GREEN GEN CYMRU

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Green GEN Towy Usk

Routeing and Consultation Document

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Chapter 1
Introduction

Purpose of the Report

1.1 This report relates to the identification and appraisal of route options for a new 132 kilovolt (kV) overhead line (OHL) supported on 'L7' steel lattice towers. The OHL will provide a connection between the proposed Nant Mithil Energy Park in Powys (under development by Nant Mithil Energy Park Limited, a subsidiary of Bute Energy) and the existing 400kV electricity network in Carmarthenshire, South Wales. As well as connecting the Nant Mithil Energy Park into the wider electricity network, it will also provide the key infrastructure to enable other future renewable energy generation to be connected into this network, including a number of additional energy parks being developed by Bute Energy. The existing network and proposed points of connection are shown in **Figure 1.1**.

1.2 The OHL is being developed by Green Generation Energy Networks Cymru Limited (Green GEN Cymru) and will hereafter referred to as the Green GEN Towy Usk project.

1.3 This report presents the methodology used to select the preferred route for the Green GEN Towy Usk project and provides an overview of the routeing work completed to date, culminating with a description of the preferred route. This report also sets out the proposed method by which consultation is to be undertaken to obtain feedback from relevant stakeholders on the preferred route.

Who are Green GEN Cymru?

1.1 Green GEN Cymru is a business in the Bute Energy Group and its aim is to promote, consent and develop new grid infrastructure to distribute green energy in Wales.

1.2 Green GEN Cymru's approach aligns with Future Wales and the Welsh Government's ambitions for unlocking renewable energy generation in Wales. Green GEN Cymru will follow best practice in working with local communities throughout the development of its proposals, ensuring that communities have a strong voice in the process.

1.3 Green CEN Cymru will invest millions of pounds directly into Welsh communities closest to its projects. A Community Benefit Fund will be established that will be worth millions of pounds every year that will be spent in the local area.

1.4 Green GEN Cymru is also keen to work in partnership with the Welsh Government, Local Authorities and the private

sector to explore how others can use its infrastructure to the benefit of local communities in Wales.

Who are Bute Energy?

1.5 Bute Energy is set to become a leading developer of onshore renewable energy in the UK. It was established to help address the climate crisis by providing low cost, reliable power using the proven technology. The mission is to help unlock Wales' potential for onshore renewable power generation and bring benefits to local communities where energy parks are created. Bute Energy's aim is to be forward-thinking in everything it does, and it is passionate about finding better ways to deliver renewable energy using reliable and proven technology.

1.6 Bute Energy is seeking to deliver a package of sustainable benefits and clean energy initiatives. Headquartered in and focused on Wales, the aim is to deliver a portfolio of new energy parks, using the proven technology to deliver onshore renewable power generation in Wales.

Background and Needs Case

1.7 In 2008, the Climate Change Act entered into force in UK law. Section 1 of the 2008 Act, which was amended in 2019, requires the Secretary of State to ensure that the net UK carbon account for 2050 is at least 100% lower than the 1990 baseline. This is often referred to as the net zero target. The 2008 Act also requires the Secretary of State to set, at five year intervals beginning in 2008, legally binding carbon budgets, which place a restriction on the total amount of greenhouse gases the UK can emit over those five year periods. The underlying objective of these carbon budgets is to set a trajectory towards the achievement of the net zero target by 2050. The sixth carbon budget, which relates to the period 2033-2037, was made in 2021. The UK Government's October 2021 Net Zero Strategy sets out its policies and proposals for decarbonising all sectors of the UK economy in order to meet its net zero target by 2050.

1.8 The Environment (Wales) Act 2016 also requires the Welsh Government to reduce greenhouse gas emissions (GGEs) in Wales to net zero for the year 2050, with a system of interim emissions targets and carbon budgets. In 2017, the Welsh Government set out a target that at least 70% of Wales' electricity consumption would be met from renewable generation by 2030.

1.9 In April 2019, the Welsh Government declared a climate emergency. As part of its plan to tackle this emergency, the Welsh Government has brought forward policies to encourage innovative ways of creating energy that are sustainable, secure and cost effective. This includes Future Wales and the eleventh edition of Planning Policy Wales. As part of these new policies, the Welsh Government has confirmed that "in determining planning applications for renewable and low carbon energy development, decision makers must give significant weight to the need to meet Wales' international commitments and our target to generate 70% of consumed electricity by renewable means by 2030 in order to combat the climate emergency".

1.10 Onshore wind development will play a critical role in assisting the Welsh Government to meet its renewable targets. Central to this are the Pre-assessed Areas for Wind Energy identified in Future Wales, which comprise those areas where the Welsh Government has already modelled the likely impact on the landscape and has found them to be capable of accommodating development in an acceptable way. Future Wales confirms that "there is a presumption in favour of large-scale wind energy development … in these areas". Outside of these areas, Future Wales confirms that a positive policy framework still exists.

1.11 It has long been acknowledged by the Welsh Government, energy generators and network operators that a key challenge with respect to delivering Wales' net zero obligations is the fact that the strongest renewable resources are generally in areas that have the lowest existing electricity network capacity, essentially meaning that key strategic opportunities for renewable energy generation are currently sterilised. Without intervention, this lack of grid infrastructure across Wales is likely to have a detrimental impact on achieving the UK Government and Welsh Government's net zero targets. Future Wales notes "The Welsh Government acknowledges the significant challenge that grid infrastructure and capacity will have on the potential for new on-shore and off-shore renewable energy development across Wales", adding that the Welsh Government "are committed to working with energy networks and developers to identify opportunities and barriers as well as working collaboratively to find solutions". There is therefore a clearly identified national need for new renewable energy development and associated grid infrastructure in Wales.

1.12 In addition to the energy parks that will be directly connected to the grid, Bute Energy is proposing to develop new energy parks across Wales, that are geographically remote from existing high voltage (HV) electricity infrastructure.

1.13 A number of the proposed energy parks will be located in South East Wales – referred to as the South Wales Eastern Cluster of energy parks. The options considered for connecting these energy parks to the national electricity transmission system (NETS), including the rationale for the preferred option, are outlined in a 'Green GEN Phase One Grid Connection Strategy' report, published for consultation alongside the present report.

1.14 The proposed energy parks, and associated connection infrastructure, provide a key opportunity to help to address the climate emergency in a timely manner by providing network connection capability for a strategic renewable energy generation hub.

1.15 Operation of infrastructure at 132kV within England and Wales is classified as 'Electricity distribution'. These assets are in the main owned and operated by Distribution Network Operators (DNOs). However, in order to increase competition in the electricity distribution market, Ofgem, as the GB energy regulator, now licences Independent Distribution Network Operators (IDNOs). Once licenced by Ofgem, IDNOs are able to develop, operate and maintain electricity distribution networks. IDNOs connect their networks onwards into the local distribution network or transmission network.

1.16 Green GEN Cymru have applied for an IDNO licence, and are anticipating a determination on the application in mid-2023. This will enable Green GEN Cymru to move forward with its plans to design, develop and construct the most appropriate solution for connecting the new energy parks, ensuring the best solutions for the local area. It would also enable Green GEN Cymru to deliver efficient and reliable grid infrastructure in Wales, opening broader opportunities for connections in the future.

1.17 As with DNOs, an IDNO holds an electricity licence under Section 6(1)(c) of the Electricity Act 1989. DNO and IDNO licences also share the same Standard Licence Conditions. This places specific requirements on an IDNO, including "the development, maintenance, and operation of an efficient, co-ordinated, and economical system for the distribution of electricity".

1.18 As a licence holder, Green GEN Cymru would be required to adhere to the Electricity Act 1989, including Schedule 9, which confirms that the licensee "shall have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and shall do what he reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects."

1.19 With oversight of the development of both the connection infrastructure promoted by Green GEN Cymru as well as the energy parks, Bute Energy Group will be able to ensure effective coordination between these two elements, enabling collaboration regarding technical and environmental considerations and delivering the most appropriate solution. As a Welsh-based company, and a prospective IDNO licence holder, Green GEN Cymru will be able to play a proactive role in the progression towards achieving Net Zero in Wales. Bute Energy Group will support the development of proposed energy parks and, through the proposed connection to the NETS promoted by Green GEN Cymru, will also be able to support the efficient and timely connection of future renewable energy projects across Wales, demonstrating the benefits of the IDNO framework.

The Development and Consenting Process

1.20 This document reports on the routeing stage of the Green GEN Towy Usk project, as described in the 'Green GEN Cymru Approach to Routeing Grid Infrastructure in Wales' guidance document (available for review alongside this routeing and consultation document).

1.21 Prior to commencing this stage, Green GEN Cymru prepared a 'Green GEN Phase One Grid Connection Strategy', which comprised a review of the project needs case and identification and appraisal of strategic options for the overarching technical design solution (e.g. points of connection and choice of technology, the choice between OHL and underground cabling (UGC) and type of structure (if OHL)). The Phase One Grid Connection Strategy is available as a discrete report, to be considered alongside this routeing and consultation document**.** The routeing process is iterative in nature with the output of each stage informing the subsequent stages. However, feedback received from consultation and/or technical review can also result in earlier stages being repeated as necessary in an iterative manner.

