

The Great Grid Upgrade

Western Link 2

Summary of Landfall and Terrestrial routeing and siting options

June 2026

nationalgrid

Contents

1. Executive summary	1
1.1. Context	1
1.2. In-focus routeing and siting considerations	1
1.3. Approach to option assessment	2
1.4. Options considered	3
1.5. Emerging preferences	7
1.6. Next steps	8
2. Introduction	9
2.1. Project Description	9
2.2. Purpose of this document	10
2.3. Structure of this document	10
3. Landfall siting	11
3.1. Options considered	11
3.2. Options assessment	12
3.3. Emerging preference(s)	12
4. Onshore cable routeing	14
4.1. Options considered	14
4.2. Options assessment	17
4.3. Emerging preference(s)	18
5. Converter station siting	20
5.1. Options considered	20
5.2. Options assessment	21
5.3. Emerging preference(s)	22
6. Consolidated emerging preferences	23

Figures

<i>Figure 1: Schematic of WL2 layout</i>	1
<i>Figure 2: Focus siting and routeing components</i>	2
<i>Figure 3: National Grid approach to consenting</i>	2
<i>Figure 4: Landfall Siting Zones (source: TCPRSS)</i>	3
<i>Figure 5: Cable Corridor Combinations (source: TCPRSS)</i>	5
<i>Figure 6: Comparison between WL2-PEN-CC-GS-01 and WL2-PEN-CC-LF2_W (source: TCPRSS)</i>	6
<i>Figure 7: Converter Station Siting Zones (source: TCPRSS)</i>	7
<i>Figure 8: Preliminary Landfall Siting Zones (source: TCPRSS)</i>	11
<i>Figure 9: Preliminary Cable Corridor Sections with 250m, 500m and 1km buffers (source: TCPRSS)</i>	15
<i>Figure 10: Cable Corridor Combinations (source: TCPRSS)</i>	17
<i>Figure 11: Comparison between WL2-PEN-CC-GS-01 and WL2-PEN-CC-LF2_W (source: TCPRSS)</i>	18
<i>Figure 12: Converter Station Siting Zones (source: TCPRSS)</i>	21

1. Executive summary

1.1. Context

National Grid Electricity Transmission (NGET) and Scottish Power Energy Networks (SP Energy Networks) are working together to upgrade the electricity transmission network between Ayrshire, Scotland, and Gwynedd, Wales. This will enable the connection of new renewable and low-carbon energy generation in Scotland and its transportation to homes and businesses in Wales and beyond.

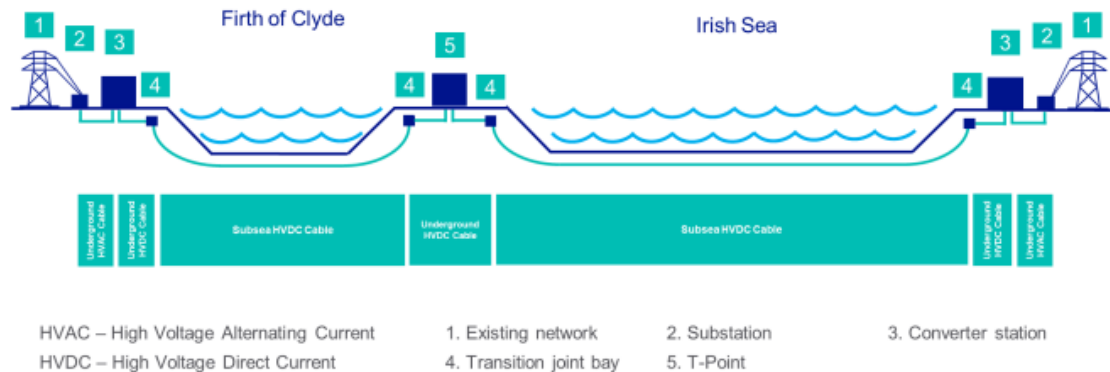
To do this, NGET and SP Energy Networks are jointly developing a new 2-gigawatt high voltage direct current (HVDC) link; the link will be approximately ~400km in length and will be predominantly offshore. This project is known as Western Link 2 and would transport enough electricity to power 2 million homes.

Western Link 2 will pass through numerous national jurisdictions, and several consents, permissions and licences will be required from multiple authorities to deliver the project. Although NGET and SP Energy Networks are developing the project together, they will take the lead for the development and consenting of different parts of the Western Link 2 project.

Western Link 2 (WL2) stems from the Holistic Network Design (HND), which established the need for this reinforcement as part of a broader package to complement policy ambitions to increase offshore wind generation as part of plans for achieving net zero.

Figure 1 illustrates the intended layout for WL2 as a schematic.

Figure 1: Schematic of WL2 layout



1.2. In-focus routing and siting considerations

NGET is leading the development of the project in respect of its footprint in the jurisdictions of Northern Ireland, Isle of Man and Wales. This includes marine cable routing in non-Scottish territorial waters, cable landfall in North Wales, and onshore cable routing between landfall and converter station, followed by connection to the existing Pentir substation, which will need to be extended to accommodate the additional 2GW infeed from WL2.

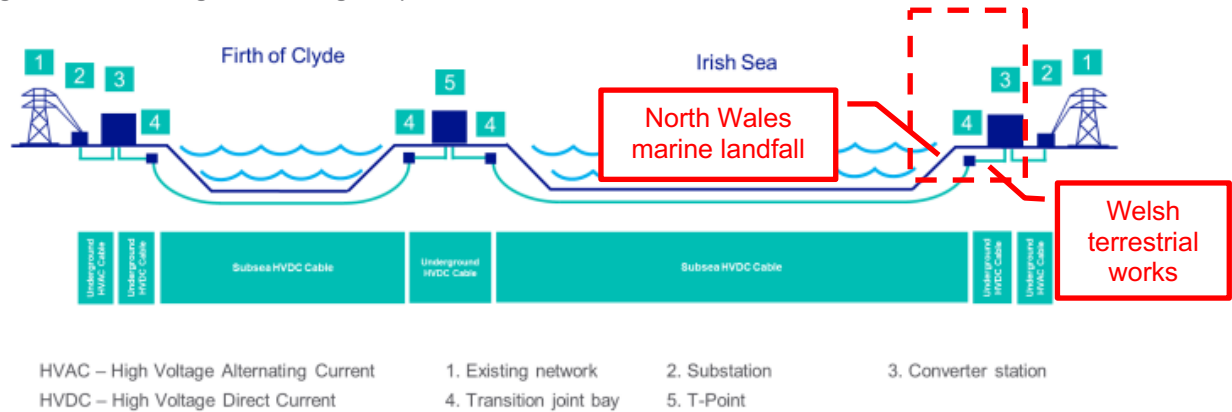
The focus of this document is on specific siting and routing choices relevant to the southern branch of WL2 running from the T-point at Girvan, South Ayrshire to Pentir, County of Gwynedd. Its focus will be on the following specific aspects in North Wales, as illustrated in the red dashed box in Figure 2:

- Cable landfall site location;
- Onshore cable routing between landfall and converter station; and
- Converter station site location.

The following aspects of the project's overall routing and siting are not included in this document:
WL2 | Summary of Landfall and Terrestrial routing & siting options – June 2026

- Marine cable routing for the southern branch of WL2, which passes through territorial waters of Northern Ireland and Isle of Man in addition to England and Wales, in the approach to potential landfall sites;
- Routing and siting for the Girvan end of the southern branch of WL2: and
- Routing and siting for the northern branch between Kilmarnock South and Girvan.

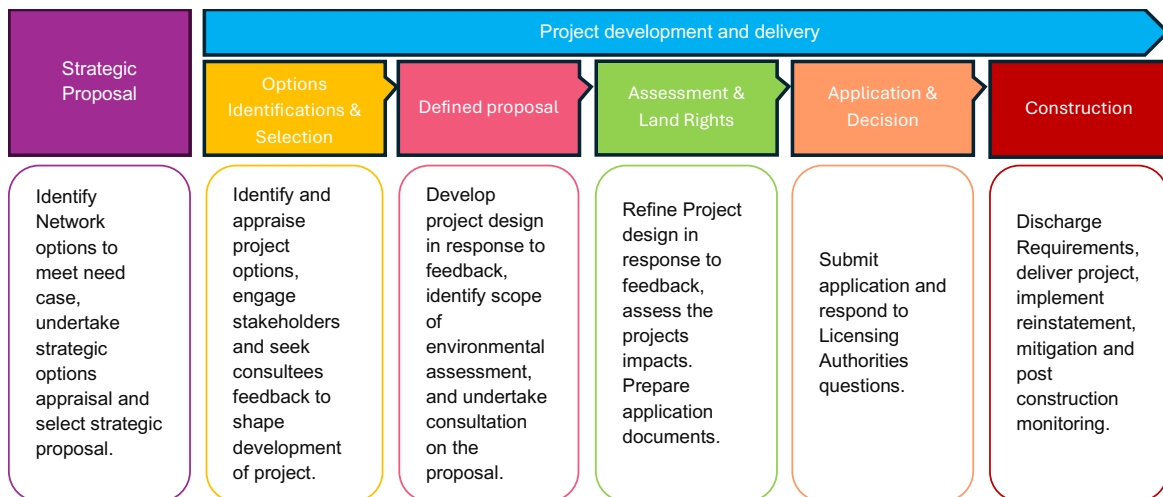
Figure 2: Focus siting and routeing components



1.3. Approach to option assessment

National Grid is applying its established major infrastructure project development and delivery approach, as shown in Figure 3, for WL2 progression. The project is in the second stage of the process; options identification and selection.

