding is flooding from runoff that has not reached a river, a drainage system or infiltrated to ground. Surface water flood risk can be defined using Natural Resources Wales’s (2025a) Surface Water and Small Watercourses mapping, an extract of which is provided as Figure 4-3. It is worth noting that the mapping does not take into consideration existing below ground drainage networks and therefore the mapping is conservative.

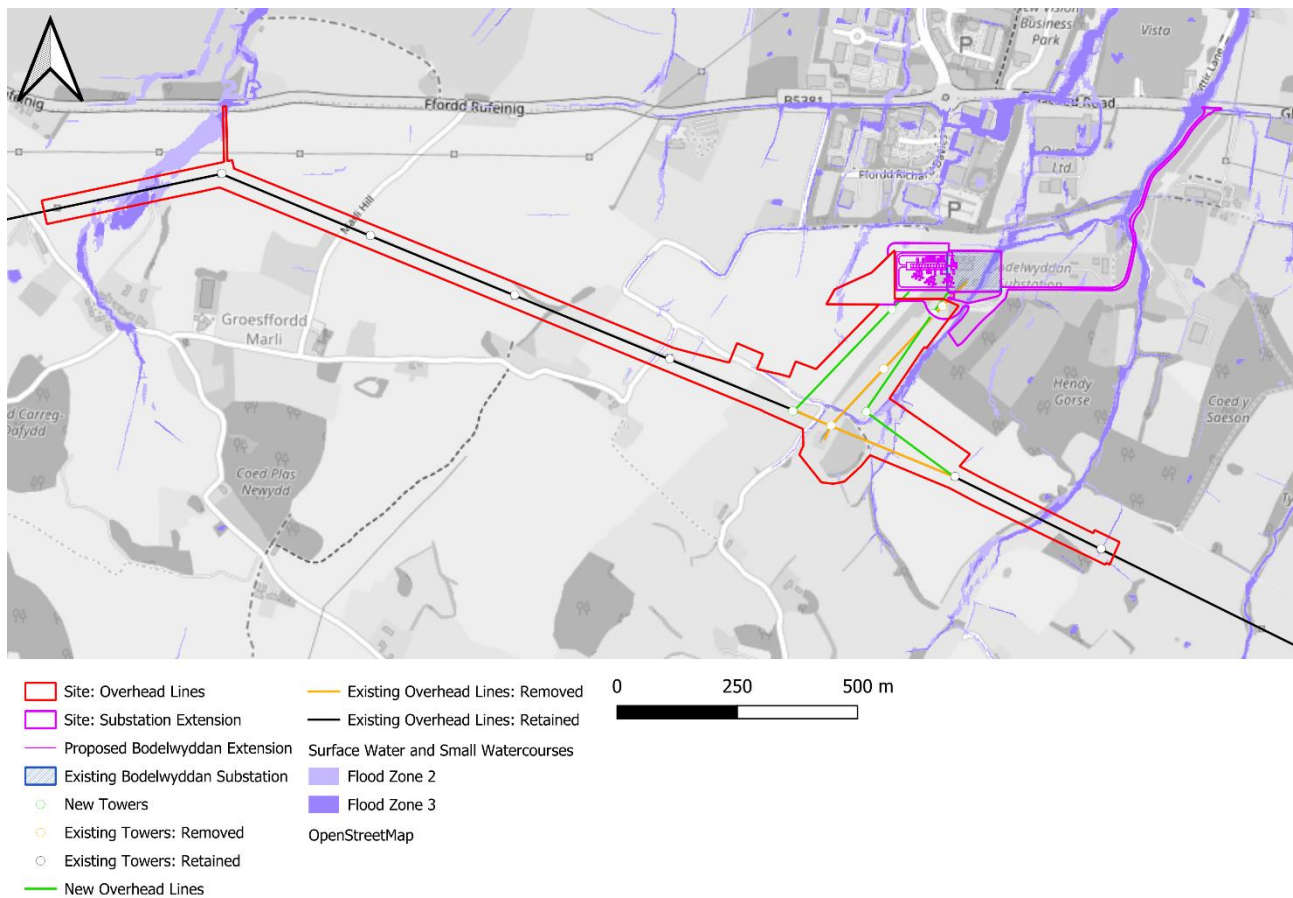


Figure 4-3. Natural Resources Wales Flood Zones 2 and 3 for surface water and small watercourses flood risk (Jacobs, 2025; Welsh Government, 2025d)

The mapping indicates that there are no permanent assets are in surface water and small water courses flood risk extents; however, there are flood extents shown beneath the overhead lines and shown to intersect the working area. It is worth noting that the construction works will be temporary, and no permanent assets are shown to be in surface water flood risk extents.

The risk of flooding from surface water and small water courses to the permanent works is therefore low with a medium risk associated with construction works.

The construction management plan will ensure that this existing surface water flow path is not impeded.

4.4 Groundwater Flood Risk

Groundwater flooding is caused by unusually high groundwater levels. It occurs as excess water emerges at the ground surface or in manmade structures such as basements. Groundwater flooding tends to be more persistent than surface water flooding, in some cases lasting for weeks or months, and can result in damage to property. The risk of groundwater flooding depends on the nature of the geological strata underlying the site and the local topography. The bedrock geology is shown to be Warwickshire Group, which is predominantly mudstone, siltstone and sandstone. Sandstone is permeable whereas siltstone and mudstone are less permeable.

Both the Local Flood Risk Management Strategy (Denbighshire County Council, 2014) and Preliminary Flood Risk Assessment for Denbighshire County Council (2009) do not have any recorded histories of groundwater flooding or information that provides evidence of future groundwater flood risk throughout the county.

Consequently, with the information available, the risk to the proposed works is low and mitigation measures are not necessary.