The Developments of National Significance (DNS) Consenting Regime

1.22 . The Green GEN Towy Usk project will be a 'Development of National Significance' according to the Planning (Wales) Act 2015. DNS are infrastructure development projects of national importance, and the majority of planning applications for DNS are decided by the Welsh Ministers. The DNS consenting process is specific to Wales, and includes bespoke requirements for pre-application consultation to take place later in the connection project development process.

Structure of the Report

1.23 This Routeing and Consultation Document is structured as follows:

- **Chapter 2** introduces the proposed Green GEN Towy Usk OHL grid connection;
- **Chapter 3** describes the overall methodological principles applied to the routeing stage of the connection project;

- **Chapter 4** describes the method used to identify and appraise corridor options;
- **Chapter 5** describes the method used to identify and appraise route options;
- **Chapter 6** details the outcome of the route option appraisal process and describes the preferred route; and
- **Chapter 7** sets out the proposals for the consultation on the preferred route.

Chapter 2
The Proposed Grid Connection

Points of Connection

2.1 The proposed new 132kV OHL will commence at the substation for the proposed Nant Mithil Energy Park. The Nant Mithil Energy Park is located approximately 9km east of Llandrindod Wells and will consist of approximately 36 turbines with tip heights up to 220m, together with ground mounted solar photovoltaic panels and Battery Energy Storage Systems (BESS). Further details of the Energy Park are available in the Scoping Report provided alongside the request for Scoping direction, which was submitted to PEDW on 6th September 2022[1]; they are also available from the Energy Park project website[2].

2.2 The application for consent for the substation for the Energy Park will form part of the Energy Park DNS application, where its location and indicative or illustrative design will be provided along with assessment of its environmental effects. This substation will not therefore be considered further in the present document.

2.3 At the southwestern end of the route, the OHL will terminate at a proposed new substation that will be located in proximity to the existing 400kV OHL to the south of Carmarthen. Two alternative locations for this substation have been identified via an appraisal study completed in July 2021. The final location of the substation will be informed by the ongoing routeing and subsequent EIA process in consultation with National Grid. Further details of the substation location selection process are provided in **Chapter 4**.

2.4 In addition to the Nant Mithil Energy Park, the OHL would potentially provide a strategic grid route for further connection opportunities for additional Bute Energy parks within South Wales.

OHL Voltage and Tower Type

2.5 The proposed OHL will be supported on a type of tower referred to as an 'L7' design, a steel lattice tower with six cross-arms (three on each side). This tower type is illustrated in **Figure 2.1**. The required voltage for the OHL is 132kV.

[1] The Scoping Report and Scoping direction can be found at https://planningcasework.service.gov.wales/ (case reference DNS - CAS-01907-D7Q6Z1 - Nant Mithil Energy Park)

[2] https://nantmithilenergypark.wales/

2.6 There are three types of L7 tower:

- Suspension towers, used to support OHLs along straight sections of the connection route.
- Tension towers, used particularly (but not exclusively) to support OHLs at points where the route changes direction.
- Terminal towers, used where the OHL terminates into a substation or onto an underground cable section via a separate cable sealing end compound or platform.

2.7 Examples of the three types of tower design together with photographs are shown in **Figure 2.1.**

Tower Heights and Span Lengths

2.8 The standard height for an L7 tower is 27m, although heights of towers across an OHL route will vary. The average span length is approximately 240m, but this can be increased or decreased depending on the requirements of terrain or intermediate obstacles such as waterbodies. Tower heights need to be increased for greater spans.

Ancillary Development

2.9 In addition to the proposed steel towers supporting the OHL conductors, ancillary development will be required to facilitate the construction of the OHL. Ancillary development will include working areas around towers, temporary access tracks, winching/pulling areas and construction compounds/laydown areas. This ancillary development will be temporary and will be removed and the ground re-instated following completion of construction of the OHL.

Construction Works

2.10 The construction of OHLs can sometimes require temporary infrastructure such as temporary accesses to tower locations. All have reduced maintenance requirements, and all are subject to recognised procedures for dismantling/ decommissioning.

Steel Tower Construction

2.11 The construction of the OHL will follow a well-established sequence of activities outlined below:

- Felling of forestry (where required);
- Preparation of accesses;
- Excavation of foundations;
- Tower delivery;
- Erection of towers;
- Delivery of conductors and stringing equipment;
- Insulator and conductor erection and tensioning; and
- Clearance and reinstatement.

Access

2.12 Prior to construction of the OHL, temporary accesses will be constructed, as needed, and laydown/ storage areas set up, usually mid-way along the route. The use of existing tracks and watercourse crossings will be maximised, with the upgrading of these if needed.

2.13 The use of low ground pressure and plant when taking temporary access is preferred. If access is required to be taken through sensitive areas, which are identified during the EIA process, other less intrusive methods can be applied such as temporary steel matting, or timber roadways.

2.14 Any trees which may have an impact on safety clearances will be removed or lopped. Following commissioning of the OHL, all equipment and temporary access of construction areas will be removed, with the land being reinstated to the approval of the landowner.

Temporary Working

2.15 Temporary working areas will be required for the duration of construction works. There is a requirement for temporary vehicular access to ever tower location as well.

2.16 L7 tower locations have a working area of approximately 25m x 25m for standard towers and 50m x 50m for angle towers. In certain circumstances, the shape/ size of the working area is controlled by the environmental/ land-use constraints that are located nearby.

2.17 The temporary working areas will be returned and restored to former conditions following the completion of the construction works.

Operation and Maintenance

2.18 Most OHL components are maintenance free, the exposed elements which suffer from corrosion, wear, deterioration and fatigue, will require inspection and periodic maintenance over the lifespan of the OHL. OHL cables generally require refurbishment after approximately 40 years.

2.19 Any felled easement areas will also be managed to maintain the required clearances whilst the connection remains active. Walkover surveys or flyovers will identify where there is requirement to clear wayleaves of new growth.

Decommissioning

2.20 When the operational life of the proposed Green GEN Towy Usk OHL ends, it is possible the OHL may be re-

equipped with new conductors, insulators and refurbished. However, the OHL may also be decommissioned fully.

Chapter 3
Approach to Routeing

Introduction

3.1 This Chapter provides an overview of the approach that Green GEN Cymru has undertaken to the routeing stage for the Green GEN Towy Usk OHL. As detailed in **Chapter 1**, this follows the review of the project needs case and identification and appraisal of potential connection options reported on within the Phase One Grid Connection Strategy.

3.2 The routeing process is iterative in nature and a diagram showing this routeing process is set out in **Figure 3.1** below.

Routeing Methodology

Overarching Approach to Routeing

3.3 A number of environmental and technical constraints and effects are taken account during the routeing process. The overall approach to routeing taken by Green GEN Cymru, however, is based on the acknowledgement that the main effects of OHLs are visual, due particularly to scale of OHL towers relative to surrounding features within the landscape. As visual effects of OHLs cannot always be mitigated (for example via screening), careful routeing is the primary way in which visual effects may be reduced. Other environmental and technical constraints and effects need to be taken into account alongside, and balanced with, visual effects.

The Holford Rules

3.4 It is generally accepted across the electricity industry that the guidelines developed by the late Lord Holford in 1959 for routeing OHLs ('The Holford Rules') should continue to be employed as the basis for routeing high voltage OHLs. The Holford Rules were reviewed circa 1992 by the National Grid Company (NGC) Plc. (now National Grid Electricity Transmission Plc (NGT)) as owner and operator of the electricity transmission network in England and Wales, with notes of clarification being added to update the Rules. A subsequent review of the Holford Rules (and NGC clarification notes) was undertaken by ScottishHydro Electric Transmission Limited (SHETL) in 2003.

3.5 The Holford Rules are presented in **Table 3.1** on this page. The Rules and the NGC and SHETL clarification notes on these Rules are included in full in **Appendix A**. These guidelines for the routeing of new high voltage overhead transmission lines provide the basis for the approach that has

been taken to routeing of the Green GEN Towy Usk OHL. Key principles of the Holford Rules include avoiding prominent ridges and skylines; following broad wooded valleys; avoiding settlements and residential properties; and maximising opportunities for 'backclothing' and the screening of infrastructure.

3.6 The routeing process can be represented in a simplified form as linear (see steps A to J in the graphic below) with the findings of each step informing the next step as the routeing design is progressively refined based on increasingly detailed assessment. However, in practice the process is iterative, due particularly to the consideration of the results of consultation at various individual steps. The iterative approach enables the validity of previously applied assumptions to be confirmed and ensures confidence in the findings of individual steps in the routeing process before subsequent steps begin.

3.7 The routeing process for the Green GEN Towy Usk OHL is divided into consideration of corridors and consideration of route options. An overview of the steps involved is provided below and shown in **Figure 3.1**. Application of the routeing methodology, including the findings are set out in **Chapter 4** and **Chapter 5**, culminating in the confirmation of the preferred route in **Chapter 6**.