Figure 3: National Grid approach to consenting



Options identification and selection has been informed by studies and assessment including the following, along with extensive use of challenge and review workshops with multi-disciplinary involvement:

- Terrestrial Corridor Preliminary Routeing and Siting Study (TCPRSS);
- Marine Corridor Preliminary Routeing and Siting Study (MCPRSS); and
- Strategic Optioneering Report.

The assessment and detailed consideration of options that has been conducted to date allows for the identification of emerging preferences for siting and routeing choices in relation to the project's footprint in the North Wales region. These emerging preferences are set out in this document and will be the subject of stakeholder engagement/consultation. Based on feedback received and

reflection on this, the project will then move to the next stage, in which a defined proposal will be established for further assessment and evaluation.

1.4. Options considered

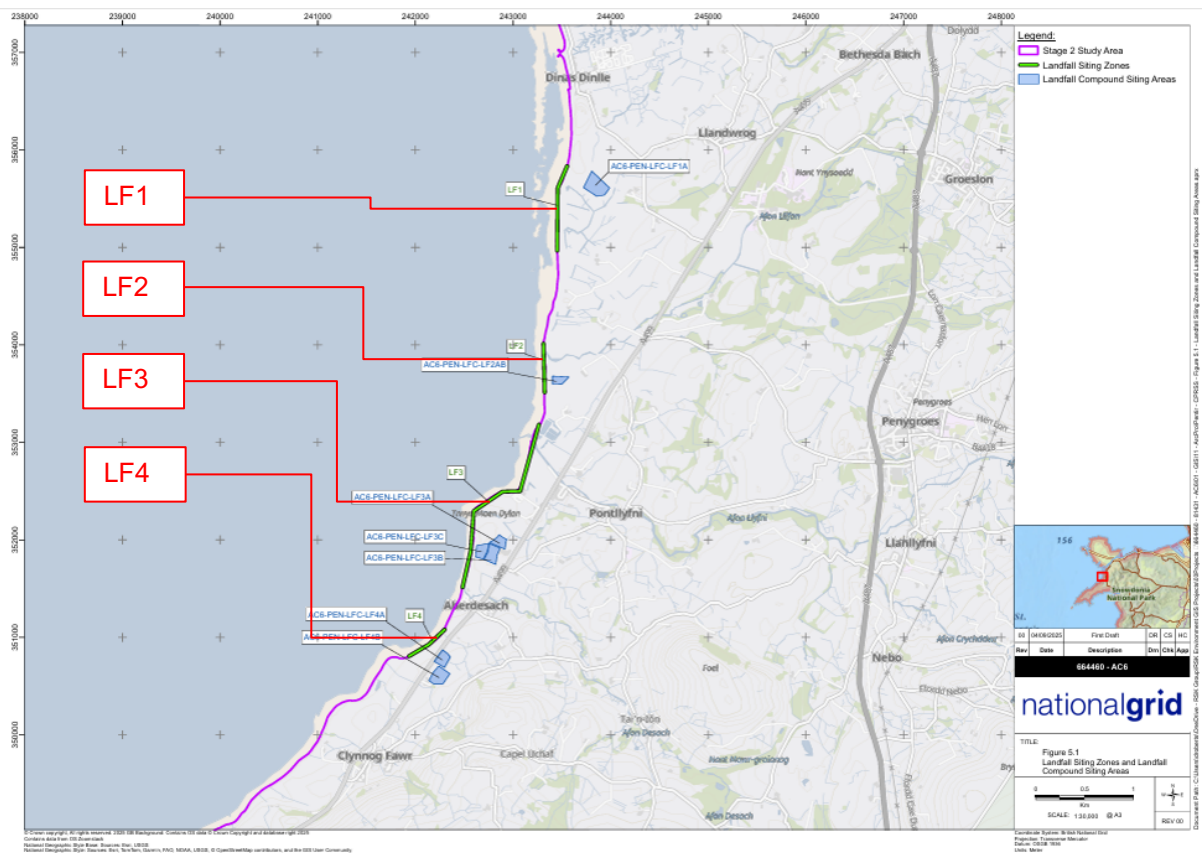
1.4.1. Landfalls in North Wales

A Landfall Siting Zone is a geographically defined area of coastline that has been identified as having the physical, environmental, and technical characteristics necessary to accommodate the transition point where an offshore HVDC cable makes landfall and connects to the onshore HVDC system.

Four preliminary Landfall Siting Zones in the vicinity of Pentir were identified through initial appraisal and taken forward in the options appraisal. These sites are as follows, and as shown in Figure 4:

- **LF1:** This siting zone lies on the Dinas Dinlle/Morfa Dinlle frontage, immediately southwest of Caernarfon and inland of the coastal dune and flood-defence ridge. The shoreline is a wide, exposed sandy/gravel beach with intertidal sandflats, backed by grassed dunes and engineered embankments.
- **LF2:** This siting zone is located near the Pontllyfni coast and fronts a more open, rural shoreline between Dinas Dinlle and Aberdesach.
- **LF3:** This siting zone is set on the Aberdesach frontage, where the coast transitions locally from a shallow sandy/shingle beach to low beach cliffs formed by glacial soils
- **LF4:** This siting zone is situated close to Clynnog Fawr and faces a more exposed stretch of the Llŷn north coast.

Figure 4: Landfall Siting Zones (source: TCPRSS)



These landfall options have been considered and assessed from terrestrial environmental and technical and marine technical perspectives, with all feeding into overall assessment of the relative merits of the options.

Marine and terrestrial feasibility constraints were identified in respect of LF1. From a marine perspective, shallow bathymetry presents challenges for cable installation. On land, potential site access limitations, a low water table with associated flood risk, and the likelihood of impacts to sensitive habitats such as peatlands and bird populations limit feasibility.

LF4 has good feasibility from a marine perspective. However, it faces terrestrial constraints linked to National Landscape and Heritage Coast, plus technical challenges such as slope stability and environmental disturbance.

LF2 is considered the strongest option from a terrestrial perspective, given gentler topography, shorter onshore route / less trenchless work, and fewer direct ecological and tourism receptor conflicts. However, it faces multiple marine constraints linked to shallow bathymetry and significant outcrop.

LF3 is the strongest option from a marine perspective, given favourable offshore geology, good access and reasonable bathymetry. However, the site has a greater topographical change and requires longer onshore cable sections than LF2 from the territorial perspective. This increases construction footprint, access requirements and trenchless crossing complexity (with crossings linked to a river, a road and Sites of Special Scientific Interest (SSSI) / Special Areas of Conservation), leading to technical constraints from a terrestrial perspective.

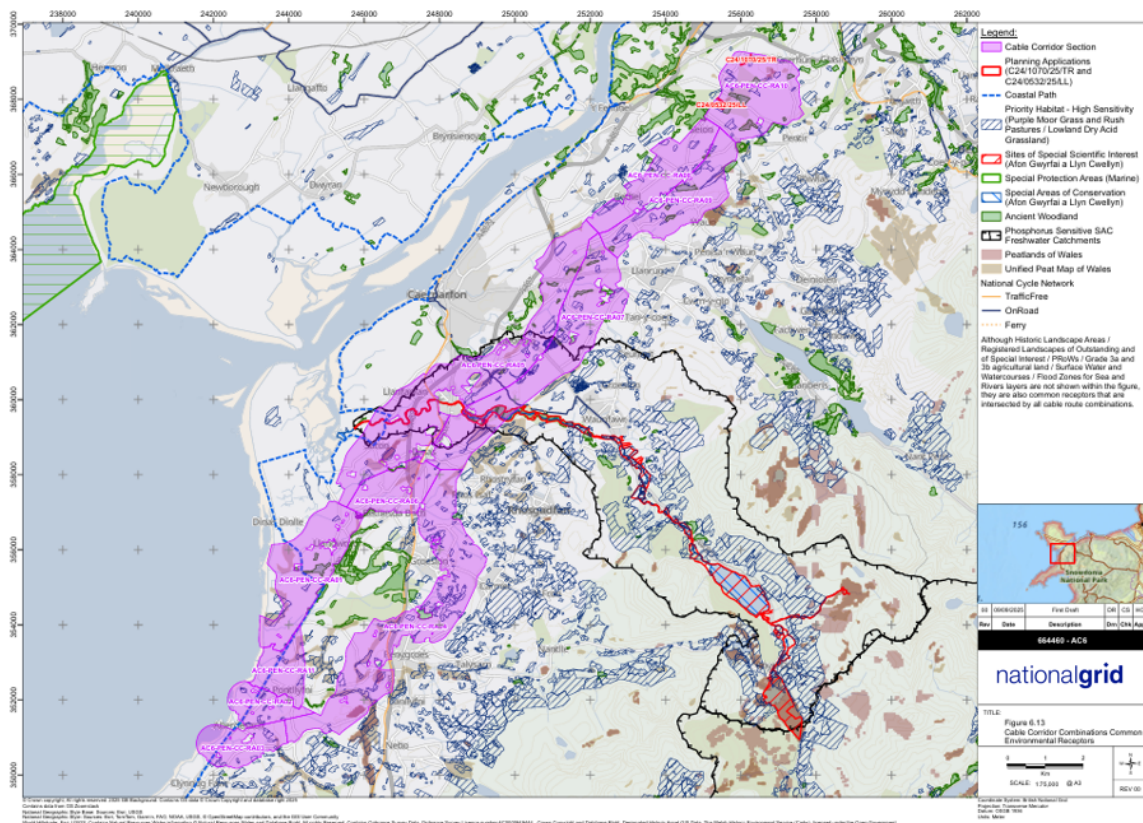
There is a trade-off between LF2 and LF3, given the former's strengths from a terrestrial perspective and the latter's strengths from a marine perspective. On balance, the relative advantages of LF3 from a marine perspective are considered to outweigh the more marginal relative advantages of LF2 from a terrestrial perspective. Therefore, **LF3** is the option that is the emerging preference at this stage, subject to ongoing considerations and engagement.

