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MONA OFFSHORE WIND PROJECT

Environmental Statement

Volume 5, Annex 4.2: Site Selection BRAG Report

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Image of an offshore wind farm

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Mona Offshore Wind Ltd	**Mona Offshore Wind Ltd.**

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Glossary

Term	Meaning
Bodelwyddan National Grid Substation	This is the Point of Interconnection (POI) selected by National Grid for the Mona Offshore Wind Project.
Cable Route Protocol	This comprises a set of requirements developed by The Crown Estate detailed in Appendix 1, to help developers establish a transmission system infrastructure including export cabling
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Project (NSIP).
Export Cable Region	The Region defined by Niras within the Round 4 HRA for the Irish Sea and North Wales bidding area where preferred bidders may place cable infrastructure
Mona Offshore Wind Project	The Mona Offshore Wind Project is comprised of both the generation assets and offshore and onshore transmission assets and associated activities.
Mona Offshore Transmission Infrastructure Scoping Search Area	The area that was presented in the Mona Scoping Report as the area encompassing and located between the Mona Potential Array Area and the landfall up to Mean High Water Springs (MHWS), in which the offshore export cables and any offshore booster substation will be located.
Mona Onshore Transmission Infrastructure Scoping Search Area	The area that was presented in the Mona Scoping Report as the area located between Mean High Water Springs (MHWS) at the landfall and the onshore National Grid substation, in which the onshore export cables, onshore substation and other associated onshore transmission infrastructure will be located.
Mona Offshore Cable Corridor	The corridor located between the Mona Array Area and the landfall up to Mean High Water Springs (MHWS), in which the offshore export cables and the offshore booster substation will be located.
Mona Onshore Cable Corridor Search Area	The corridor located between Mean High Water Springs (MHWS) at the landfall and the Mona onshore substation, in which the onshore cable route will be located.
Mona 400kV Cable Corridor	The corridor from the Mona onshore substation to the Bodelwyddan National Grid substation.
Mona Proposed Onshore Development Area	The area in which the landfall, onshore cable corridor, onshore substation, mitigation areas, temporary construction facilities (such as access roads and construction compounds), and the connection to National Grid Bodelwyddan substation will be located.
Offshore Substation Platform (OSP)	The offshore substation platforms located within the Mona Array Area will transform the electricity generated by the wind turbines to a higher voltage allowing the power to be efficiently transmitted to shore.
Applicant	Mona Offshore Wind Limited.
Wind turbines	The wind turbine generators, including the tower, nacelle and rotor.
Inter-array cables	Cables which connect the wind turbines to each other and to the offshore substation platforms. Inter-array cables will carry the electrical current produced by the wind turbines to the offshore substation platforms.
Interconnector cables	Cables that may be required to interconnect the Offshore Substation Platforms in order to provide redundancy in the case of cable failure elsewhere.
Intertidal area	The area between Mean High Water Springs (MHWS) and Mean Low Water Springs (MLWS).

Term	Meaning
Landfall	The area in which the offshore export cables make contact with land and the transitional area where the offshore cabling connects to the onshore cabling.
The Northern Wales and Irish Sea Bidding Area	The Northern Wales and Irish Sea Bidding Area was one of four Bidding Areas identified by The Crown Estate through the Offshore Wind Leasing Round 4 process.
Preferred Bidding Areas	The Applicant identified two Preferred Bidding Areas (Morgan and Mona) within the Northern Wales and Irish Sea Bidding Area. In February 2021, The Crown Estate awarded the Applicant the right to develop up to 1.5GW of wind capacity within each of the two Preferred Bidding Areas.
Offshore Wind Leasing Round 4	The Crown Estate auction process which allocated developers preferred bidder status on areas of the seabed within Welsh and English waters and ends when the Agreements for Lease (AfL) are signed.

Acronyms

Acronym	Description
AfL	Agreement for Lease
AoS	Area of Search
BRAG	Black, Red, Amber, Green
CRIA	Cable Route Identification and Approval
CRP	Cable Route Protocol
HND	Holistic Network Design
JNCC	Joint Nature Conservation Committee
MCZ	Marine Conservation Zone
NGESO	National Grid Electiricty System Operator
NRW	Natural Resources Wales
POI	Point of Interconnection
SAC	Special Area of Conservation
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest

1. SELECTION AND REFINEMENT OF THE ONSHORE INFRASTRUCTURE

1.1 Introduction

1.1.1 Purpose

1.1.1.1 This annex summarises the refinements made to the Mona Offshore Wind Project onshore infrastructure options (cable route, onshore substation location and siting, and onshore substation access) following the Stakeholder consultation exercise involving the project's Expert Working Group (EWG) members in 2022 and 2023; and the subsequent consultation feedback received from all consultees as part of the Preliminary Environmental Information Report (PEIR) published in April 2023, as required under the Planning Act 2008. This annex describes subsequent additional technical work that has been undertaken since the consultation, in order to select and refine the onshore infrastructure. A reduction in the onshore cable route optionality and the onshore substation final location were communicated to the Site Selection EWG, landowners and the public via a post consultation newsletter in Autumn 2023.

1.1.1.2 The outcomes presented in this annex are the result of careful consideration of feedback provided by stakeholders and consultation responses; and further BRAG (Black-Red-Amber-Green) analysis undertaken by the Applicant in combination with evolving and updated technical, environmental and landowner information.

1.1.1.3 The purpose of this report is:

- To share the further refinement that has been undertaken on the final option(s) since PEIR in April 2023; and
- To present at a high level the work that has been undertaken to select the final onshore cable route, onshore substation location and siting, and onshore substation access; and the reasons why the other shortlisted options have been deselected.