Table 3.1: The Holford Rules

The Holford Rules
***Rule 1**: Avoid altogether, if possible, the major areas of highest amenity value, by so planning the general route of the first line in the first place, even if the total mileage is somewhat increased in consequence.*
***Rule 2**: Avoid smaller areas of high amenity value, or scientific interests by deviation; provided that this can be done without using too many angle towers, ie the more massive structures which are used when lines change direction.*
***Rule 3**: Other things being equal, choose the most direct line, with no sharp changes of direction and thus with fewer angle towers.*
***Rule 4**: Choose tree and hill backgrounds in preference to sky backgrounds wherever possible; and when the line has to cross a ridge, secure this opaque background as long as possible and cross obliquely when a dip in the ridge provides an opportunity. Where it does not, cross directly, preferably between belts of trees.*
***Rule 5**: Prefer moderately open valleys with woods where the apparent height of towers will be reduced, and views of the line will be broken by trees.*
***Rule 6**: In country which is flat and sparsely planted, keep the high voltage lines as far as possible independent of smaller lines, converging routes, distribution poles and other masts, wires and cables, so as to avoid a concentration or 'wirescape'.*
***Rule 7**: Approach urban area through industrial zones, where they exist; and when pleasant residential and recreational land intervenes between the approach line and the substation, go carefully into the comparative costs of the undergrounding, for lines other than those of the highest voltage.*

Environmental Considerations

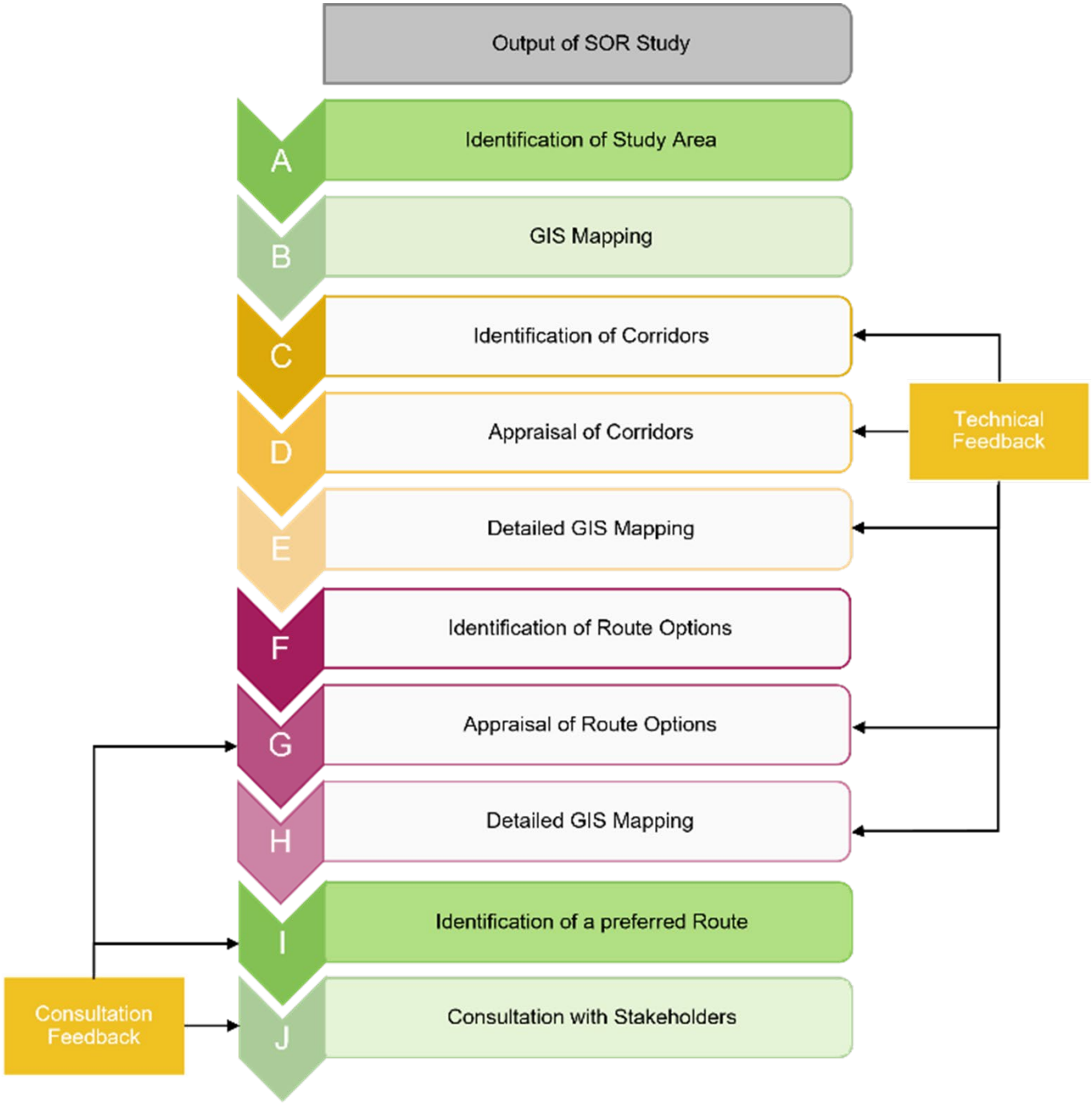
3.8 Statutory duties imposed by Section 38 and Schedule 9 of the Electricity Act 1989 require licence holders to seek to preserve features of natural and cultural heritage interest, and to mitigate where possible, any effects which their proposals may have on such features. The construction and operation of an OHL will have potential effects on people and the environment, including potential effects on (in no hierarchical order):

- cultural heritage including archaeology;
- ecology and ornithology;
- hydrology, hydrogeology, geology and water resources;
- landscape character;
- land uses including mineral operations, agriculture and forestry;
- recreation and tourism; and
- visual amenity.

3.9 Some effects can be avoided or limited through careful routeing. Other effects are best mitigated through local deviations of the route, the refining of steel tower locations and/or specific construction practices. These are reviewed as part of the EIA process.

3.10 There are other topics such as traffic and transport, noise and air quality that would be considered during the EIA stage of the development and consenting process but are not included within this document as they are not considered to materially influence the routeing stages.

Figure 3.1: OHL Routeing Process.



Technical Considerations

3.11 Technical considerations which can influence routeing include the existing electricity transmission network, existing transport infrastructure such as railways, access requirements/opportunities, Ministry of Defence (MoD) safeguarding areas, slope gradient, altitude, waterbodies and wind farms.

Economic Considerations

3.12 Section 9 of the Electricity Act 1989, states that 'It shall be the duty of an electricity distributor…to develop and maintain an efficient, co-ordinated ad economical system of electricity distribution...' This duty has been interpreted by Green GEN Cymru to mean that, as far as is reasonably practicable, and all other concerns being equal, the proposed OHL should be as direct as possible and the route should avoid areas which would render the scheme unviable on economic grounds.

Identification and Appraisal of Corridors

3.13 For OHL connections, a route 'corridor' is identified that will contain a number of candidate route options. Selection of the corridor is initially preceded by identification of a study area (Step A) of a sufficient size to contain relevant alternative corridor options. Following mapping of environmental and technical considerations (Step B), a landscape led approach is taken to identify corridor options within the study area (Step C). From which the preferred corridor is selected via appraisal of the corridor options against environmental and technical considerations referenced above, applying the Holford Rules as appropriate (Step D). The data used for this appraisal and the detail of the analysis is necessarily proportionate to the appraisal's strategic scale.

Identification and Appraisal of Route Options

3.14 Following confirmation of the preferred corridor (Step D), the identification and appraisal of route options (Steps F and G) essentially follows the same process as the identification and appraisal of corridors, with the data used (Step E) and detail of the analysis for this step being proportionate to the more narrowly defined spatial range of the appraisal. Route options have a defined width of 200m to allow scope for further refinement of routeing and OHL component locations (such as towers) within the route option width during subsequent stages of the development process.

3.15 The appraisal of route options includes balancing of the environmental considerations, with this resulting in identification of an 'emerging preferred route'. A technical review of the 'emerging preferred route' is then undertaken, which may result in further modifications to the emerging preferred route. This process ends with confirmation of the preferred route for the purposes of consultation.

Review of Preferred Route Post-Consultation and Confirmation of Proposed Route

Following consultation with stakeholders, including landowners and the community, and a review of consultation responses, the preferred route may be refined further to take account of feedback. This process results in confirmation of a proposed route for the purposes of progression to EIA Scoping. Further public consultation on a detailed route alignment for the project, including proposed tower locations, access routes and working areas will also take place during the EIA development stage, as discussed further in **Chapter 7** below.

Chapter 4
Corridor Identification and Selection

Introduction

4.1 A Strategic Routeing Study was undertaken resulting in the identification of a preferred corridor between the Nant Mithil Energy Park and a proposed new substation located in proximity to the existing 400kV OHL network in Carmarthenshire. This Strategic Routeing Study involved identifying an initial study area and potential corridor options within this. These corridor options were then appraised relative to each other to identify the preferred corridor.