1.4.2. Onshore cable routeing in North Wales

Cable Corridor Sections are the building blocks of the onshore cable connection, while Cable Corridor Combinations are groupings of corridor sections that form complete alignments from each Landfall Siting Zone to the Converter station siting zones. Based on 11 identified Cable Corridor Sections, 6 Cable Corridor Combinations were identified with three following western routeing options and the remaining three following eastern routeing options. These cable corridor routes are as follows and as shown in Figure 5:

- **WL2-PEN-CC-LF2_W**: from landfall site LF2 to Pentir via western routeing;
- **WL2-PEN-CC-LF2_E**: from landfall site LF2 to Pentir via eastern routeing;
- **WL2-PEN-CC-LF3_W**: from landfall site LF3 to Pentir via western routeing;
- **WL2-PEN-CC-LF3_E**: from landfall site LF3 to Pentir via eastern routeing;
- **WL2-PEN-CC-LF4_W**: from landfall site LF4 to Pentir via western routeing; and
- **WL2-PEN-CC-LF4_E**: from landfall site LF4 to Pentir via eastern routeing.

Figure 5: Cable Corridor Combinations (source: T CPRSS)



From both an engineering and environmental perspective, the WL2-PEN-CC-LF2_W and WL2-PEN-CC-LF2_E options are the most preferred Cable Corridor Combinations. These routes present the shortest overall lengths (21.3 and 21.4km, respectively) and avoid many of the key receptors and designations that affect other alignments.

The WL2-PEN-CC-LF2_W option is marginally preferred to WL2-PEN-CC-LF2_E as it provides a narrower SSSI crossing and passes through areas with less peatland and fewer priority habitats, thereby reducing both consenting risk and construction complexity. The shorter distance also reduces construction duration, reinstatement time, and associated disturbance to residents and receptors. WL2-PEN-CC-LF2_E performs similarly well, with only a minor increase in length and environmental exposure.

The second most favoured combination is the WL2-PEN-LFC-LF3. At approximately 23.6km, this route remains relatively short and is considered preferable if LF3 is confirmed as the favoured Landfall Siting Zone.

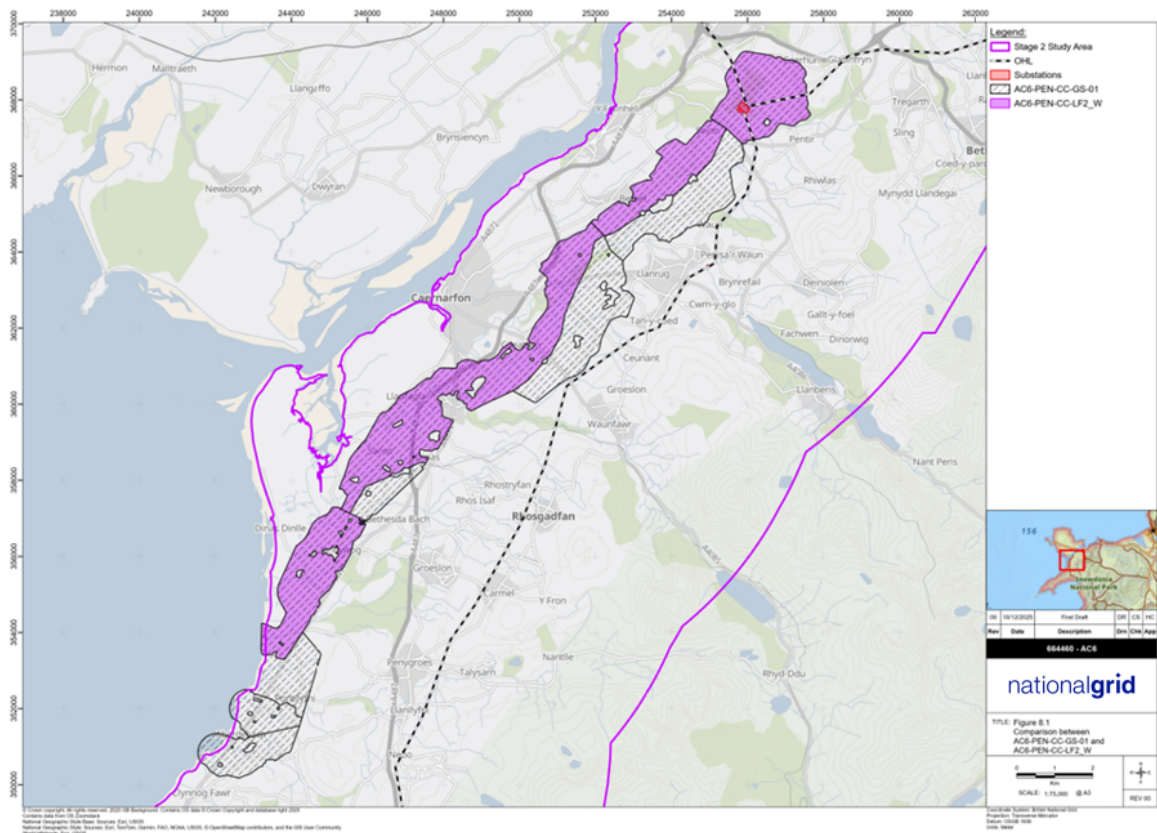
The WL2-PEN-CC-LF3_E and WL2-PEN-CC-LF3_W combinations are considered the third most favoured. Both routes are longer (25km and 31km, respectively) and interact with more peatland, more priority habitats, and several urban areas. WL2-PEN-CC-LF3_E requires a wider SSSI crossing, while WL2-PEN-CC-LF3_W is substantially longer at 31.1km. These factors increase construction duration, community disturbance, and environmental complexity.

The least preferred options are WL2-PEN-CC-LF4_W and WL2-PEN-CC-LF4_E. These routes traverse the Llŷn AONB and Heritage Coast, which significantly increases landscape and visual sensitivity and ensures any works would be subject to greater scrutiny. Both also interact with extensive peatland, priority habitats, and urban areas, alongside more challenging.

Following additional consideration to increase flexibility and focus on the landfall areas that are emerging as preferences going forward, an additional Cable Corridor Combination was identified; WL2-PEN-CC-GS-01. This is primarily based on WL2-PEN-CC-LF2_W, but with key unconstrained areas from other sections incorporated. Adding the WL2-PEN-CC-GS-01 Cable Corridor Combination is considered to ensure greater optionality and adaptability. A comparison between WL2-PEN-CC-GS-01 and WL2-PEN-CC-LF2_W is shown in Figure 6.

Following the addition of WL2-PEN-CC-GS-01, it is the emerging preferred option.