4.5 Flood Risk from Sewers and Artificial Drainage Systems

Flooding from surface water sewers most commonly occurs when the flow entering the sewer exceeds the capacity of the receiving system. Other causes include blocked drains and the inability of sewers to discharge into receiving watercourses. This results in flooding from manholes and drains.

There are no known incidences of flooding from this source in the vicinity of the site or known public sewers crossing the site (JBA Consulting, 2018). Given the current available information there is a low risk of sewers and artificial drainage systems posing a flood risk to the proposed works and no mitigation measures are necessary.

4.6 Flood Risk from Reservoirs

The probability of reservoir failure in the UK is extremely low, however, it can be a particularly dangerous form of flooding as it results in the sudden release of large volumes of water that can travel at high velocity. This can result in deep and widespread flooding, potentially resulting in loss of life and significant damage. The likelihood of a reservoir failure is very low.

The Natural Resources Wales's (2025b) Flood Risk from Reservoirs map determines that the site is not at risk from reservoir flooding. Consequently, the risk to the proposed works is negligible, and no mitigation measures are necessary.

4.7 Flood Risk from Canals

Canals and artificial waterways rarely flood as the water levels are generally managed all year round. However, large rainfall events, a lack of maintenance or overtopping from nearby rivers can cause flooding of canals and artificial waterways.

The nearest canal to the site is Chester Canal, approximately 40km to the southeast. Consequently, the risk to the proposed works is negligible and no mitigation measures are necessary.

5. Flood Risk from the Proposed Works

5.1 Impact on Tidal Flood Risk

Section 4.1 established that the site was approximately 7.5km inland and 2.3km from areas of tidal flood risk and so not at risk from flooding from the sea. Consequently, there is a negligible risk of the proposed works impacting tidal flood risk and no mitigation measures are necessary.

5.2 Impact on Fluvial Flood Risk

Section 4.2 established that the site is 1.2km away from Flood Zones 2 and 3 according to Natural Resources Wales's (2025a) Flood Map for Planning. The proposed works will not therefore displace flood waters. For this reason, the proposed works present a negligible risk of exacerbating fluvial flood risk and no mitigation measures are necessary.

5.3 Impact on Surface water Flood Risk

Section 4.3 determined that there are surface water flood extents shown in the vicinity of the site and that the temporary construction works could impact these flows.

The construction management plan will ensure that this existing surface water flow path is not impeded.

Following the works there will be a reduction in impermeable area resulting in a betterment to the land drainage regime, most notably a reduction in runoff rates as a result of returning approximately 1,000 square metres to pastoral grassland.

5.4 Impact on Groundwater Flood Risk

Section 4.4 established that there are no historic or recorded instances of groundwater flooding in the area. As a result, the risk of the proposed works exacerbating this type of flooding is negligible and no mitigation measures are necessary.

5.5 Impact on Flood Risk from Sewers and Artificial Drainage

As identified in Section 4.5, there is no historic evidence of this type of flooding in the vicinity of the site.

The risk of the proposed works exacerbating flood risk to third parties associated with sewers and artificial drainage is therefore negligible for which mitigation measures are not required.

5.6 Impact on Flood Risk from Reservoirs

As established in Section 4.6, there is no risk of reservoir flooding in the vicinity of the site. Consequently, the risk of the proposed works exacerbating this source of flooding to third parties is negligible, and mitigation measures are not required.

5.7 Impact on Flood Risk from Canals

As established in Section 4.7, there is no risk of canal flooding to the site. The proposed works does not involve any construction which could compromise the structural integrity of any local canals.

Therefore, the risk of the proposed works exacerbating flood risk from canals to third parties is negligible, and mitigation measures are not required

6. Flood Mitigation Measures and Residual Risk

6.1 Summary of Flood Risk

Sections 4 and 5 have discussed flood risk to and from the proposed works. Table 6-1 summarises these risks.

Table 6-1: Summary of flood risk to and from the proposed works

Flood Type	To the proposed works	From the proposed works	Mitigation needed
Tidal	Negligible	Negligible	No
Fluvial	Negligible	Negligible	No
Surface water	Medium during construction phase	Medium during construction phase	Yes
Groundwater	Low	Low	No
Sewers and artificial drainage systems	Negligible	Negligible	No
Reservoirs	Negligible	Negligible	No
Canals	Negligible	Negligible	No

6.2 Residual Risks

No permanent assets are proposed in any areas of flood risk, but there are areas of surface water flooding and small watercourses shown to be beneath the overhead lines and in the temporary construction works. Therefore, there is a limited potential for temporary effects on the land drainage regime during construction.

During construction, mitigation is to be provided by a competent contractor to be appointed by NGET in the associated construction management plan to keep an increase in risks to a minimum. Land used temporarily during construction will be reinstated to its pre-construction condition and use.

7. Conclusion and Recommendation

NGET have commissioned Jacobs to prepare an FCA to accompany two applications to the Secretary of State for Energy Security and Net Zero for consent to build and operate two overhead lines which will connect to the Bodelwyddan substation to the southwest of St. Asaph.

This FCA has reviewed a range of sources of flood risk. It has considered risk to the site, as well as the risk arising to third parties as a consequence of the proposed works interacting with local flood sources.

The proposed works were found to be at negligible risk from tidal, fluvial, sewers, reservoirs and canals. The proposed works were found to be at low risk from groundwater flooding and flooding from surface water and small watercourses.

The construction phase of the proposed works lie partially in surface water flood extents. The impact on flood risk due to the works will inherently be temporary for the duration of the works period. Mitigation is to be provided by a competent contractor to be appointed by NGET in the associated construction management plan.

Following the works, there is a reduction in impermeable area providing an automatic betterment to the land drainage regime.