4.2 The selection of the preferred corridor consisted of a number of steps as set out in Diagram 3.1 in **Chapter 3**:

- Step A: Identification of Study Area.
- Step B: GIS Mapping of Routeing Considerations.
- Step C: Identification of Corridors.
- Step D: Appraisal of Corridors.

Step A: Identification of Study Area

4.3 The initial step was to identify a study area, predominantly for the purposes of gathering data specific to the project area. The initial study area was drawn to ensure it was large enough to accommodate all potential OHL route options. As such, the study area was required to be able to accommodate a connection from the Nant Mithil Energy Park to the substation locations identified to the south of Carmarthen.

4.4 The study area was identified on the basis of the above principles whilst reflecting topography (i.e. avoiding higher ground) and geographically extensive 'areas of highest environmental value', such as National Parks and Special Protection Areas, whilst maintaining a reasonably direct route between the wind farm and the substation location. The identified study area is shown in **Figure 4.1**.

4.5 The study area identified extends broadly on a north-east to south-west alignment from north-east of Llandrindod Wells to the south of Carmarthen. At the south-west end, the extent of the study area was designed to include possible points of connection along the existing 400kV OHL south of Carmarthen. The south-eastern boundary is formed by the presence of Brecon Beacons National Park, which was excluded from consideration as an 'area of highest amenity' in line with the Holford Rules. The north-west is largely

constrained by higher ground at the foothills of the Cambrian Mountains and the Elenydd Special Protection Area (SPA) (and Special Area of Conservation (SAC)).

4.6 The study area is notably aligned to existing transport infrastructure, primarily the A483 which travels from Builth Wells to Carmarthen. This road passes through several main settlements including Builth Wells, Llanwrtyd Wells, Llandovery, Llandeilo and finally Carmarthen. Additionally, numerous properties and smaller settlements are scattered through the study area. As the study area broadly reflects topography, the Afon Tywi runs within the study area from the Crychan Forest to Carmarthen with an associated area of floodplain.

Step B: GIS Mapping of Routeing Considerations

4.7 Within the study area routeing considerations were mapped which primarily reflected the Holford Rules, taking into account a number of constraints relating to areas of high amenity value. The presence of the following environmental routeing considerations[3] was used to inform the identification of corridor options (as show on **Figure 4.2**):

- National Parks
- Special Protection Areas
- Special Areas of Conservation
- Ramsar Sites
- Sites of Special Scientific Interest (SSSI)
- National Nature Reserves
- Scheduled Monuments
- Conservation Areas
- Registered Historic Parks and Gardens
- Settlements (as identified in Local Development Plans (LDPs))
- The Sennybridge Training Area[4]

4.8 The approach to the identification of corridor options was to avoid larger areas constrained by the designations noted above. It was not possible to avoid all of the above constraints entirely. This is particularly the case with smaller designated areas such as Scheduled Monuments, SSSIs and also some settlements. Concentrations of these features were avoided. The broad nature of the corridor means that there is a degree of flexibility to seek to avoid certain environmental and planning constraints at the detailed routeing stage.

4.9 Other areas were noted as 'non-absolute' constraints for the identification of corridor areas. These included Special Landscape Areas (SLAs) and Registered Historic Landscapes (RHLs). It was not possible for the corridor options to avoid these entirely due to their geographic scale and location within the study area, however corridor selection sought to minimise the length of overlap of the proposed OHL with these areas. These areas were used to inform the appraisal and selection of the preferred corridor as shown on **Figure 4.4**.

4.10 Residential properties were also mapped at this stage with 150m 'trigger for consideration' zones (zones within which the potential for visual effects needs particularly detailed consideration), as were areas of ancient woodland. Concentrations of these more localised constraints were avoided where it was likely that they would severely constrain options for identification of route options at the subsequent detailed routeing stage.

4.11 The following technical routeing considerations were also mapped (see **Figure 4.2**) as Green GEN Cymru identified that these would present challenges for routeing the OHL:

- Steep slopes: gradients over 10 degrees were mapped for information, and gradients over 22 degrees avoided where possible.
- Areas of high ground: elevations of over 200m were mapped for information, and elevations over 450m avoided where possible.
- 400kV, 275kV and 132kV OHLs: these were mapped for information only at this stage, as any new OHL will be required to maintain a safety clearance from nearby OHLs.
- Wind farms which were operational, under construction, consented or with a valid application were mapped, as these require to be avoided by the OHL where possible.

Step C: Identification of Corridors

Proposed Carmarthen Substation Location

4.12 Green GEN Cymru's consideration of the optimal location for the proposed new substation was identified via an appraisal study. The study is included as **Appendix H**. The

[3] It is noted that not all of these constraints were found to potentially interact with corridor and route options; those that did not, fell outside the scope of subsequent appraisals.

[4] The Sennybridge Training Area is a Ministry of Defence (MoD) military training area near Sennybridge village in Powys. It is not feasible to attempt to route an OHL within the training area, as this would be considered by the MoD to present an unacceptable conflict with its use for military training.

key technical criteria used to identify the substation location included the following:

- An area of 300 x 300m of land was available to accommodate a control building, up to four 400/132kV transformers, associated switchgear bays and any required reactive compensation equipment;
- The new substation could be located within 500m of the existing 400kV OHL; and
- The new substation could be readily accessed by construction and maintenance vehicles from the public highway.

4.13 The substation site selection process then considered a number of environmental and landscape and visual constraints; five potential sites were appraised and two were identified as the preferred sites for the proposed substation. These two sites are represented by the Substation Siting Area on **Figure 4.1.** The final location of the substation will be confirmed by National Grid, informed by the ongoing findings of the routeing and EIA stages.

OHL Corridor Options

4.14 The Holford Rules (Rule 4) indicate that OHL infrastructure is deemed most visible when located on higher ground, for example ridges and skylines, therefore the identification of corridors favours lower lying topography. Furthermore, Holford Rule 3 states that all other things being equal, the most direct line should be taken, with the smallest distance and minimal changes in direction. Based upon these primary rules and the constraints discussed above, figures were produced to inform preliminary fieldwork undertaken to identify corridor options.

4.15 Holford Rules 4 and 5 formed the basis for the landscape led identification of corridors in the field. These rules state that OHL infrastructure is judged to be more widely visible from surrounding areas when located on higher ground, for example on ridges and skylines. Direct corridors with fewer 'bulky' angle structures are recommended, as is the avoidance of 'wirescape' (i.e. cumulative effects of multiple OHLs). Consideration was therefore given to the potential 'fit' of the line within the landscape. Key objectives were as follows:

- Follow the grain of the landscape, following moderately open valleys and avoiding complex terrain;
- Minimise the exposure of towers on ridges and skylines;
- Avoid impacts on woodland where possible;
- Use woodland and topography as a backdrop to the line, or as a foreground screen;
- Minimise the number of crossings of linear features (e.g. roads and rivers), and when appropriate cross at a perpendicular angle;
- Avoid creating wirescapes with existing infrastructure (noting that in some cases it may be preferable to co-locate routes than to spread effects across a wider area);
- Avoid key views from recreational locations, such as popular walking routes, summits and promoted viewpoints, including those outside the route corridors where appropriate;
- Avoid residential areas as far as practicable, and
- Other things being equal, prefer the most direct alignment.

4.16 The topography of the study area informed the identification of corridors as the OHL is required to pass from the Wye catchment in the north into the Towy catchment in the south. Two locations along this watershed were identified where the OHL would be most viable. Both of these link the upper Towy valley with the Irfon valley, a tributary of the Wye. To the north-west of these valleys the terrain was not found to be conducive to routeing an OHL. A route within this area would cut across the grain of the landscape, meaning it would traverse ridges and valleys and at perpendicular angle, rather than following valleys as advised by the Holford Rules. To the south-east of these valleys, the Brecon Beacons National Park forming the edge of the study area and the MoD Sennybridge military training area precluded the identification of corridors in the east of the study area, based on the provisions of the Holford Rules and land use conflict considerations respectively.

4.17 In the north, two OHL corridor options were identified, running south and west respectively from the Nant Mithil Energy Park. The former corridor turns southward to cross the farmed lowland around Llandrindod Wells. The latter remains within upland valleys as far as Builth Wells. Crossing points on the River Wye were also a key factor for corridor identification. The two corridors cross the Wye to the north and south of Builth Wells, and then run westward in parallel, broadly following the Irfon valley.

4.18 To cross the watershed, the northern corridor follows the A483 past the Sugar Loaf, and then crosses into the upper Towy valley. The southern corridor crosses higher ground in Crychan Forest, descending into the Afon Bran valley.

4.19 From Llandovery to Llangathen, a combination of constraints including topography, settlements and the National Park restrict the options to one corridor which generally follows the Towy valley. West of Llangathen, three corridor options were identified, which vary in the location at which

they depart from the Towy valley to cross the farmland approaching the substation location.