Figure 6: Comparison between WL2-PEN-CC-GS-01 and WL2-PEN-CC-LF2_W (source: TCPRSS)



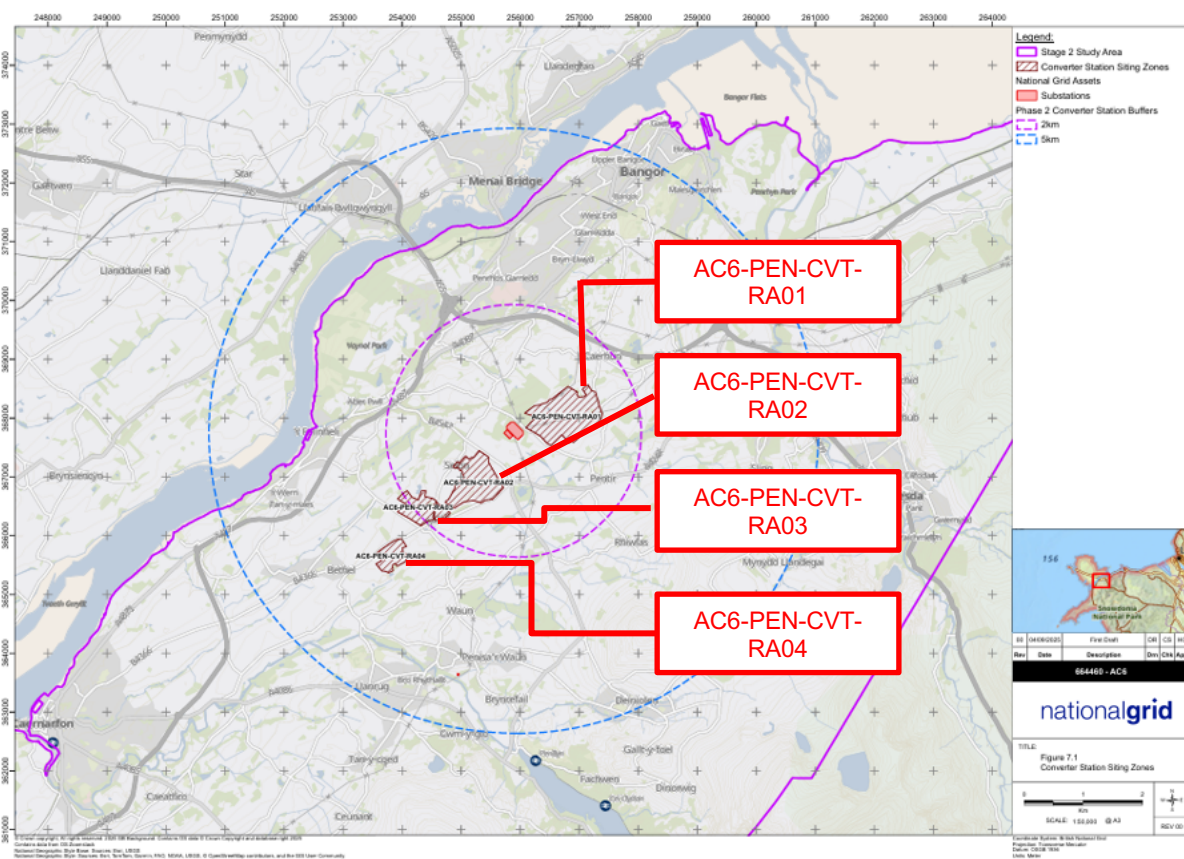
1.4.3. Converter station siting zone in North Wales

A Converter Station Siting Zone is a strategically defined area of land that possesses the spatial, environmental, and technical capacity to accommodate one or more Converter Station Siting Areas, each of which is suitable for hosting a single converter station, associated components and construction areas.

Four potential Converter Station Siting Zones near Pentir, all in proximity to existing National Grid infrastructure at Pentir and the 400 kV OHL network, were identified and brought forward to the options appraisal stage. These sites are as follows and as shown in Figure 7:

- **WL2-PEN-CVT-RA01:** located closest to the existing 400 kV Pentir substation;
- **WL2-PEN-CVT-RA02:** situated slightly further from the substation but within the same wider area;
- **WL2-PEN-CVT-RA03:** positioned east of Pentir in more constrained terrain; and
- **WL2-PEN-CVT-RA04:** located to the south, in an area with potential ground condition and access constraints.

Figure 7: Converter Station Siting Zones (source: TCPRSS)



Following detailed appraisal, significant constraints were identified in respect of WL2-PEN-CVT-RA03 and WL2-PEN-CVT-RA04:

- **WL2-PEN-CVT-RA03** is bisected by the B4366, presenting significant logistical challenges for AIL and HGV access.
- **WL2-PEN-CVT-RA04** is located adjacent to the Coed Bolyn Mawr Farm Historic Landfill Site, which is privately-owned and with no records of deposited materials, posing a risk of groundwater contamination and leachate migration into the siting zone.
- **Both sites** are also considerably smaller and located further away from the existing Pentir substation than either of the alternative two options.

Each of **WL2-PEN-CVT-RA01** and **WL2-PEN-CVT-RA02** are highly viable options, both within 2km of Pentir substation and with good access roads. However, the latter has slightly higher engineering effort due to platform formation and utilities diversion coordination requirements.

Therefore, **WL2-PEN-CVT-RA01** is the option that is the emerging preference at this stage, subject to ongoing considerations and engagement.

1.5. Emerging preferences

All options remain in consideration pending further investigations. However, at this stage and based on prevailing knowledge, the emerging preferences for siting and routing near the north Wales landfall and terrestrial infrastructure are as follows:

- **Landfall site location:** site **LF3** based on balance of marine and terrestrial feasibility assessments.
- **Onshore cable routing:** cable corridor combination **WL2-PEN-CC-GS-01** given its optionality and adaptability.

- **Converter station siting:** site **WL2-PEN-CVT-RA01** based on its proximity to Pentir, accessibility and engineering feasibility.

1.6. Next steps

Taking the emerging preferences outlined in this document, the project will move onto stakeholder and public consultation and non-intrusive/intrusive survey activities.

2. Introduction

2.1. Project Description

National Grid Electricity Transmission (NGET) and Scottish Power Energy Networks (SP Energy Networks) are working together to upgrade the electricity transmission network between Ayrshire, Scotland and Gwynedd, Wales to connect new renewable and low-carbon energy to homes and businesses.

To do this, we are jointly proposing to build a new 2-gigawatt high voltage direct current (HVDC) link approximately 400 kilometres long and primarily offshore. This project is known as Western Link 2 (WL2).

Western Link 2 passes through numerous jurisdictions, each with their own authorities who we must obtain permission from to deliver our proposals. Although we are jointly responsible for developing WL2, NGET and SP Energy Networks are taking the lead on different parts of the proposed project, depending on the relevant authority in that area. This includes:

SP Energy Network's Onshore Proposals

- a new converter station next to Kilmarnock South substation in Ayrshire;
- a 13 kilometre underground HVDC cable linking the new converter station with a landfall location on the Ayrshire coast, near Monkton; and
- connecting into a new switching station at Grangestone, north of Girvan in Ayrshire.

SP Energy Network's Inshore Marine Proposals

- a new 42-kilometre marine HVDC cable starting at a landfall location on the Ayrshire coast near Monkton, then routing south to another landfall location at Grangestone, north of Girvan, in Ayrshire; and
- a further 55 kilometres of new marine HVDC cable from the landfall location at Grangestone, north of Girvan, in Ayrshire, routing south to the southern limit of Scottish territorial seas.

National Grid's Wider Marine Proposals

- approximately 200 kilometres of additional new marine HVDC cable, starting from the southern limit of Scottish territorial seas and continuing south until it reaches Welsh territorial seas.

National Grid's Inshore Marine Proposals

- approximately 65 kilometres of new marine HVDC cable, starting from limit of Welsh territorial seas and ending at a new underground transition joint bay at a landfall location on the Gwynedd coastline, at Caernarfon Bay.

National Grid's Onshore Proposals

- a new underground transition joint bay at the landfall location on the Gwynedd coastline at Caernarfon Bay, where the new marine HVDC cable connects to a new onshore HVDC cable;
- a new underground HVDC cable route of approximately 25 kilometres length from the landfall location to a new converter station;
- a new converter station near the existing Pentir substation in Gwynedd;
- an extension to existing Pentir substation, for the purposes of connecting Western Link 2 to the National Electricity Transmission System, including modifications to existing overhead lines in proximity to Pentir substation to accommodate the new infrastructure; and
- a short length of a new underground High Voltage Alternating Current (HVAC) cable between the new converter station and extended Pentir substation.

2.2. Purpose of this document

As NGET's elements of WL2 integrate both marine and terrestrial infrastructure, a transition would occur at a landfall zone along the coastline in North Wales. At this interface, HVDC cables extend from the marine environment and, following landfall, into the terrestrial environment and then, via an HVDC converter station, into the transmission system.

Multiple design choices need to be made to deliver the infrastructure. These choices include elements such as marine cable landfall siting, onshore cabling routeing and HVDC converter station siting. Multiple options exist for each choice, each with differing impacts on socio-economic and environmental outcomes and with different engineering challenges. Much consideration has been given to and assessment conducted in respect of these choices in the context of WL2.

For the parts of WL2 that are currently being led by NGET, this document captures the prevailing status of assessment across these design areas and consolidates the emerging preferences, based on the assessments completed to date. Specifically, this document captures the current thinking in respect of the North Wales landfall, terrestrial siting and routeing. These elements of WL2 fall within National Grid's Inshore Marine Proposals and National Grid's Onshore Proposals. Final decisions are still to be made and will be informed by further studies and assessment.

2.3. Structure of this document

The remainder of this document is structured as follows:

- **Section 3: Landfall** – describes the landfall options considered in North Wales, the assessment undertaken, and the emerging preferred landfall option(s);
- **Section 4: Onshore cable routeing** – details the onshore cable routeing options considered in North Wales, the assessment process, and the emerging preferred corridor option(s);
- **Section 5: Converter station siting** – presents the converter station siting options in North Wales, the associated assessments, and the emerging preferred site(s); and
- **Section 6: Consolidated emerging preferences** – provides a consolidated overview of the appraisal findings, key decisions, and preferred options.