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8.1 Figure Information

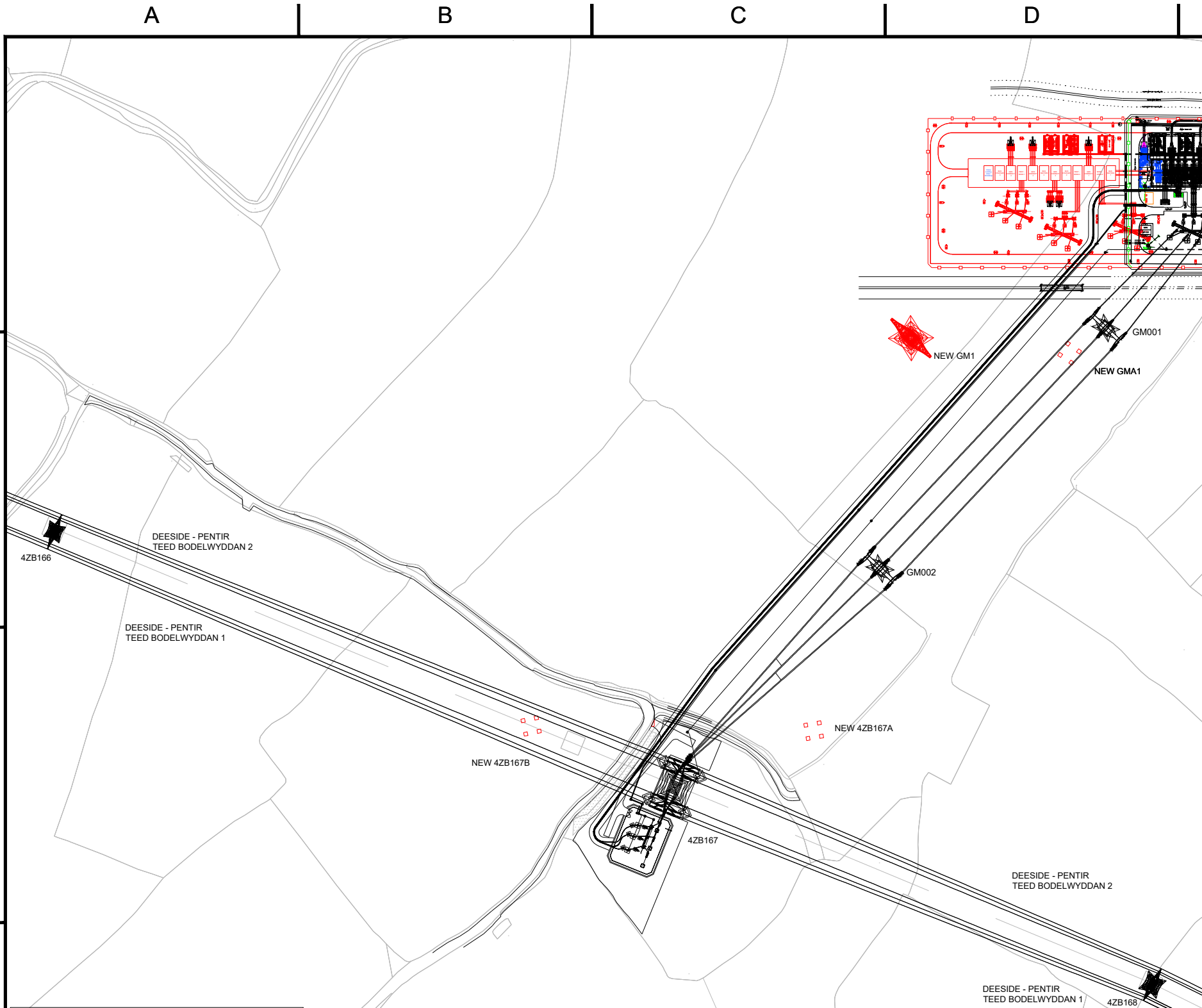
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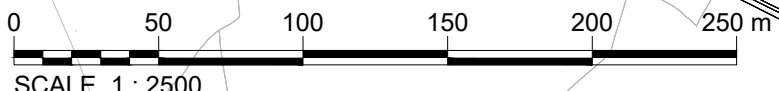
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Appendix A. Proposed Overhead Lines Works Stage-by-Stage



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Issue	P04	NG Contract No. 32281	Issue	P05	NG Contract No. 32281	Issue	P06	NG Contract No. 32281			
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Checked	CT		Checked	CT		Checked	MCC				
Approved	CT	Date	07/05/24	Approved	CT	Date	30/05/24	Approved	CT	Date	10/04/25

NOTES

1. This is a 4.2/4.3 drawing and is for development purposes only
2. All dimensions are in millimetres unless otherwise stated.

SEQUENCE OF WORK

- Stage 1. Pre-outage (assumes 2026 works for April 2027 completion)
1. Access and accommodation works at each work area.
 2. Installation of foundations at GM1, GMA1, 4ZB167A* and 4ZB167B* (*towers with potential proximity issue due to foundation construction beneath or adjacent to live conductors and therefore may require an outage to complete this work)
 3. Construction of tower GM1

LEGEND

- Energised Equipment
- New Equipment
- Equipment Removed
- OHL Tower Foundations

REFERENCE DRAWINGS

PDD-32281-SBS-002	STAGE 2
PDD-32281-SBS-003	STAGE 3
PDD-32281-SBS-004	STAGE 4
PDD-32281-SBS-005	STAGE 5
PDD-32281-SBS-006	STAGE 6

P03	NOTE AMENDMENTS	RW	AS	CT	19/05/23
P04	UPDATED SUBSTATION LAYOUT	RW	CT	CT	09/05/24
P05	DESIGN REVIEW COMMENTS ADDRESSED	RW	CT	CT	30/05/24
P06	MINOR ANNOTATION AMENDMENT	DC	MCC	CT	10/04/25
Rev	Description	Cre'd	Chk'd	App'd	Date

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Master Scheme No: 32281 Sub-Scheme No: B31000G6 Site: BODELWYDDAN 400KV SUBSTATION