4.20 An overview of the identified corridor options is shown in **Figure 4.2** with the individual corridors shown in **Figure 4.3**. The figure highlights that the corridor options were split into two distinct sections, A and B. This was undertaken to aid the comparative appraisal of the corridor options, given the length of the project. These sections both meet at Llandovery, but provided several options for routeing to the north and south of this location. Within corridor section A, options A1a, b, c and A2a, b, c were identified. Within Corridor section B, options B1, B2 and B3 were identified.

Step D: Appraisal of Corridors

4.21 To identify a preferred corridor, the corridor options within sections A and B were appraised relative to each other across a range of criteria.

4.22 The appraisal process sought to draw out distinctions between the corridors to enable the relative strengths and weaknesses of each to be identified. Professional judgement, informed by the desk studies, GIS mapping and landscape field work, was employed to identify the preferred corridor within which route options could be identified to accommodate the OHL.

4.23 The comparative appraisal of corridor options was undertaken in stages as set out below:

- Identification of appraisal criteria, together with their reasoning for inclusion;
- Application of appraisal criteria to each corridor option, following the appraisal methodology; and
- Comparative appraisal of corridor options to identify a preferred corridor.

4.24 The criteria comprised the following:

- Length of Corridor;
- Biodiversity and Geological Conservation;
- Landscape Sensitivity and Visual Amenity;
- Cultural Heritage;
- Forestry and Woodland;
- Hydrology and Flood Risk; and
- Land Use.

4.25 Each corridor option was examined in relation to the above criteria and 'sub-criteria'), listed in **Table 4.1** below (note that these are the criteria and sub-criteria used for appraisal of options, which are more extensive than the set of considerations used for the purposes of corridor identification). A preferred corridor was then identified in relation to each of the criteria. The appraisal process and findings are captured within appraisal tables, with appraisals set out by criteria. The appraisal tables for both corridor sections (A and B) are available in **Appendix B**. As with the mapped routeing considerations, where there was no potential interaction between individual sub-criteria and corridor options, these sub-criteria are not referenced in the appraisal tables.

4.26 The appraisal process involved making a professional judgement concerning the potential interaction between the OHL and the relevant environmental considerations represented by the sub-criterion, with the objective of avoiding/minimising likely significant effects. These judgements were made on a case-by-case basis, with the general principle being that corridors were preferred which offered opportunities to avoid constraints during the subsequent route option stage. The presence of an unavoidable constraint was generally given greater weight (i.e., that corridor performed poorly) than the presence of an avoidable constraint, even if the area of the avoidable constraint was larger in geographic scale. A similar approach was taken in relation to the number of constrained areas: one unavoidable constrained area was generally given greater weight than a higher number of avoidable constrained areas.

Table 4.1: Criteria and Sub-criteria used in Corridor Appraisal[5]

Criterion	Sub-criterion
Approximate Length of Corridor	N/A
Biodiversity and Geological Conservation	Special Areas of Conservation (SAC)
	Sites of Special Scientific Interest (SSSI)
	Regional Important Geological and Geomorphological Sites (RIGS)
	Geological Conservation Review Sites (GCRS)
	Peat
Landscape and Visual Amenity	National Park
	Locally Designated Landscapes (Special Landscape Area (SLA))
	LANDMAP ■ Visual and Sensory ■ Landscape Habitats ■ Historic Landscape ■ Geological Landscape ■ Cultural Landscape
	Landscape Character[6]
	Residential Visual Amenity with '150m trigger for consideration zone'
	Tourism and Recreation (visual amenity – viewpoints, cycle corridors, public rights of way (PRoW), long distance trails, tourist attractions and recreational areas)
	Public roads, including tourist corridors, railways
Cultural Heritage	Scheduled Monuments (Cadw (SMs))
	Listed Buildings (I, II*, II)
	Historic Parks and Gardens (I, II*, II)

[5] This table includes only the criteria and sub-criteria that were found to be relevant to the corridor appraisals i.e. those that were considered to have the potential to experience effects from the proposed grid connection.
[6] Since completion of the routeing and appraisal work, the Powys Landscape Character Assessment (2022) has been published by Powys County Council. This document provides updated evidence relating to landscape character, but does not supersede the site-specific analysis of landscape character undertaken to inform the routeing and appraisal.

Criterion	Sub-criterion
	Registered Historic Landscapes (RHL)
	Conservation Areas
Land Use	Agricultural land (Best and Most Versatile (BMV))
	Common Land
Forestry and Woodland	Ancient Woodland (as per the Ancient Woodland Inventory (AWI))
	National Forest Inventory (NFI)
Flood Risk	Flood Zones (High risk)

4.27 The appraisal of the corridor section A identified that, based on the balance of all criteria and sub-criteria, Corridor Option A2c is the preferred corridor. Particular considerations in its favour are:

- It is the shortest corridor; and
- It is preferred in relation to biodiversity and on landscape and visual grounds.

4.28 However, it was noted that at detailed routeing, potential effects on the setting of cultural heritage features as well as minimising loss of woodland and minimising infrastructure within the flood risk areas will form key design considerations.

4.29 The appraisal of the B corridors identified that on balance Corridor Option B3 is the preferred corridor. Particular considerations in favour of this option are:

- It is the shortest and is preferred in relation to landscape and visual criteria;
- It contains the smallest area of BMV agricultural land and ancient woodland; and
- It offers the narrowest crossing of the floodplain.

4.30 However, it was noted that at detailed routeing, potential effects on peat and on the setting of cultural heritage features will form key design considerations.

Preferred Corridor Selection

4.31 The emerging preferred corridor consisting of Corridor Options A2c and B3 was reviewed by technical specialists to identify any significant constraints that might prevent identification of a viable route option within it. This assessment indicated that the preferred corridor was appropriate to progress into the next routeing stage. **Figure 4.4** shows the preferred corridor for progression to the next stage: Route Option Identification and Selection.

Chapter 5
Route Option Identification and Selection

Step E and F: GIS Mapping and Identification of Route Options

5.1 Following identification of the preferred corridor, potential route options were identified reflecting the preferred corridor, to link Nant Mithil Energy Park with the substation siting area near Carmarthen. As with the corridor options, the purpose of identifying route options is to allow comparison between alternative route options to identify a preferred route without having to develop detailed design proposals for each.

5.2 The aim of the landscape led approach was to define a proportionate number of route options for comparative appraisal against environmental and technical constraints. It is noted that the appraisal process may lead to route options being amended or combined as part of the iterative routeing process. Route options were defined as having a width of 200m to allow for detailed design of the OHL alignment in subsequent development stages.

5.3 The constraints mapped at the corridor selection stage again formed the basis for defining route options. Following the Holford Rules, areas of highest amenity were avoided as far as possible.

5.4 Additional constraints of regional/local importance, and areas of high amenity value which are smaller in scale, were also taken into account when identifying the route options (as set out in **Chapter 4**, they had generally been mapped to inform the corridor option appraisal but had not necessarily been used to identify the corridor options themselves). These include:

- Local Nature Reserves, The Royal Society for the Protection of Birds (RSPB) Reserves, etc. ;
- Listed Buildings;
- National Forest Inventory; Regionally Important Geodiversity Sites (RIGS); and
- National Cycle Network, long-distance routes, public rights of way.

5.5 These constraints were avoided where possible and where they fell within a 200m route option the possibility of avoiding them through detailed route alignment was considered.

5.6 Areas considered as 'non-absolute' constraints at corridor identification, i.e. SLAs and RHLs cannot be avoided in their entirety due to their size and geographic location. Therefore, where it was necessary to cross these areas, the length of overlap was minimised.

5.7 Routeing sought to follow the grain of the topography and took opportunities to use rising ground as a backdrop rather than running along skylines following the routeing principles applied for the identification of corridors which reflect the Holford Rules.

5.8 Where possible, routeing sought to avoid the 150m 'trigger for consideration' zones around residential properties, although in some cases dwellings fall within the 200m wide route options.

5.9 Route options were identified to avoid ancient or other broadleaf woodland as far as possible, though the density of small woodlands along the corridor meant that some of these are within the route options (in many cases it is considered likely at this stage, and based on currently available information, that impacts on these smaller woodlands could be avoided through detailed design).

5.10 Other potential constraints were mapped at this stage and considered within the route option identification process, without being considered necessarily as absolute constraints for the purposes of route option identification. These included flood risk, common land and LANDMAP aspect areas.

5.11 To assist in the subsequent appraisal process, due to the length of the OHL, the route options were subdivided across five sections. This allowed comparison of route options over shorter distances. Each of the five sections has between three and five route options, though in most cases these route options overlap for parts of the route.

5.12 The five sections were numbered 1-5 from north to south. Route options were identified as 'north', 'central', and 'south', with sub-options denoted A and B where necessary. An overview of all route options is shown on **Figure 5.1** and the individual route options are shown on **Figure 5.2**.

Step G: Appraisal of Route Options

Environmental Appraisal

5.13 The objective of the environmental appraisal of the route options was to identify a preferred route based on a transparent assessment of route options against a range of environmental considerations. These considerations needed to be sufficiently comprehensive whilst also being proportionate to the geographical scale of analysis and the degree of flexibility that would apply to any preferred route (i.e. with respect to detailed future siting of infrastructure) later in the development process.