3. Landfall siting

3.1. Options considered

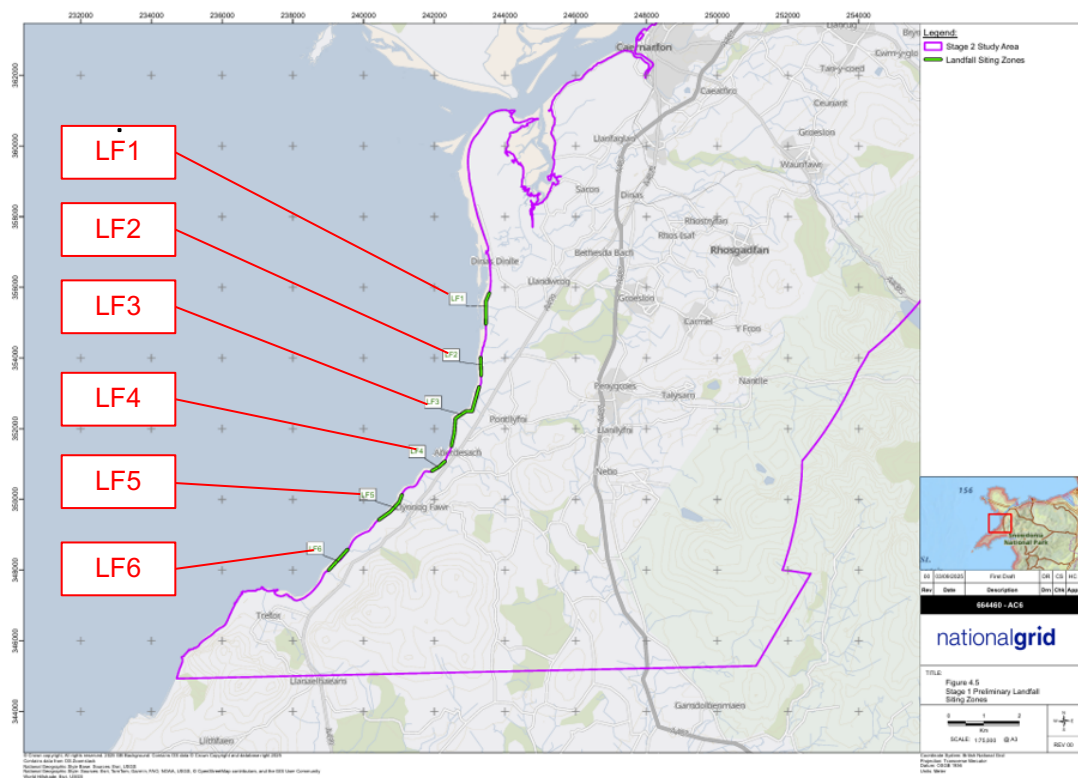
The Strategic Optioneering Process identified the Pentir area as the preferred strategic option. On this basis, the TCPRSS develops and refines preliminary Landfall Siting Zones, Landfall Compound Siting Areas, Cable Corridor Sections (and Combinations), and Converter Station Siting Zones in the Pentir area. It also conducts comparative assessment of these to identify emerging preferred options.

Building on preceding work, six Landfall Siting Zones, extending across a 5.5km stretch of the Caernarfon Bay coastline between Dinas Dinlle and Clynnog Fawr, were identified in the Pentir area. These are shown in Figure 8.

More detailed assessment of these locations highlighted that two of these options, LF5 and LF6, faced significant limitations in terms of landfall feasibility, namely excessively steep terrain and thick superficial geology. Therefore, four options were taken forward as follows:

- **LF1:** This siting zone lies on the Dinas Dinlle/Morfa Dinlle frontage, immediately southwest of Caernarfon and inland of the coastal dune and flood-defence ridge. The shoreline is a wide, exposed sandy/gravel beach with intertidal sandflats, backed by grassed dunes and engineered embankments.
- **LF2:** This siting zone is located near the Pontllyfni coast and fronts a more open, rural shoreline between Dinas Dinlle and Aberdesach.
- **LF3:** This siting zone is set on the Aberdesach frontage, where the coast transitions locally from a shallow sandy/shingle beach to low beach cliffs formed by glacial soils.
- **LF4:** This siting zone is situated close to Clynnog Fawr and faces a more exposed stretch of the Llŷn north coast.

Figure 8: Preliminary Landfall Siting Zones (source: TCPRSS)



3.2. Options assessment

Options LF1 to LF4 inclusive have been assessed from both a terrestrial feasibility and a marine feasibility perspective. The outcomes from these assessments are set out below.

3.2.1. Terrestrial assessment

The findings of the terrestrial feasibility assessment, as derived from the BRAG ranking summary from TCPRSS, highlight several key points that emerge from the analysis.

- **LF1:** Faces multiple terrestrial constraints including potential site access limitations, a low water table with associated flood risk, and the likelihood of impacts to sensitive habitats such as peatlands and bird populations.
- **LF2:** Option with strongest feasibility from a terrestrial perspective given gentle topography, short onshore route / less trenchless work, and fewer direct ecological and tourism receptor conflicts.
- **LF3:** Similar feasibility to LF2 in most regards, although the site has a greater topographical change and requires longer onshore cable sections than LF2. This increases construction footprint, access requirements and trenchless crossing complexity (with crossings linked to a river, a road and Sites of Special Scientific Interest (SSSI) / Special Areas of Conservation), leading to technical constraints from a terrestrial perspective.
- **LF4:** Faces multiple terrestrial constraints linked to National Landscape and Heritage Coast designations, plus technical challenges such as slope stability and environmental disturbance.

3.2.2. Marine assessment

The findings of the Marine feasibility assessment, as derived from the BRAG ranking summary from MCPRSS, highlight several key points that emerge from the analysis.

- **LF1:** Faces multiple marine constraints including a very shallow approach to shore, significant areas of outcrop and construction challenges.
- **LF2:** Also faces multiple marine constraints linked to shallow bathymetry and significant outcrop.
- **LF3:** Reasonable bathymetry, good offshore geology and relatively short landfall HDD.
- **LF4:** Good bathymetry, moderate offshore geology and relatively short landfall HDD.

3.3. Emerging preference(s)

Drawing together the findings from the assessments conducted to date, it is clear that there are different emerging preferences from terrestrial and marine perspectives; the emerging preference from the terrestrial assessment is LF2, while the emerging preference from the marine assessment is LF3. Given this, work has been undertaken to consider the balance between marine and terrestrial assessment in the context of an overall, aggregated assessment across both.

To recap:

- **Terrestrial perspective:** There is a preference for LF2 over LF3 due to the smaller topographical change across the LF2 area. Additionally, LF2 benefits from the fewest designated ecological sites in direct conflict with the landfall works. Where statutory designations or priority habitats are present, they can be largely avoided through a trenchless installation approach, with a comparatively shorter length required than the alternative longer and more costly installation to serve the LF3 site. This reduces both technical risk and environmental disturbance. In addition, LF2 avoids the densest clusters of sensitive recreational or tourism receptors. Overall, LF2 demonstrates a more balanced risk profile across all key disciplines than LF3.

- **Marine perspective:** There is a preference for LF3 over LF2 due to favourable bathymetry, offshore geology, and site access constraints for LF3 over LF2. Additionally, LF3 benefits from the shortest HDD landfall length, more suitable (deeper) water depth for interface between long length HDD landfall and sub-sea cable than for LF2. LF3 also has less complex access requirements for onshore site working area than LF2.

On balance, the relative advantages of LF3 from a marine perspective are considered to outweigh the more marginal relative advantages of LF2 from a terrestrial perspective. Therefore, **LF3** is the option that is the emerging preference at this stage, subject to ongoing considerations and engagement. However, LF2, LF3 and LF4 are all technically feasible landfalls and worthy of initial consultation.

4. Onshore cable routeing

4.1. Options considered

4.1.1. Preliminary Primary/Secondary Cable Corridor Sections

A Cable Corridor Section defines the maximum spatial boundary within which onshore cable infrastructure may be installed, including all potential alignments and construction areas required for installation, operation, and maintenance. This approach ensures design flexibility while minimising environmental, technical, consenting, and land-use impacts.

Potential HVDC Cable Corridor Sections were mapped to connect potential landfall sites with potential converter station sites. The routeing methodology was informed by BRAG analysis, which identified spatial patterns of constraint and opportunity through heatmapping. Corridor alignments were developed following a “path of least resistance” to minimise interaction with key environmental, planning, technical, and socio-economic designations and receptors.