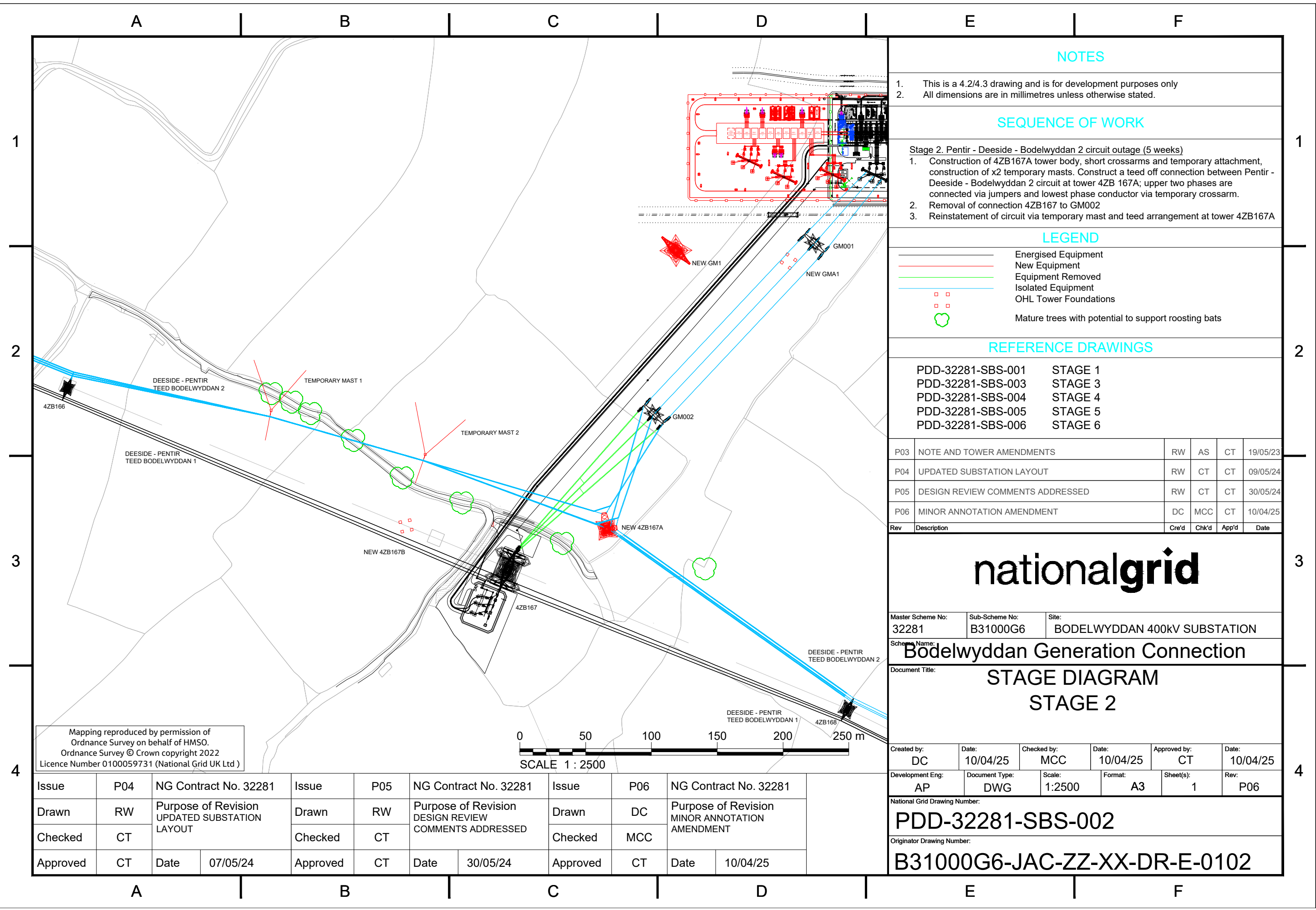
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STAGE 1**

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Development Eng:	Document Type:	Scale:	Format:	Sheet(s):	Rev:
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National Grid Drawing Number:
PDD-32281-SBS-001

Originator Drawing Number:
B31000G6-JAC-ZZ-XX-DR-E-0101



NOTES

1. This is a 4.2/4.3 drawing and is for development purposes only
2. All dimensions are in millimetres unless otherwise stated.

SEQUENCE OF WORK

- Stage 2. Pentir - Deeside - Bodelwyddan 2 circuit outage (5 weeks)
1. Construction of 4ZB167A tower body, short crossarms and temporary attachment, construction of x2 temporary masts. Construct a teed off connection between Pentir - Deeside - Bodelwyddan 2 circuit at tower 4ZB 167A; upper two phases are connected via jumpers and lowest phase conductor via temporary crossarm.
 2. Removal of connection 4ZB167 to GM002
 3. Reinstatement of circuit via temporary mast and teed arrangement at tower 4ZB167A

LEGEND

- Energised Equipment
- New Equipment
- Equipment Removed
- Isolated Equipment
- OHL Tower Foundations
- Mature trees with potential to support roosting bats

REFERENCE DRAWINGS

PDD-32281-SBS-001	STAGE 1
PDD-32281-SBS-003	STAGE 3
PDD-32281-SBS-004	STAGE 4
PDD-32281-SBS-005	STAGE 5
PDD-32281-SBS-006	STAGE 6

Rev	Description	Cre'd	Chk'd	App'd	Date
P03	NOTE AND TOWER AMENDMENTS	RW	AS	CT	19/05/23
P04	UPDATED SUBSTATION LAYOUT	RW	CT	CT	09/05/24
P05	DESIGN REVIEW COMMENTS ADDRESSED	RW	CT	CT	30/05/24
P06	MINOR ANNOTATION AMENDMENT	DC	MCC	CT	10/04/25