5.14 As with corridor options, the appraisal of route options was undertaken against a series of topic-based criteria comprising more detailed sub-criteria. These are set out in **Table 5.1** below. Discrete objectives were also identified for each criterion, to be applied to the appraisal of route options.

Table 5.1: Route Option Appraisal Criteria and Sub-criteria

Criterion	Sub-criterion
Approximate Length of Route Option	N/A
Biodiversity	■ Ramsar Sites ■ Special Protection Areas (SPA) ■ Special Areas of Conservation (SAC) ■ Sites of Special Scientific Interest (SSSI) ■ National Nature Reserves (NNR) ■ Wildlife Reserves managed by the Carmarthenshire and Radnorshire Wildlife Trusts ■ Local Nature Reserves (incl. RSPB Reserves) ■ Local Wildlife Sites (LWS)/Sites of Importance for Nature Conservation (SINC)/ Designated Road Verges (note that different authorities use a range of different names for these features)

Criterion	Sub-criterion
	■ Environment (Wales) Act 2016 Priority Habitats
Landscape Sensitivity and Visual Amenity	■ National landscape designations, (National Parks), Local landscape designations (SLA) ■ LANDMAP areas with 'outstanding' or 'high' evaluations ■ National Landscape Character Areas (NLCA) ■ Analysis of Landscape Character[7] ■ Visual amenity from residential properties (Residential Visual Amenity) ■ Views from tourism and recreation sites and routes (including promoted viewpoints, cycle routes, PRoWs, long distance trails, NRW National Trails, tourist attractions and formal recreational areas such as golf courses)
Cultural Heritage	■ World Heritage Sites (WHS) ■ Scheduled Monuments (SM) ■ Listed Buildings (Grades I, II*, II) ■ Registered Historic Parks and Gardens (RHPG) ■ Registered Historic Landscapes (RHLs) ■ Conservation Areas (CA) ■ Non-designated historic assets including archaeological remains, structures and historic landscape areas/components.
Forestry and Woodland	■ Ancient Woodland (as per the AWI) ■ Commercial conifer and other woodlands as identified in the National Forestry Inventory (NFI)
Hydrology (including Flood Risk), Hydrogeology and Geology	■ Flood risk zones ■ Waterbodies/watercourses ■ Peat ■ SSSI (with geodiversity features) ■ Geological Conservation Review Sites (GCRs) ■ World Heritage Sites (with geological interest) ■ UNESCO Geoparks ■ Regionally Important Geodiversity Sites (RIGS) ■ Landfill sites ■ Operational mineral extraction sites ■ Restored opencast mining sites/mining spoil heaps

[7] Since completion of the routeing and appraisal work, the Powys Landscape Character Assessment (2022) has been published by Powys County Council. This document provides updated evidence relating to landscape character, but does not supersede the site-specific analysis of landscape character undertaken to inform the routeing and appraisal.

Criterion	Sub-criterion
	■ Mine entries ■ Areas of landslide or ground instability ■ Source protection zones ■ Local Authority Mineral Consultation and Protection Areas
Land Use	■ Infrastructure (existing OHL transmission and distribution infrastructure, existing gas infrastructure, existing road (A roads and trunk roads), rail infrastructure and existing, consented or proposed wind energy developments) ■ Committed Development (Consented and Undetermined[8] Planning Applications) ■ Local Development Plan (LDP) Allocations ■ Best and Most Versatile (BMV) Agricultural Land (Grades 1, 2 and 3a) ■ Common Land ■ Sennybridge MoD Training Area

5.15 The detail of the appraisal method varied by criterion. A full list of criteria, sub-criteria and objectives, together with a description of the appraisal methodology applied for each criterion, is provided in **Appendix C**. A schedule of the data collated to inform the appraisal is presented in **Appendix D**. As with the mapped routeing considerations and corridor appraisals, where there was no potential interaction between individual sub-criteria and route options, these sub-criteria are not referenced in the appraisal tables. **Appendix C** sets out the principles applied to inclusion or otherwise of sub-criteria within appraisal tables.

5.16 The appraisal for each topic-based criterion included:

- A professional judgement of the preferred route option by individual sub-criterion, with the objective of avoiding/minimising likely significant effects; and
- A professional judgement of the preferred route option for the topic-based criterion overall, based on the balance of all sub-criteria for that topic.

5.17 The final stage in the environmental appraisal of route options was identification of an 'emerging preferred route' in environmental terms. This included two elements, as detailed in the following paragraphs.

5.18 The first element of the decision-making process concerning the overall route preference was making a judgement concerning the preferred route option in cases where preferences by topic-based criterion differed. This involved professional judgement considering:

- Whether constraints resulting in non-preference of a route option could be avoided and associated significant effects avoided or reduced during tower siting, or if effects in relation to these constraints could potentially be mitigated. Considerations such as the scale over which unavoidable effects might occur were also taken into account. For example, landscape and visual effects may be experienced over large geographical scales and affect large numbers of people, and often cannot be avoided through tower siting. Considerations of this kind needed to be balanced, where appropriate, against the protection given to various environmental features in principle via policy (for example, BMV agricultural land and ancient woodland).
- The degree of preference between different route options, as reflected in appraisal text.
- The relative weight to be given to differing preferences, where conflicts could not be addressed via avoidance of constraint or other mitigation. The weighting and balancing of differing preferences was undertaken on the basis of professional judgement following the same method applied for the corridor appraisal.

5.19 The second element of the decision-making process concerning the overall route preference was consideration of whether constraints that were avoidable in principle from the point of view of one criterion would in fact not be avoidable in practice due to the presence of constraints relating to other criteria. This might include locations, for example, where

[8] Undetermined planning applications are those which have been validated, i.e. are 'live' applications, but have not yet been decided.

avoiding an area of ancient woodland would involve encroaching on an area of peat. If conflicts of this kind were identified, a professional judgement was applied concerning the weight to be given to the differing constraints involved. This included consideration of the possibility of mitigating environmental effects by other means than avoiding the constraint through tower siting.

5.20 In both of the above respects, judgements were informed by a workshop, allowing further clarification of the degree of preference between different route options and its basis, and the prospect of mitigating potential impacts via detailed design (including where conflicting constraints were present).

5.21 Whilst appraisals for individual criteria contained quantitative elements e.g. hectarage of a constraint present within the route option, the overall approach to decision-making concerning the route preference on environmental grounds was qualitative and professional judgement-based.

Technical Review

5.22 A technical review of the route options was undertaken by Green GEN Cymru. Notes on the method and scope of this review are provided in **Appendix F**.

Chapter 6
Route Options Appraisal Findings

Step I: Identification of a Preferred Route

Environmental Appraisal

6.1 The environmental appraisal tables for each route section are presented in **Appendix E.** These include a summary of the overall conclusions on emerging route preference for each route section. **Figures 6.1-6.6** show the route options in relation to key environmental considerations, set out by environmental topic, that were taken into account during the environmental appraisal.

6.2 A summary of the emerging route preference and key judgements reflecting the balancing and decision making made using professional judgement that informed this preference is provided in the following paragraphs.

Section 1

6.3 The route options for this section were 1N, 1C and 1S ('N', 'C' and 'S' were used throughout to indicate northern, central and southern options respectively). All route options for all sections can be seen in **Figure 5.2**.

6.4 1C is the shortest route option; however, 1N and 1S are only marginally longer.

6.5 1N was the preferred route option in relation to the landscape and visual criterion, however, the degree of preference between 1N and 1S was relatively small. It was considered that 1N offered relatively better opportunities for minimising effects on residential properties via detailed routeing; but equally, 1N passes closer to more properties than 1S overall (see **Figure 6.2.2**). On landscape and visual grounds, the preference was for 1N and 1S over 1C as 1N runs through a more open upper valley and avoids more frequent changes of direction.

6.6 1N was preferred on cultural heritage grounds (see **Figure 6.3**) and also hydrology, hydrogeology and geology (see **Figure 6.4**), although the degree of preference was small.

6.7 1S was the marginal preference in relation to biodiversity (see **Figures 6.1.1-3**), primarily due to this route option overlapping with only one SAC/SSSI which could be avoided or spanned (SACs/SSSIs encroaching into other route options could also be avoided or spanned).

6.8 1N was the only route option containing ancient woodland spanning the full width of the route option and was therefore not preferred in relation to the forestry criterion (see **Figure 6.5**).

6.9 In balancing the landscape and visual considerations with the protection of ancient woodland in particular, the **overall preference was for the route to consist of 1N up to the vicinity of Frank's Bridge, transferring to 1S for the remainder of the route section** to avoid passing through the block of Ancient Woodland spanning the width of the route option.

Section 2

6.10 The route options for this section were 2N, 2C and 2S.

6.11 Overall, 2C has the best landscape fit and avoids the river valley to a greater extent than 2N and 2S. It makes use of screening by the low hill of Garth near Builth Wells, while avoiding wooded slopes south-west of Builth Wells. Although likely to be more visible from roads than 2S, 2C was preferred on balance.