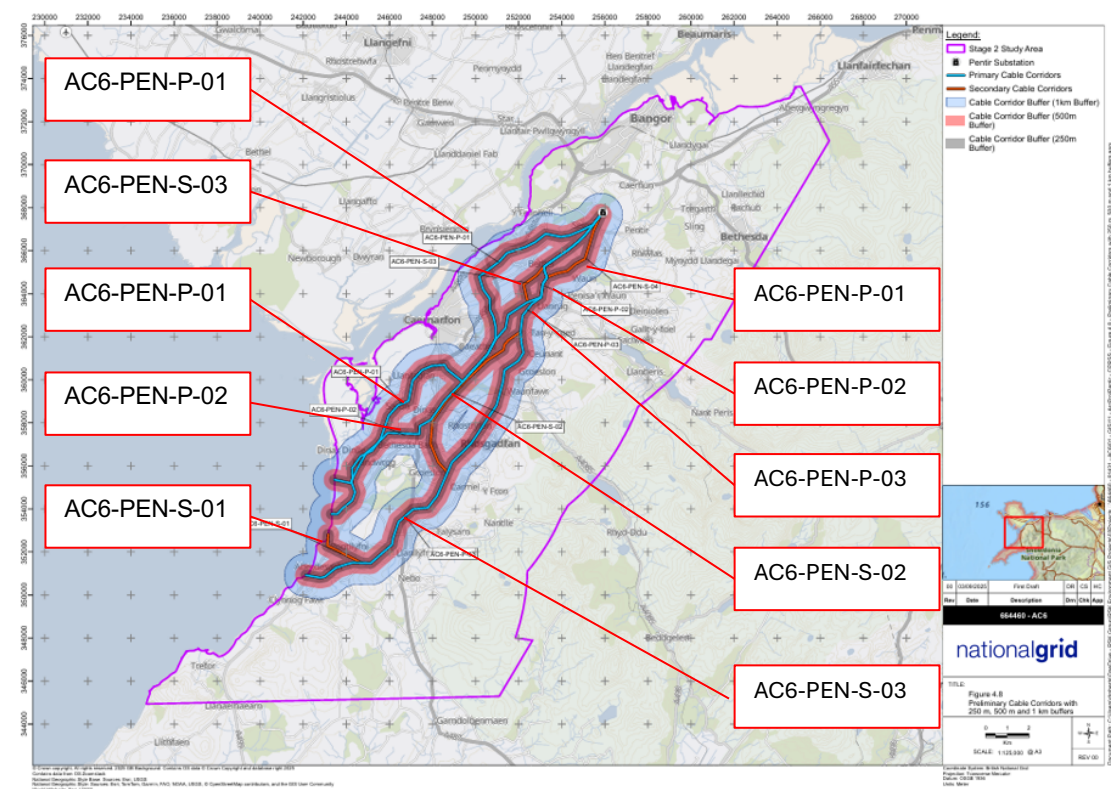
Buffer zones of 250m, 500m, and 1km were applied to each route to support refinement and maintain flexibility, based on relevant project experience. This approach enabled the identification of wider corridor envelopes for later optimisation. The result was a set of multiple cable corridor options within the Stage 2 Study Area, resulting in multiple routeing options that provide flexibility and resilience to evolving constraints and stakeholder feedback.

As part of the preliminary routeing and siting process, the identified corridors were categorised into Primary and Secondary Cable Corridor Sections to support a structured and flexible approach to route development. As illustrated in Figure 9, the Primary Cable Corridor Sections comprised three principal ‘trunk’ routes forming the backbone of the routeing strategy. These corridors followed the most direct and least constrained alignments from Landfall Siting Zones LF1, LF2, and LF4, extending northwards towards the existing Pentir 400 kV substation, and were prioritised based on their strategic fit and reduced interaction with high-sensitivity areas.

Secondary Cable Corridor Sections were subsequently developed to provide interconnectivity between the Primary corridors, enabling routeing flexibility and optionality. These sections acted as contingency routes and supported the development of a resilient and adaptable corridor network for appraisal and future consenting stages.

Due to its proximity to LF4, LF3 did not generate a standalone Primary corridor. Instead, it was incorporated into the network via a Secondary Cable Corridor Section (WL2-PEN-S-01), which connected LF3 to Primary Cable Corridor Section WL2-PEN-P-03, ensuring its inclusion within the overall routeing strategy.

Figure 9: Preliminary Cable Corridor Sections with 250m, 500m and 1km buffers (source: TCPRSS)



4.1.2. Identified Cable Corridor Sections

11 Cable Corridor Sections (RA01–RA11) formed the building blocks of the onshore routing strategy. Each section was assessed against environmental, socio-economic, land use, planning, and technical criteria, distinguishing between common receptors (shared across all options) and differentiating receptors, which enabled comparison of risks, opportunities, and overall feasibility.

A brief description of each Cable Corridor Section is provided below:

- **WL2-PEN-CC-RA01:** This section begins at the Dinas Dinlle/Morfa Dinlle frontage and routes inland across low-lying agricultural land, connecting toward the A499 corridor. The underground cable route within this section would be approximately 4.4km in length.
- **WL2-PEN-CC-RA02:** This section starts at the Pontllyfni/Clynnog Fawr frontage and routes inland across enclosed pasture, turning toward the A499. Underground cable routes within this section would be approximately 1.15km in length.
- **WL2-PEN-CC-RA03:** This section begins at the Aberdesach frontage, crossing coastal hinterland near areas of AONB/Heritage Coast, before trending inland. Underground cable routes within this section would be approximately 2.16km in length.
- **WL2-PEN-CC-RA04:** This section runs inland from the coastal feeders, which are the existing utility routes along the coast, providing early corridor consolidation and accommodating the first tranche of watercourse and minor road crossings. Underground cable routes within this section would be approximately 10.0km in length.
- **WL2-PEN-CC-RA05:** This section forms part of the western inland route, extending through medium length agricultural land parcels while balancing settlement avoidance and floodplain extents. Underground cable routes within this section would be approximately 11.74km in length.
- **WL2-PEN-CC-RA06:** This section provides a shorter inland link, offering optionality for western and eastern routing alternatives. Underground cable routes within this section would be approximately 3.11km in length.

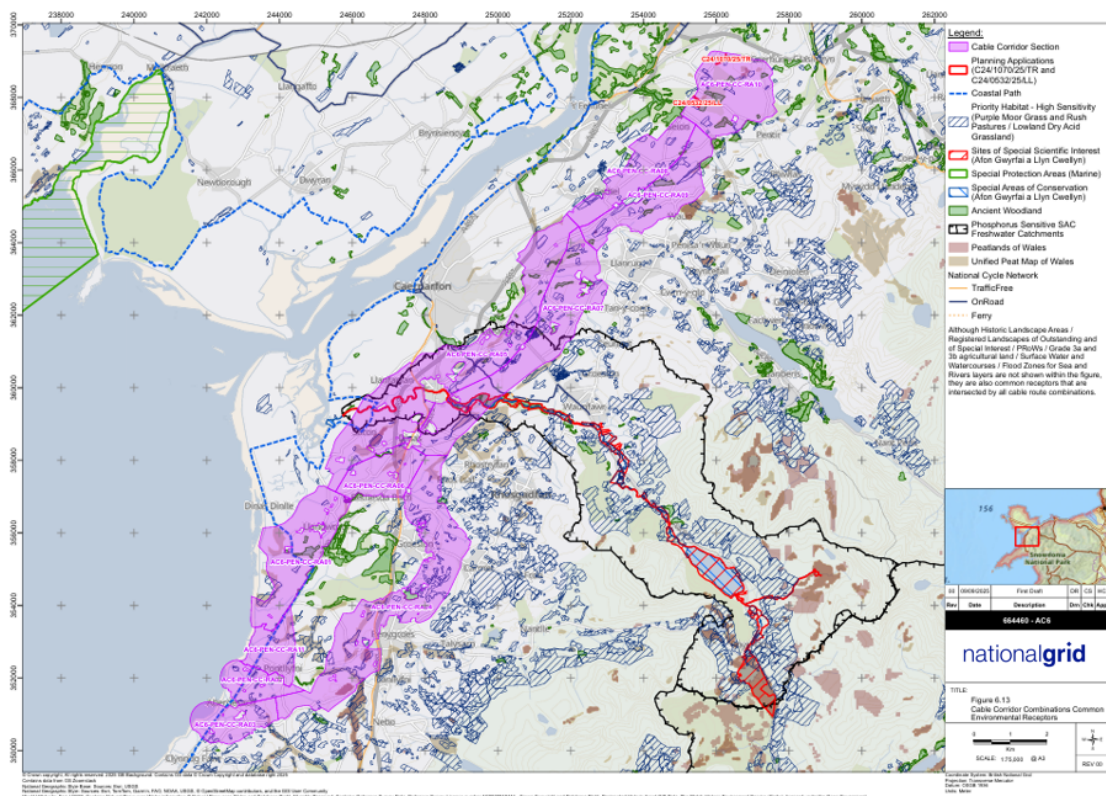
- **WL2-PEN-CC-RA07:** This section forms part of the eastern inland route, connecting agricultural land and field patterns with the wider corridor network. Underground cable routes within this section would be approximately 8.18km in length.
- **WL2-PEN-CC-RA08:** This section provides a western convergence link, rationalising crossings before the central approach. Underground cable routes within this section would be approximately 4.5km in length.
- **WL2-PEN-CC-RA09:** This section provides an eastern convergence link, tying the inland routes into the shared central corridor. Underground cable routes within this section would be approximately 5.23km in length.
- **WL2-PEN-CC-RA10:** This section provides the final approach to the Converter Station Siting Zones, offering a versatile tie-in and direct access to the highway network. Underground cable routes within this section would be approximately 2.5km in length.
- **WL2-PEN-CC-RA11:** This section is retained as a contingency or variant approach, safeguarding design resilience and optionality during later consenting. Underground cable routes within this section would be approximately 2.8km in length.