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Master Scheme No: 32281 Sub-Scheme No: B31000G6 Site: BODELWYDDAN 400KV SUBSTATION

Scheme Name: **Bodelwyddan Generation Connection**

Document Title: **STAGE DIAGRAM
STAGE 2**

Created by: DC	Date: 10/04/25	Checked by: MCC	Date: 10/04/25	Approved by: CT	Date: 10/04/25
Development Eng: AP	Document Type: DWG	Scale: 1:2500	Format: A3	Sheet(s): 1	Rev: P06

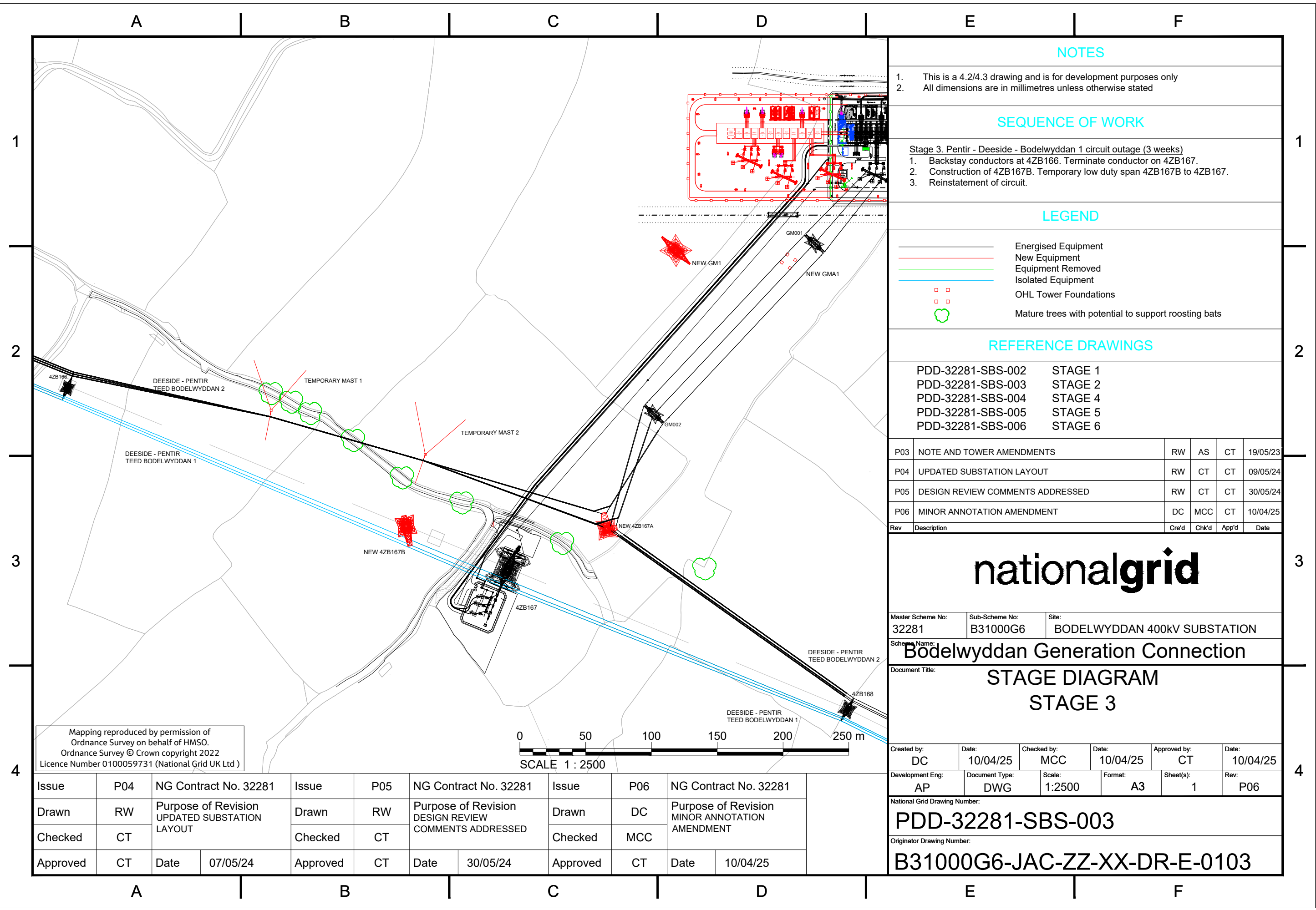
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Approved	CT	Date	07/05/24	Approved	CT	Date	30/05/24	Approved	CT	Date	10/04/25



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Issue	P04	NG Contract No. 32281	Issue	P05	NG Contract No. 32281	Issue	P06	NG Contract No. 32281			
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Approved	CT	Date	07/05/24	Approved	CT	Date	30/05/24	Approved	CT	Date	10/04/25

NOTES

1. This is a 4.2/4.3 drawing and is for development purposes only
2. All dimensions are in millimetres unless otherwise stated

SEQUENCE OF WORK

- Stage 3. Pentir - Deeside - Bodelwyddan 1 circuit outage (3 weeks)
1. Backstay conductors at 4ZB166. Terminate conductor on 4ZB167.
 2. Construction of 4ZB167B. Temporary low duty span 4ZB167B to 4ZB167.
 3. Reinstatement of circuit.