6.12 2N and 2C were equally preferred in relation to biodiversity (see **Figures 6.1.1-3**).

6.13 In relation to cultural heritage, 2S was the preference as it has fewest likely effects related to recorded historic assets (see **Figure 6.3**). The preference for 2S with respect to cultural heritage was primarily influenced by potential effects upon Garth House Grade II Listed Building; and it was considered that careful tower placement within the route option were likely to lower effects upon Garth House to a level at which these effects should not outweigh the preference for 2C on other environmental grounds.

6.14 On balance 2C was preferred in relation to hydrology, hydrogeology and geology (see **Figure 6.4**).

6.15 However, 2C has the greatest amount of BMV land within it, some of which cannot be avoided during detailed routeing (although 2N and 2S also contain unavoidable BMV land) (see **Figure 6.6**). Whilst 2C potentially has a greater proportion of unavoidable BMV land within it than other route options, the difference in the potential BMV area between all three route options was small in proportionate terms. Also, whilst the policy protection afforded to BMV land is acknowledged, it was considered that the scale of effects upon this resource (small proportionate losses of BMV at tower locations) should also be given appropriate weight in the balancing of environmental considerations.

6.16 2C also contains AWI that cannot be avoided (as do 2N and 2S) (see **Figure 6.5**).

6.17 . In weighing the cultural heritage, BMV land and AWI considerations, it was not considered justified to depart from the landscape and visual-led **preference for 2C** on the grounds of these criteria/sub-criteria..

Section 3

6.18 The route options for this section were 3N, 3C, 3Sa and 3Sb.

6.19 3N is the shortest route option with 3C the second shortest.

6.20 In relation to the landscape and visual criterion, there was a preference for 3N in the central part of the section, as this passes through less sensitive conifer forest and avoids more sensitive receptors. To the west of Crychan Forest, 3C was preferred as it routes around Cynghordy. In the east, there was no clear preference between 3N and 3C. The overall preference was for a route that combines 3N or 3C in the east, 3N in the central section, and 3C to the west.

6.21 3N was preferred for biodiversity, particularly due to consideration of crossings and proximity to the Afon Gwy SAC/SSSI. However, it is considered likely that the SAC/SSSI can be avoided or spanned for all route options; and there are opportunities for all route options to avoid various other potential constraints by spanning or detailed tower placement also (see **Figures 6.1.1-3**).

6.22 All route options have AWI within them that could not be avoided (see **Figure 6.5**), although a combined route as per the landscape and visual preference appears likely to offer the best opportunities for minimising effects on AWI. Of the non-mixed route options, 3C was the preference with respect to woodland as it avoids the Crychan forest plantation and contains the smallest area of AWI, with better options to avoid AWI loss.

6.23 In relation to cultural heritage (see **Figure 6.3**), 3Sa and 3Sb are the preference. Potential effects on Abererbwll fort (a Scheduled Monument) will require to be considered during detailed design if 3C/3N are progressed due to the potential to undermine the relationship between the fort and associated non-designated Roman assets. Potential effects upon Dol-y-Gaer and Cefn-gorwydd Listed Buildings will be subject to careful tower placement if the 3C/3N combination is progressed.

6.24 3N was the preference for hydrology, hydrogeology and geology, primarily in relation to peat and flooding (see **Figure 6.4**).

6.25 Due to the balance of landscape and visual, cultural heritage and forestry considerations in particular, the **preferred route for this section was 3C as far as Bryn-beili; then 3N as far as the vicinity of Esgair-fwyog; then 3C for the remainder of the section**.

Section 4

6.26 The route options for this stage were 4N, 4C, 4Sa and 4Sb.

6.27 4N was preferred in relation to biodiversity, as this route option does not cross the Afon Twyi SAC/SSSI, is at the greatest distance from the Gallt y Tlodion WTR and contains the smallest amount of Floodplain Grazing habitat (see **Figures 6.1.1-3**).

6.28 In relation to the landscape and visual criterion, the preference was for 4N as far as the north-west of Llandovery as it avoids pinch points at the edge of the settlement and then 4Sb for the remainder of the route (see **Figure 6.2.2**). 4Sb is contained within a side valley away from the main Tywi Valley and is less visible from tourism receptors and key routes and contains fewest unavoidable pinch-points with residential properties.

6.29 4N was preferred jointly with 4C in relation to cultural heritage (see **Figure 6.3**). Effects on the setting of Listed Buildings will require careful consideration at the detailed design stage if 4Sb is progressed. The interaction with both RHLs will require careful consideration during detailed design for 4Sb.

6.30 Although all route options contain AWI, and 4Sa was slightly preferred to other route options with respect to potential effects on AWI, the 'mixed' option preferred on landscape and visual grounds provides reasonable opportunities for AWI avoidance with the possible exception of Restored Ancient Woodland (RAWS) at Coed Caeau-bach, where a residential property may constrain the ability of the OHL to avoid the RAWS (see **Figure 6.5**).

6.31 4N was the preference in relation to hydrology, hydrogeology and geology as this has the fewest interactions with potential constraints (see **Figure 6.4**). Detailed routeing within 4Sb will require consideration of tower placement within the floodplain (as with all route options).

6.32 4N was preferred in relation to land use (see **Figure 6.6**) as it has the fewest interactions with existing infrastructure, does not contain any common land and contains the smallest area of BMV agricultural land. The two non-residential committed developments within 4N could be avoided through detailed design. Detailed design will be required to take into consideration BMV land and the Felindre to Three Cocks gas pipeline particularly within 4Sb.

6.33 For this section, **the preferred route was therefore 4N up to the north-west of Llandovery and then 4Sb southwards** primarily due to the preference on landscape and visual grounds.

Section 5

6.34 The route options for this section were 5Na, 5Nb, 5C, 5Sa and 5Sb.

6.35 5Na and 5Nb were preferred in relation to biodiversity (see **Figures 6.1.1-3**) as these route options cross the Afon Tywi SAC/SSSI and the Gwendraeth Fach and their tributaries the fewest times. These route options do not cross any other SSSIs, NNRs or Wildlife Trust Reserves.

6.36 5Na and 5Nb were generally preferred in relation to landscape and visual effects, and 5Nb was preferred to 5Na, due to its potential to minimise potential effects upon woodland than 5Na. Consistent with this, 5Nb was also the preference with respect to forestry (see **Figure 6.5**). The exception to the preference for 5Na and 5Nb on landscape and visual grounds is the first (approximately) 3km of 5Na/5Nb where consented glamping pods north of Letty-maeliog, potentially in combination with consented holiday accommodation at Lletty-maeliog and consented additional accommodation at Brynteg, would create a constrained pinchpoint with notable changes of line direction being needed, requiring large angle towers close to properties. The overall landscape and visual preference was therefore to follow 5C as far as Llanfawr, before returning to 5Na/5Nb north-east of Pen-y-banc. This section of 5C is routed on lower ground than 5Na/5Nb.

6.37 In relation to cultural heritage (see **Figure 6.3**), 5Na/5Nb or 5C route options were preferred overall. If 5Na/5Nb is chosen, potential effects on Listed Buildings, including the listed LLwyncelyn Farm, will require to be addressed during the detailed design stage, such as by siting of the OHL and towers within the route option to maximise clearance of this property.

6.38 In relation to hydrology, hydrogeology and geology (see **Figure 6.4)**, 5Na and 5Nb are preferred.

6.39 In relation to land use (see **Figure 6.5**), 5Na and 5Nb were of equal preference. There were no Carmarthenshire LDP allocations present within the route options and they contain the least BMV agricultural land.

6.40 Overall, **the preferred route was to follow 5C as far as Llanfawr, before transferring to 5Nb north-east of Pen-y-banc,** consistent with the preference on landscape and visual grounds.

Technical Review and Confirmation of the Preferred Route

6.41 A technical review of the route options was undertaken by Green GEN Cymru. Notes on the method and scope of this review are provided in **Appendix F,** and the full review is

provided in **Appendix G**. The findings of the review for each section are summarised below:

- For section 1, route 1N was preferred, due to its potential requirement for fewer direction changes and its having fewer engineering requirements related to flood risk zone spanning than other options.
- For section 2, the preference was to follow route 2C up to the south of Builth Wells and then to join 2N; this was based on the balance of flood risk zone avoidance east of Built Wells with reduction where possible of route length and number of direction changes.
- For section 3, 3N was the preference overall; 3C would require lower woodland removal, but this was considered to be outweighed by 3C's greater flood risk engineering requirements. 3N was also preferred with respect to route length and potential number of direction changes.
- For section 4, 4N was preferred, closely followed by 4C. This was due to the considerations of direction change and flood zone spanning engineering requirements and the potential for interaction with the Felindre to Three Cocks gas pipeline.
- For section 5, 5C was preferred due to the potential interactions with the Felindre to Three Cocks gas pipeline and the existing Brechfa OHL in comparison with other options.