4.1.3. Identified Cable Corridor Combinations

Taking the 11 Cable Corridor Sections outlined above as inputs, 6 Cable Corridor Combinations were identified. Three routes follow western routeing options, and the remaining three follow eastern routeing options. These cable corridor routes are as follows and their constituent parts are shown in Figure 10:

- **WL2-PEN-CC-LF2_W:** from landfall site LF2 to Pentir via western routeing;
- **WL2-PEN-CC-LF2_E:** from landfall site LF2 to Pentir via eastern routeing;
- **WL2-PEN-CC-LF3_W:** from landfall site LF3 to Pentir via western routeing;
- **WL2-PEN-CC-LF3_E:** from landfall site LF3 to Pentir via eastern routeing;
- **WL2-PEN-CC-LF4_W:** from landfall site LF4 to Pentir via western routeing; and
- **WL2-PEN-CC-LF4_E:** from landfall site LF4 to Pentir via eastern routeing.

Figure 10: Cable Corridor Combinations (source: TCPRSS)



4.2. Options assessment

4.2.1. Initial Cable Corridor Combinations

Each of the Cable Route Combination Options were further analysed for common Environmental Receptors that are consistently present within all eleven Cable Corridor Sections. These designations and receptors are considered common because they either directly intersect the corridor section or they are located within 250m of the corridor section boundary. While these designations and receptors form an important part of the baseline environment and may influence design or mitigation measures, they do not provide a basis for distinguishing between corridor sections, as they are unavoidable across all sections.

From both an engineering and an environmental perspective, the WL2-PEN-CC-LF2_W and WL2-PEN-CC-LF2_E options are the most preferred Cable Corridor Combinations. These routes present the shortest overall lengths (21.3 and 21.4km, respectively) and avoid many of the key receptors and designations that affect other alignments.

The WL2-PEN-CC-LF2_W is marginally preferred to WL2-PEN-CC-LF2_E as it provides a narrower SSSI crossing and passes through areas with less peatland and fewer priority habitats, thereby reducing both consenting risk and construction complexity. The shorter distance also reduces construction duration, reinstatement time, and associated disturbance to residents and receptors. WL2-PEN-CC-LF2_E performs similarly well, with only a minor increase in length and environmental exposure.

The second most favoured combination is the WL2-PEN-LFC-LF3. At approximately 23.6km, this route remains relatively short and is considered preferable if LF3 is confirmed as the favoured Landfall Siting Zone.

The WL2-PEN-CC-LF3_E and WL2-PEN-CC-LF3_W combinations are considered the third most favoured. Both routes are longer (25km and 31km, respectively) and interact with more peatland, more priority habitats, and several urban areas. WL2-PEN-CC-LF3_E requires a wider SSSI crossing, while WL2-PEN-CC-LF3_W is substantially longer at 31.1km. These factors increase construction duration, community disturbance, and environmental complexity.

The least preferred options are WL2-PEN-CC-LF4_W and WL2-PEN-CC-LF4_E. These routes traverse the Llŷn AONB and Heritage Coast, which significantly increases landscape and visual sensitivity and ensures any works would be subject to greater scrutiny. Both also interact with extensive peatland, priority habitats, and urban areas, alongside more challenging.

4.2.2. Additional Cable Corridor Combination

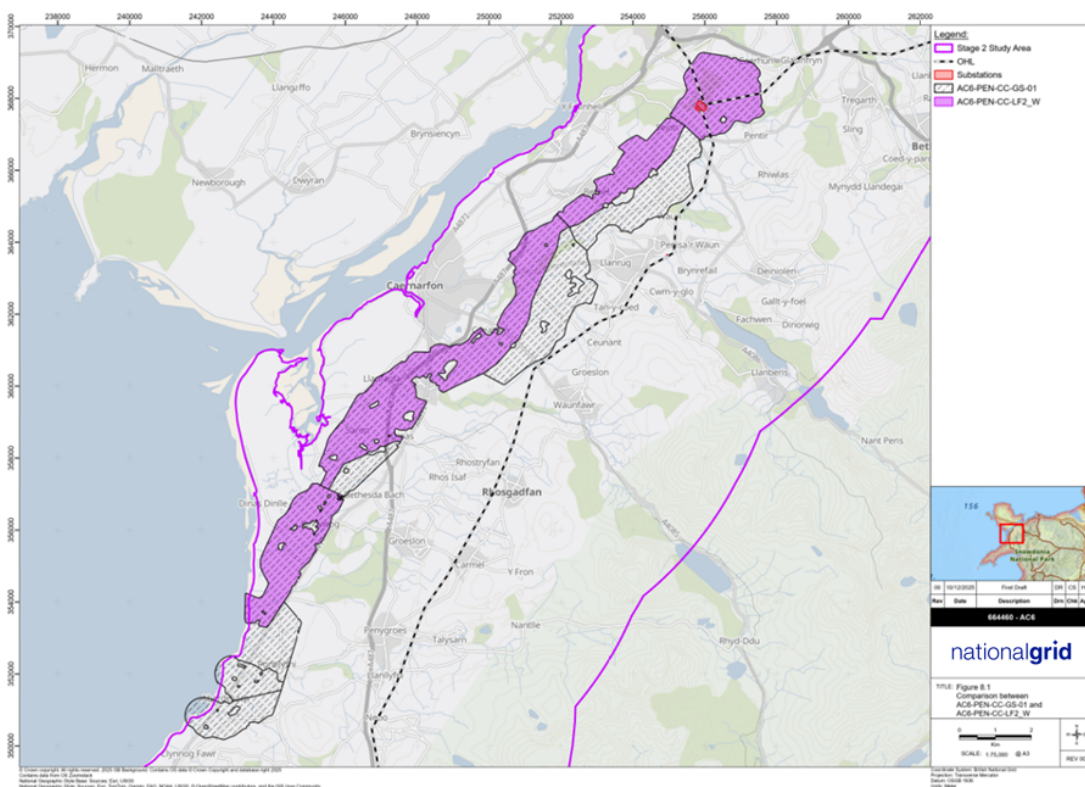
Although WL2-PEN-CC-LF2_W remained the confirmed preferred Cable Corridor Combination, the project team agreed to refine its boundary to increase flexibility as the corridor transitioned into the Graduated Swathe model. This refinement involved a realignment and integration of multiple Cable Corridor Sections to reinforce connectivity with the main WL2-PEN-CC-LF2_W route.

To optimise connectivity across Landfall Siting Zones (LF2, LF3 and LF4), the team incorporated unconstrained areas from various corridor combinations originating within each Landfall Siting Zone. Additionally, Cable Corridor Section WL2-PEN-CC-RA11 was introduced to enhance connectivity specifically to LF3 and LF4. This approach concentrated the Graduated Swathe on the landfall options progressing into Stage 3.

Therefore, following additional consideration to increase flexibility and focus on the landfall areas that are emerging as preferences going forward, an additional Cable Corridor Combination was identified; WL2-PEN-CC-GS-01. This is primarily based on WL2-PEN-CC-LF2_W, but with key unconstrained areas from other sections incorporated. Adding the WL2-PEN-CC-GS-01 Cable Corridor Combination is considered to ensure greater optionality and adaptability. A comparison between WL2-PEN-CC-GS-01 and WL2-PEN-CC-LF2_W is shown in Figure 11.

Following the addition of WL2-PEN-CC-GS-01, it is the emerging preferred option.

Figure 11: Comparison between WL2-PEN-CC-GS-01 and WL2-PEN-CC-LF2_W (source: TCRSS)



4.3. Emerging preference(s)

The following emerging preferences stem from consideration of the original set of corridors:

- The WL2-PEN-CC-LF2_W option has been identified as the most preferred Cable Corridor Combination, due to clear environmental and technical advantages, closely followed by LF2_E.
- If LF3 is selected as the preferred landfall, the WL2-PEN-CC LF3 (A, B and C) + WL2-PEN-CC RA11 + WL2-PEN-CC-LF2_W/E combination becomes the second most favoured option.
- Other alignments such as WL2-PEN-CC-LF3_E and LF3_W are considered workable but less favourable, while WL2-PEN-CC-LF4_W and LF4_E are the least preferred due to their greater length, landscape designations, and more challenging environmental and socio-economic constraints.

However, WL2-PEN-CC-GS-01 (based on WL2-PEN-CC-LF2_W) offers greater optionality and adaptability going forward and is the emerging preference moving into future phases of project development.