LEGEND

- Energised Equipment
- New Equipment
- Equipment Removed
- Isolated Equipment
- OHL Tower Foundations
- Mature trees with potential to support roosting bats

REFERENCE DRAWINGS

PDD-32281-SBS-002	STAGE 1
PDD-32281-SBS-003	STAGE 2
PDD-32281-SBS-004	STAGE 4
PDD-32281-SBS-005	STAGE 5
PDD-32281-SBS-006	STAGE 6

P03	NOTE AND TOWER AMENDMENTS	RW	AS	CT	19/05/23
P04	UPDATED SUBSTATION LAYOUT	RW	CT	CT	09/05/24
P05	DESIGN REVIEW COMMENTS ADDRESSED	RW	CT	CT	30/05/24
P06	MINOR ANNOTATION AMENDMENT	DC	MCC	CT	10/04/25
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Master Scheme No: 32281 Sub-Scheme No: B31000G6 Site: BODELWYDDAN 400KV SUBSTATION

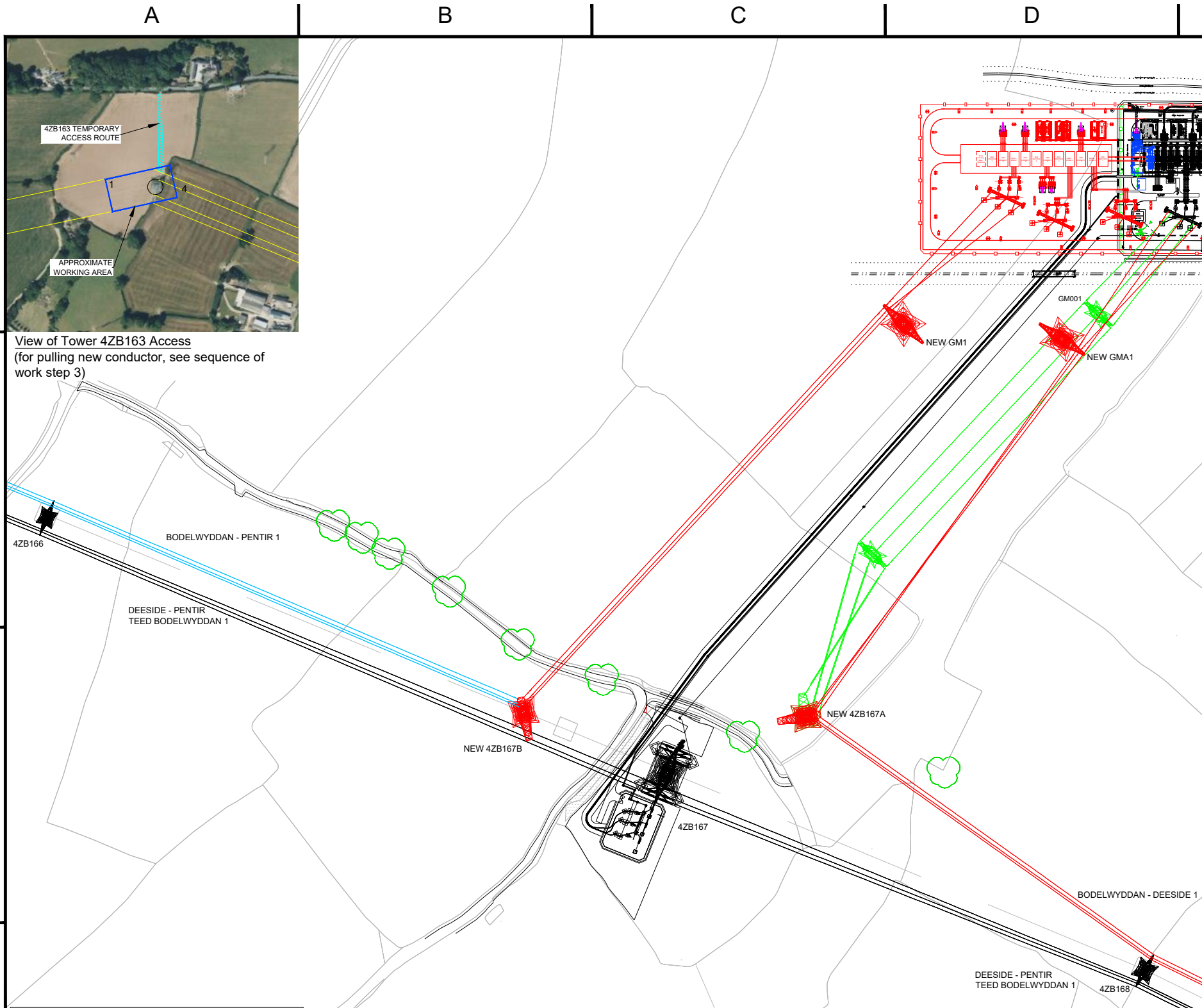
Scheme Name: **Bodelwyddan Generation Connection**

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NOTES

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SEQUENCE OF WORK

- Stage 4. Pentir - Deeside - Bodelwyddan 2 circuit outage (6 weeks subject to confirmation of remote end works)
1. Dismantle GM001, GM002 and spans
 2. Construction of GMA1 (Possibly including foundations if not possible in stage 1, therefore 28-day concrete curing period may be necessary) and span 4ZB168 - 4ZB167A - GMA1 plus downloads.
 3. Removal of temporary mast, construction of span 4ZB163-GM1 plus downloads for circuit 1.
 4. Remote end protection changes. 4ZB167-255 (88 towers) change circuit identification plates and flag brackets. Commission new Bodelwyddan - Deeside 1 and new Bodelwyddan - Pentir 1 circuit.