6.42 Some of the technical preferences differed from the preferences on environmental grounds. However, due to the potential to address technical issues via detailed design and construction methods, it was not considered that these considerations would necessitate an amendment to the preferred route identified from an environmental perspective. This preferred route is shown in **Figure 6.7**.

Chapter 7
Consultation Process and Next Steps

The Consultation Process

The Consultation Strategy

7.1 PEDW has set out its expectations for public consultation and engagement on infrastructure projects in its document Pre-Application Community Consultation: Best Practice Guidance for Developers (December 2021)[9], in which Section 3.1 states: "*The challenge is for a developer to consult widely and clearly to capture a balanced and informed response. When executed well, engagement should increase the level of transparency, develop relationships, and shape the project by considering and responding to feedback*."

7.2 As a company based in Wales, and investing in Wales, Green GEN Cymru attaches great importance to the effect that its work may have on the environment and local communities in Wales. Green GEN Cymru is committed to providing clear and up-to-date information on its proposals, and listening to local people and consulting them at each stage where their views can help to shape Green GEN Cymru's proposals before consent applications are submitted.

7.3 Green EN Cymru recognises that finding a route for the Green GEN Towy Usk project is a complex process, and its consultation strategy goes beyond the PEDW good practice guidance to ensure that local people have the opportunity to comment at each stage of the routeing process. Therefore, two rounds of pre-application consultation will be carried out, as follows:

- Round One: Public consultation on the preferred route for the Green GEN Towy Usk project, during Spring 2023.
- Round Two: Public consultation on a detailed route alignment for the Green GEN Towy Usk project, including proposed tower locations, access routes and working areas, likely in Spring 2024.

7.4 Following submission of the consent applications, PEDW will carry out further statutory consultation with the public and stakeholders before making any decisions on the plans.

[9] Welsh Government (2021) Pre-application Community Consultation: Best Practice Guidance for Developers. Available [online] at: https://www.gov.wales/sites/default/files/publications/2021-12/planning-major-developments-guidance-on-pre-application-consultation.pdf

7.5 The overall objective of the consultation process is to ensure that all parties with an interest in the project have access to up to date information and are given clear and easy ways in which to comment, so they can help to shape and inform Green GEN Cymru's proposals at the pre-application stage.

7.6 The key issues identified through the pre-Scoping consultation process will be recorded and presented to decision makers in the Consultation Report to be submitted with the DNS application.

7.7 To ensure that all residents and stakeholders potentially affected by the proposals are consulted, Green GEN Cymru has defined a consultation zone. The zone includes all residential and business addresses within the preferred routeing corridor and up to 1km either side of it. Where the boundary of the zone would bisect a community, the boundary will be extended to include the whole settlement. However, any member of the public (whether living within or outwith the consultation zone) will be welcome to participate in the consultation, attend an event or make a comment using one of the channels outlined within this document.

7.8 The consultation will include the following broad groups:

- Statutory and non-statutory consultees, including PEDW, community councils, Natural Resources Wales (NRW), Cadw, archaeological trusts and local planning authorities (Powys and Carmarthenshire County Councils and the Brecon Beacons National Park Authority);
- Approximately 7,500 homes and businesses in the consultation zone;
- Known local interest and community groups operating in the area affected by the proposals;
- Elected members of Powys and Carmarthenshire Councils, Members of the Senedd (MSs) and Members of Parliament (MPs) whose constituencies are within the consultation zone; and
- The public in general.

7.9 Green GEN Cymru will also consult fully with affected landowners and occupiers, who will have an ongoing opportunity to comment on proposals as they progress.

7.10 Pre-Scoping consultation (undertaken prior to submission of a formal request for an EIA Scoping direction) will include drop-in and online events for the public, stakeholders and consultees. Details of the consultation process are set out below.

Consultation Dates and Duration

7.11 The consultation will run for eight weeks, from Monday 06 March 2023 to Friday 28 April 2023.

7.12 Prior to the start of consultation, adverts will appear in local weekly newspapers promoting the consultation events and explaining where to find information and how to take part. A news release will be issued to local media announcing the impending start of the consultation. Information leaflets explaining the project and the consultation will be posted out to homes, businesses, and known local interest and community groups within the local area making them aware of the start of the consultation and inviting them to take part. Other stakeholder groups will also be contacted direct, informed and invited to take part.

7.13 The closing date for sending responses to Green GEN Cymru will be midnight on Friday 28 April 2023. Following this date, the information will remain accessible online on the project website and available to download from www.greengentowyusk.com

The Focus of the First Round of Consultation

7.14 This report presents the outcome of the routeing stage of the Green GEN Towy Usk project, resulting in the identification of a preferred route.

7.15 The focus of the first round of consultation will be to invite people to provide their views on:

- The preferred route;
- Any of the alternative route options considered during the appraisal process; and
- Any other issues, suggestions or feedback; particularly views on the local area (for example, areas used for recreation, local environmental features, and any plans to build along the OHL route).

Sources of Information about the Consultation

Project Website

7.16 The project website will be accessible via the following link and will contain publicly available consultation documents available for viewing or download, and an online feedback form. The feedback form will be available from Monday 06 March 2023 until the deadline for receipt of feedback at midnight on Friday 28 April 2023.

www.greengentowyusk.com

Project leaflet

7.17 The leaflet will be mailed to every home and business in the consultation zone (within 1km of the study area). It will include details of the scheme, the consultation process, how to find out more and how to submit comments by feedback form, website, post or email, and by when.

How People can make Comments

7.18 There will be a number of ways for people to make comments:

- In person at a consultation event;
- Online, using the feedback form on the website www.greengentowyusk.com
- By post, using a paper feedback form, or by letter to FREEPOST GREEN GEN TOWY USK;
- By email to the project email address info@greengentowyusk.com ; or
- By phone to the project contact centre Freephone number 0800 3777 339.

In person

7.19 Green GEN Cymru will hold five public consultation exhibitions within the local area where people can view maps and documents, talk to members of the project team and pick up a feedback form. Locations have been chosen so that people within the consultation zone are only a short distance from their nearest exhibition by car or public transport. The dates and venues are listed in full in the project leaflet and on the website. The format will be an afternoon/evening drop-in.

7.20 The exhibitions will be held at the following locations at the dates and times stated:

- Thursday 23 March, 2pm to 7:30pm: Montgomery Pavilion, Royal Welsh Showground, Builth Wells LD2 3SY
- Saturday 25 March, 11am to 4pm: Llandeilo Fawr Civic Hall, 17 Crescent Road, Llandeilo SA19 6HW
- Tuesday 28 March, 2pm to 7:30pm: Penybont District Community Centre, nr Llandrindod Wells LD1 5UA
- Wednesday 29 March, 2pm to 7:30pm: Llandovery Rugby Club, Church Bank, Llandovery SA20 0BA
- Thursday 30 March, 2pm to 7:30pm: Llandyfaelog Community Hall, Carmarthenshire SA17 5PA

Online

7.21 People will be able to make comments online at www.greengentowyusk.com using an interactive online version of the feedback form, which will be available until midnight on Friday 28 April 2023.

7.22 The website will also host online consultation webinars and 'live chat' sessions for those who would like to find out more, or ask questions to the project team, but who are unable or prefer not to attend the drop-in exhibitions. Further information on these events, and how to join, will be available on www.greengentowyusk.com

By post

7.23 A hard-copy feedback form will be available at public exhibitions, for download from the website, by request to the project contact centre on 0800 3777 339 or by email to info@greengentowyusk.com . Completed forms must be returned to FREEPOST GREEN GEN TOWY USK by Friday 28 April 2023.

By email

7.24 Green GEN Cymru will also accept consultation responses by e-mail to info@greengentowyusk.com by midnight on Friday 28 April 2023.

By phone

7.25 Green GEN Cymru prefers to receive comments in writing as this helps avoid the risk of misinterpretation. However, where no other means are available, people can comment via phone call free on 0800 3777 339. The project contact centre is open Monday to Friday (except bank holidays) between the hours of 9am and 5.30pm. There is a voicemail facility outside of these hours where people can leave messages.

After the consultation

7.26 The responses received in the first round of consultation will be evaluated by Green GEN Cymru and reported back in the form of a Consultation Summary Report. Although Green GEN Cymru may not be able to respond to all individual comments, people will be able to request to be informed by email as and when there are project developments, such as the availability of the Consultation Summary Report.

7.27 People interested in being kept informed in this way can register on the website or send their email address to info@greengentowyusk.com

Next Steps: Route Alignment and EIA

7.28 The responses received from the consultation process will be considered in combination with the findings of this Routeing and Consultation Document to enable Green GEN Cymru to determine a 'proposed route' to be progressed to the next stage in the development process.

7.29 The proposed route will then be progressed to identify an OHL alignment, including tower positioning, which will be informed by the detailed surveys which will be presented in the Environmental Statement (ES) and discussions with landowners. This alignment, including all ancillary development, will be included in the application to PEDW for planning permission.

7.30 Green GEN Cymru intends to consult fully with affected landowners and occupiers on all aspects of the Green GEN Towy Usk project and will give them opportunity to comment on the proposals as they progress. This will include the public consultation on a detailed route alignment for the project.