5. Converter station siting

5.1. Options considered

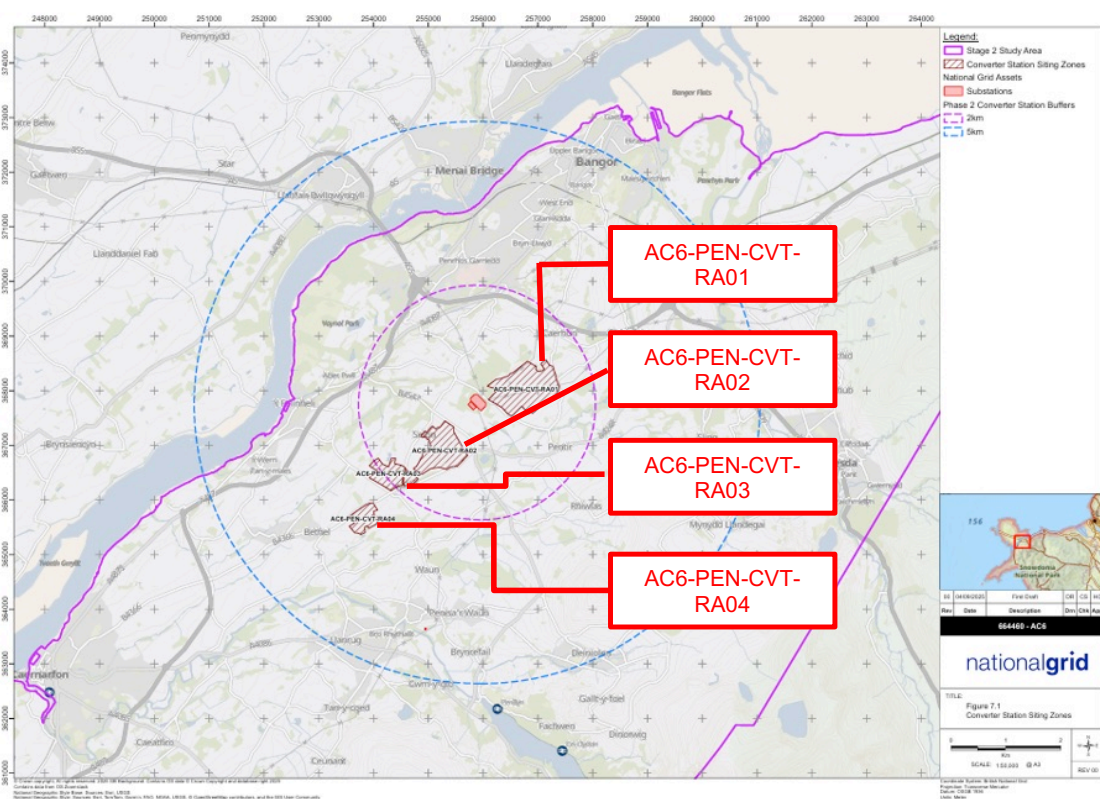
A Converter Station Siting Zone is a strategically defined area of land that possesses the spatial, environmental, and technical capacity to accommodate one or more Siting Areas, each of which is suitable for hosting a single converter station, associated components and construction areas.

The identification of Preliminary Converter Station Siting Zones focused on spatial environmental, planning and socio-economic constraints, as well as on technical feasibility and engineering parameters. This integrated approach ensured that both environmental sensitivities and engineering requirements were considered from the outset. Proximity to the existing Pentir substation was an important factor in site identification, as this offers solutions more closely integrated with existing infrastructure, which helps to reduce engineering requirements and local area impacts.

As a result of preliminary consideration, four options were taken forward as follows and as shown in Figure 12:

- **WL2-PEN-CVT-RA01:** Located approximately 1.0km northeast of the existing 400 kV Pentir substation, this Converter Station Siting Zone is located within the 2km radius set by NGET in the Converter Station Siting Hierarchy;
- **WL2-PEN-CVT-RA02:** Situated approximately 1.1km southwest of the existing 400 kV Pentir substation, this Converter Station Siting Zone is also located within the 2km radius set by NGET in the Converter Station Siting Hierarchy;
- **WL2-PEN-CVT-RA03:** Positioned approximately 1.9–2.0km southwest of the existing 400 kV Pentir substation, this Converter Station Siting Zone sits at the edge of the 2km radius; and
- **WL2-PEN-CVT-RA04:** Located approximately 3.0km south of the existing 400 kV Pentir substation, this Converter Station Siting Zone falls outside the 2km radius but sits within the 5km radius set by NGET in the Converter Station Siting Hierarchy.

Figure 12: Converter Station Siting Zones (source: TCPRSS)



5.2. Options assessment

From both an engineering and environmental perspective, assessment of the sites is as follows:

- WL2-PEN-CVT-RA01:** lies within the 2km radius of Pentir substation, sits in enclosed rolling farmland, and can be accessed from the A4244 via minor B-roads with proposed upgrades. The principal differentiating risks are proximity to existing assets and OHL clearance, which are manageable through early engagement with National Grid Electricity Transmission/National Gas Transmission (NGT) or National Gas Distribution (NGD) and a construction access assessment. No direct peatland, SSSI or SPA conflicts; potential effects on nearby Ancient Woodland and five nearby Scheduled Monuments are limited to setting and can be addressed through micrositing, screening and a proportionate WSI. With limited receptors within 250m and no PRoW crossings, the socio-economic risk profile is low and largely construction-phase only. Overall, WL2-PEN-CVT-RA01 offers good deliverability, consenting confidence and operational flexibility.
- WL2-PEN-CVT-RA02:** also sits within 2km of Pentir and benefits from direct frontage to two high-quality B-roads (B4547/B4366), simplifying Abnormal Indivisible Load (AIL) routing subject to junction improvements. Differentiating risks relate to cut-and-fill, existing buried/adjacent assets, and settlement potential. These are well bounded: converter siting refinement, targeted ground investigation, and early engagement with telecoms/utility owners are expected to reduce risk. One minor watercourse traverses the site; a standard buffer, pollution prevention and sustainable drainage strategy will reduce hydrological effects. Visual effects are manageable with micrositing toward lower ground and woodland/thicket planting along the B4366. Receptors within 250m are few; PRoWs lie outside the footprint. On balance, WL2-PEN-CVT-RA02 is highly viable, but engineering effort requires platform formation and utilities diversion coordination.
- WL2-PEN-CVT-RA03:** also within the 2km radius, but it comprises two separate parcels north of the B4366, which increases access complexity for AIL, internal logistics and construction phasing. Risks are AIL access, existing assets, settlement, and a restricted

developable area; mitigations include swept-path assessment, early engagement with telecoms, and ground investigation, but the split-parcel layout continues to constrain layout and landscaping opportunities. Two small watercourses and nearby surface waters elevate construction water-management needs. Views from scattered properties and the Ty'n Rhos Country House Hotel require careful design and planting; PRow in close proximity add sensitivity during construction. These issues are not prohibitive, but they increase complexity, programme risk and stakeholder interface. Additionally, the site is amongst the smallest of the available options, resulting in reduced siting optionality.

- **WL2-PEN-CVT-RA04:** lies outside the 2km radius (approximately 3km from Pentir), directly intersects two PRows, and sits beside the B4366 with nearby residences (e.g., Coed Bolyn Lodge). Differentiating risks include AIL access, existing assets, settlement, restricted site area, and a potential groundwater/landfill constraint on the boundary. While AIL access could be engineered (swept-path design, junction works), the combination of PRow diversions or stopping-up, closer residential viewpoints, and the need for a landfill desk study/hydrogeology assessment (with possible gas/leachate controls and foundation adaptation) elevates consenting and construction risk. Landscape and visual effects are also harder to contain due to the PRow that cross the siting zone, requiring robust mitigation. These issues present planning and delivery risks. Furthermore, the site is located adjacent to the Coed Bolyn Mawr Farm Historic Landfill Site. The site was privately owned, with no records of deposited materials, posing a risk of groundwater contamination and leachate migration into the siting zone. Additionally, the site is amongst the smallest of the available options, resulting in reduced siting optionality.

5.3. Emerging preference(s)

Drawing on the above assessment, the Converter Station Siting Zone options have been ranked in order of emerging preference based on both technical and environmental considerations:

- **WL2-PEN-CVT-RA01:** the most preferred siting zone and is considered to offer the best balance of deliverability, consenting confidence and operational flexibility;
- **WL2-PEN-CVT-RA02:** the second preferred siting zone as a highly viable option, albeit with a slightly higher engineering effort than WL2-PEN-CVT-RA01 due to platform formation and utilities diversion coordination;
- **WL2-PEN-CVT-RA03:** the third-ranked siting zone, with increased complexity, programme risk and stakeholder interface compared with WL2-PEN-CVTRA01 or WL2-PEN-CVT-RA02; and
- **WL2-PEN-CVT-RA04:** the least preferred siting zone given its distance from Pentir and issues considered to present the highest planning and delivery risk across the options.

WL2-PEN-CVT-RA01, is therefore, the emerging preferred option overall, as it combines proximity to Pentir substation, fewer environmental constraints, low socio-economic risk and manageable engineering challenges that offers greater consenting confidence and clearer pathway to operation.

6. Consolidated emerging preferences

All options remain in consideration pending further investigations. However, at this stage and based on prevailing knowledge, the emerging preferences for siting and routeing near the north Wales landfall and terrestrial infrastructure are as follows:

- **Marine landfall location:** site LF3 based on balance of marine and terrestrial feasibility assessments,
- **Onshore cable routeing:** cable corridor combination **WL2-PEN-CC-GS-01** given its optionality and adaptability.
- **Converter station siting:** site **WL2-PEN-CVT-RA01** based on its proximity to Pentir, accessibility and engineering feasibility.

National Grid Electricity Transmission
National Grid House, Warwick Technology Park,
Gallows Hill, Warwick, CV34 6DA

Scottish Power Energy Networks Holdings Limited
320 St Vincent Street, Glasgow, G2 5AD