LEGEND

- Energised Equipment
- New Equipment
- Equipment Removed
- Isolated Equipment
- ⊕ Mature trees with potential to support roosting bats

REFERENCE DRAWINGS

PDD-32281-SBS-002	STAGE 1
PDD-32281-SBS-003	STAGE 2
PDD-32281-SBS-004	STAGE 3
PDD-32281-SBS-005	STAGE 5
PDD-32281-SBS-006	STAGE 6

P03	NOTE AMENDMENTS	RW	AS	CT	19/05/23
P04	UPDATED SUBSTATION LAYOUT	RW	CT	CT	09/05/24
P05	DESIGN REVIEW COMMENTS ADDRESSED	RW	CT	CT	30/05/24
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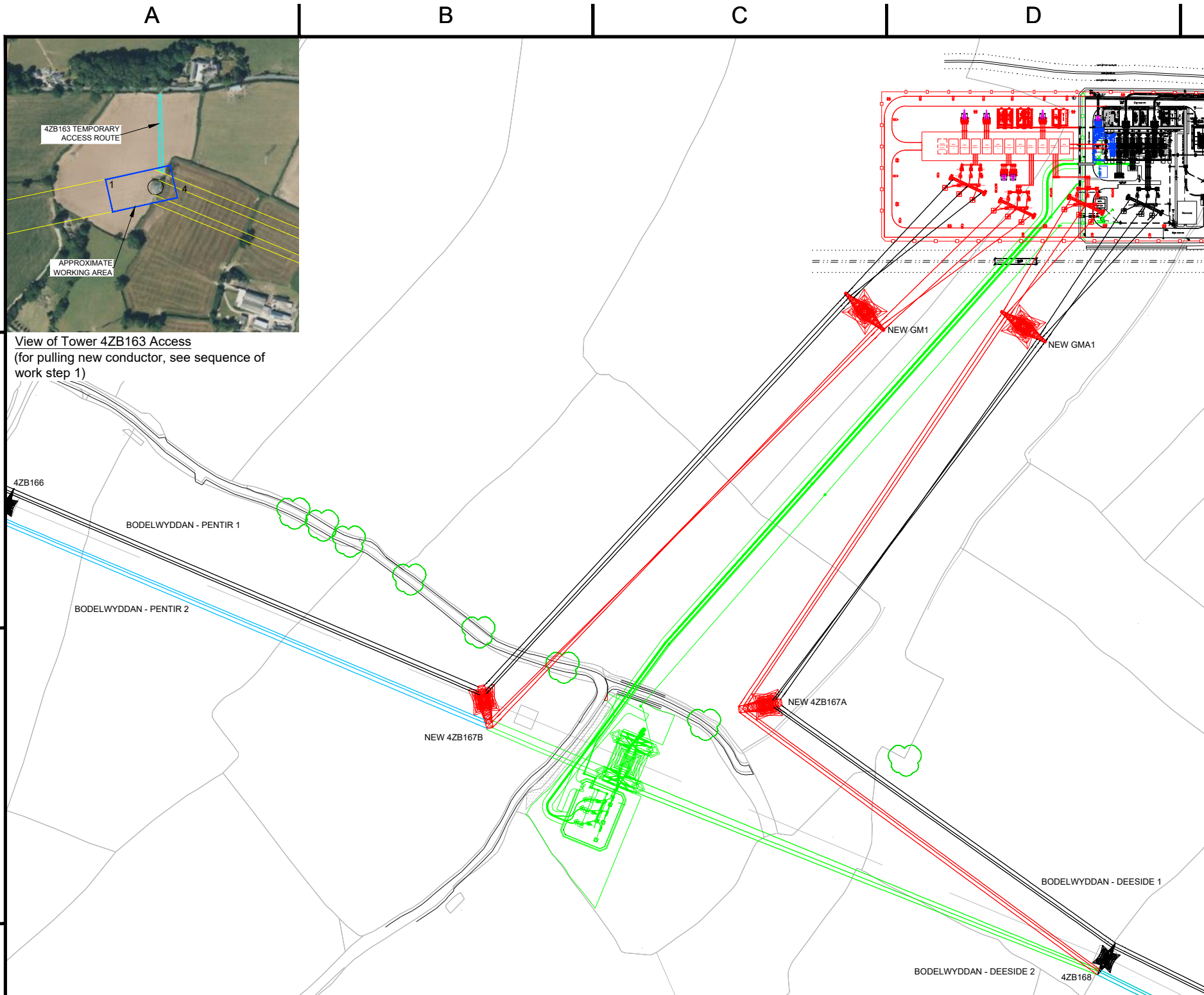
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Master Scheme No: 32281 Sub-Scheme No: B31000G6 Site: BODELWYDDAN 400KV SUBSTATION
 Scheme Name: Bodelwyddan Generation Connection

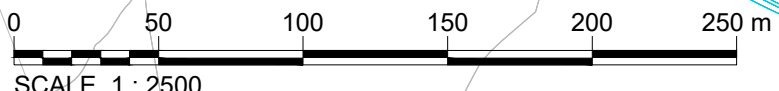
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Approved	CT	Date	07/05/24	Approved	CT	Date	30/05/24	Approved	CT	Date	10/04/25

NOTES

1. This is a 4.2/4.3 drawing and is for development purposes only
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SEQUENCE OF WORK

- Stage 5. Pentir - Deeside - Bodelwyddan 1 circuit outage (4 weeks subject to confirmation of remote end works)
1. Construction of span 4ZB163-GM1 and downloads for circuit 2.
 2. Add crossarms to tower 4ZB167A, construct spans 4ZB168-4ZB167A-GMA1 and downloads
 3. Removal of towers 4ZB167, CSE compound cable and conductors between 4ZB167B and 4ZB168.
 4. Remote end protection changes. 4ZB167-255 (88 towers) change circuit identification plates and flag brackets. Commission new Bodelwyddan - Deeside 2 and new Bodelwyddan - Pentir 2 circuit

LEGEND

- Energised Equipment
- New Equipment
- Equipment Removed
- Isolated Equipment
- Mature trees with potential to support roosting bats

REFERENCE DRAWINGS

PDD-32281-SBS-002	STAGE 1
PDD-32281-SBS-003	STAGE 2
PDD-32281-SBS-004	STAGE 3
PDD-32281-SBS-005	STAGE 4
PDD-32281-SBS-006	STAGE 6

P03	NOTE AMENDMENTS	RW	AS	CT	19/05/23
P04	UPDATED SUBSTATION LAYOUT	RW	CT	CT	09/05/24
P05	DESIGN REVIEW COMMENTS ADDRESSED	RW	CT	CT	30/05/24
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Rev	Description	Cre'd	Chk'd	App'd	Date

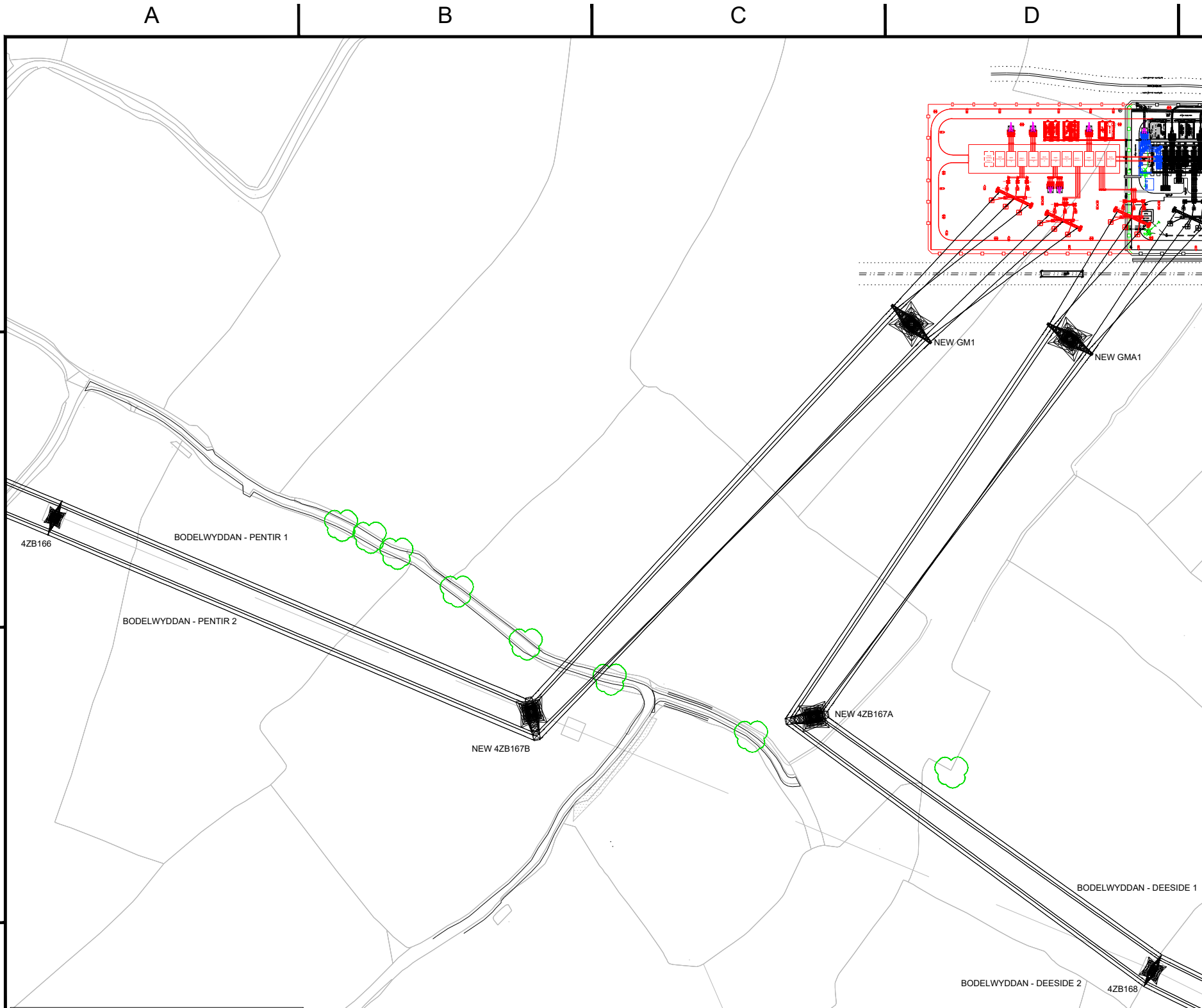
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Master Scheme No: 32281 Sub-Scheme No: B31000G6 Site: BODELWYDDAN 400kV SUBSTATION
 Scheme Name: **Bodelwyddan Generation Connection**

Document Title: **STAGE DIAGRAM
STAGE 5**

Created by:	DC	Date:	10/04/25	Checked by:	MCC	Date:	10/04/25	Approved by:	CT	Date:	10/04/25
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Approved	CT	Date	07/05/24	Approved	CT	Date	30/05/24	Approved	CT	Date	10/04/25

NOTES

- This is a 4.2/4.3 drawing and is for development purposes only
- All dimensions are in millimetres unless otherwise stated

SEQUENCE OF WORK

- Stage 6. Post outage and final arrangement
- Reinstatement, landscaping, and screening.

LEGEND

- Energised Equipment
- New Equipment
- Equipment Removed
- Mature trees with potential to support roosting bats

REFERENCE DRAWINGS

PDD-32281-SBS-002	STAGE 1
PDD-32281-SBS-003	STAGE 2
PDD-32281-SBS-004	STAGE 3
PDD-32281-SBS-005	STAGE 4
PDD-32281-SBS-006	STAGE 5

P03	NOTE AMENDMENTS	RW	AS	CT	19/05/23
P04	UPDATED SUBSTATION LAYOUT	RW	CT	CT	09/05/24
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P06	MINOR ANNOTATION AMENDMENT	DC	MCC	CT	10/04/25
Rev	Description	Cre'd	Chk'd	App'd	Date



Master Scheme No: 32281 Sub-Scheme No: B31000G6 Site: BODELWYDDAN 400kV SUBSTATION
 Scheme Name: Bodelwyddan Generation Connection

STAGE DIAGRAM STAGE 6

Created by:	Date:	Checked by:	Date:	Approved by:	Date:
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