1.1.2 Data sources

1.1.2.1 Surveys and targeted consultation were undertaken as part of the Scoping, Preliminary Environmental Information Report and Environmental Impact Assessment processes to inform the site selection work.

1.1.2.2 Targeted data collection and consultation has informed the site selection process following identification of a preferred option to progress micro-siting of the Mona Offshore Wind Project onshore infrastructure. A comprehensive list of data sources used to identify the onshore substation area of search and identification of zones for this Black-Red-Amber-Green (BRAG) assessment are identified in section 1.4.5 of volume 5, annex 4.1: Site Selection Area of Search Identification of the ES.

1.2 Site Selection for PEIR: Onshore Substation

1.2.1 Introduction

1.2.1.1 This section describes the site selection process undertaken to identify a potential location for the onshore substation within the onshore substation area of search for the purposes of the PEIR.

1.2.1.2 A review of planning policy guidance was undertaken as part of defining the onshore substation area of search (see section 4.3: Policy Context in volume 1, chapter 4: Site Selection and Consideration of Alternatives). This guidance has further informed site selection and the BRAG assessment.

1.2.1.3 The Holistic Network Design (HND) process is the mechanism used by National Grid Electricty System Operator (NGESO) to evaluate the potential transmission options required. The HND aims to identiy and develop the most efficient, coordinated and economical connection point in line with National Grid's legal obligation to develop and maintain an efficient, coordinated and economical system of electricity transmission. NGESO concluded, through the HND process, that the preferred connection option representing the most optimal design (economic, efficient and co-ordinated) considering all criteria (i.e. technical, cost, environmental and deliverability) for the Mona Offshore Wind Project was a single radial grid connection into Bodelwyddan Substation in Denbighshire, North Wales (NGESO, 2022) and therefore this is the only option the Applicant considered as part of the site selection process.

1.2.1.4 In addition to the considerations placed upon the project by the HND process, the National Policy Statement for Energy (NPS-EN1) states that: "*applicants are obliged to include in the Environmental Statement, as a matter of fact, information about the main alternatives they have studied. This should include an indication of the main reasons for the applicant's choice, taking into the account the environmental, social and economic effects and including, where relevant, technical and commercial feasibility… alternative proposals which mean the necessary development could not proceed, for example because the alternative proposals are not commercially viable or alternative proposals for sites would not be physically suitable, can be excluded on the grounds that they are not important and relevant to the [Secretary of State's] decision*".

1.2.1.5 Similarly, National Grid's guidelines on siting and design (the Horlock Rules) state that: "consideration must be given to environmental issues from the earliest stage to balance the technical benefits and capital cost requirements for new developments against the consequential environmental effects in order to keep adverse effect to a reasonably practicable minimum".

1.2.1.6 Furthermore, the Electricity Act, 1989 (EA89) states that: "it shall be the duty of the holder of a licence authorising him to participate in the transmission of electricity to develop and maintain an efficient, co-ordinated and economical system of electricity distribution; and to facilitate competition in the supply and generation of electricity". The same is applicable to the holder of a licence authorising them to transmit electricity. This includes Offshore Transmission Operators (OFTO) who will take over the Mona Offshore Wind Project's electrical connection after it is constructed.

1.2.1.7 Considering the requirements of the HND process, NPS-EN1, the Horlock Rules and EA89, the onshore substation area of search was required to prepare an economic and efficient solution for the onshore substation site selection that considered the environmental, amenity, cultural, local context, land use and site planning constraints, resulting in the aim to locate onshore substation options as close to the existing National Grid substation as possible.

1.2.1.8 Within these aims, the HND process, NPS-EN1, the Horlock Rules and EA89, as well as Mona Offshore Wind Project team decisions, identified a number of objectives that set a framework of site selection principles which this site selection process will adhere to:

- Shortest route preference to reduce impacts by minimising footprint for the Mona Offshore Cable Corridor and Mona Onshore Cable Corridor as well as

considering cost (hence ultimately reducing the cost of energy to the consumer) and minimising transmission losses

- Avoidance of key sensitive features where possible, and where not, ensure mitigation of impacts
- Minimise the disruption to populated areas
- The need to accommodate the range of technology sought within the design envelope, such as air insulated or gas insulated switchgear for the onshore substation.

1.2.1.9 The guiding principles for locating the project's onshore substation are to achieve an economic and efficient connection (i.e. as close as possible to the National Grid connection point) whilst taking into account environmental constraints including siting principles in the Horlock Rules. Engineering considerations regarding an economic and efficient connection (i.e. as close as possible to the National Grid connection point) include minimising distance as far as is reasonably practicable as it minimises the cable reactive power component and losses.

1.2.1.10 The onshore substation area of search was initially defined as a 3 km buffer around the grid connection point at Bodelwyddan National Grid Substation.

1.2.1.11 To meet the above criteria, an initial onshore substation area of search was expanded from 3 km to 5 km. The 3 km buffer was expanded to 5 km following engineering review of the maximum electrical distance between the Mona Offshore Wind Project onshore substation and the National Grid substation. This also increased the potential number of areas to site the onshore substation as part of the site selection process. Selection of this area of search was considered sufficient to locate an onshore substation footprint (125,000 m^2) and associated onshore substation construction compound. footprint (250,000 m^2) – see section 1.2.3 for 'Technical Considerations').

1.2.1.12 Hard constraints such as areas of infrastructure, landfills, roads, railways, National Grid overhead lines, and other potential constraints to development and / or construction (as outlined in Volume 5, Annex 4.1: Site Selection Area of Search Identification of the PEIR) were plotted and removed from the onshore substation area of search. These are illustrated in Figure 1.1.

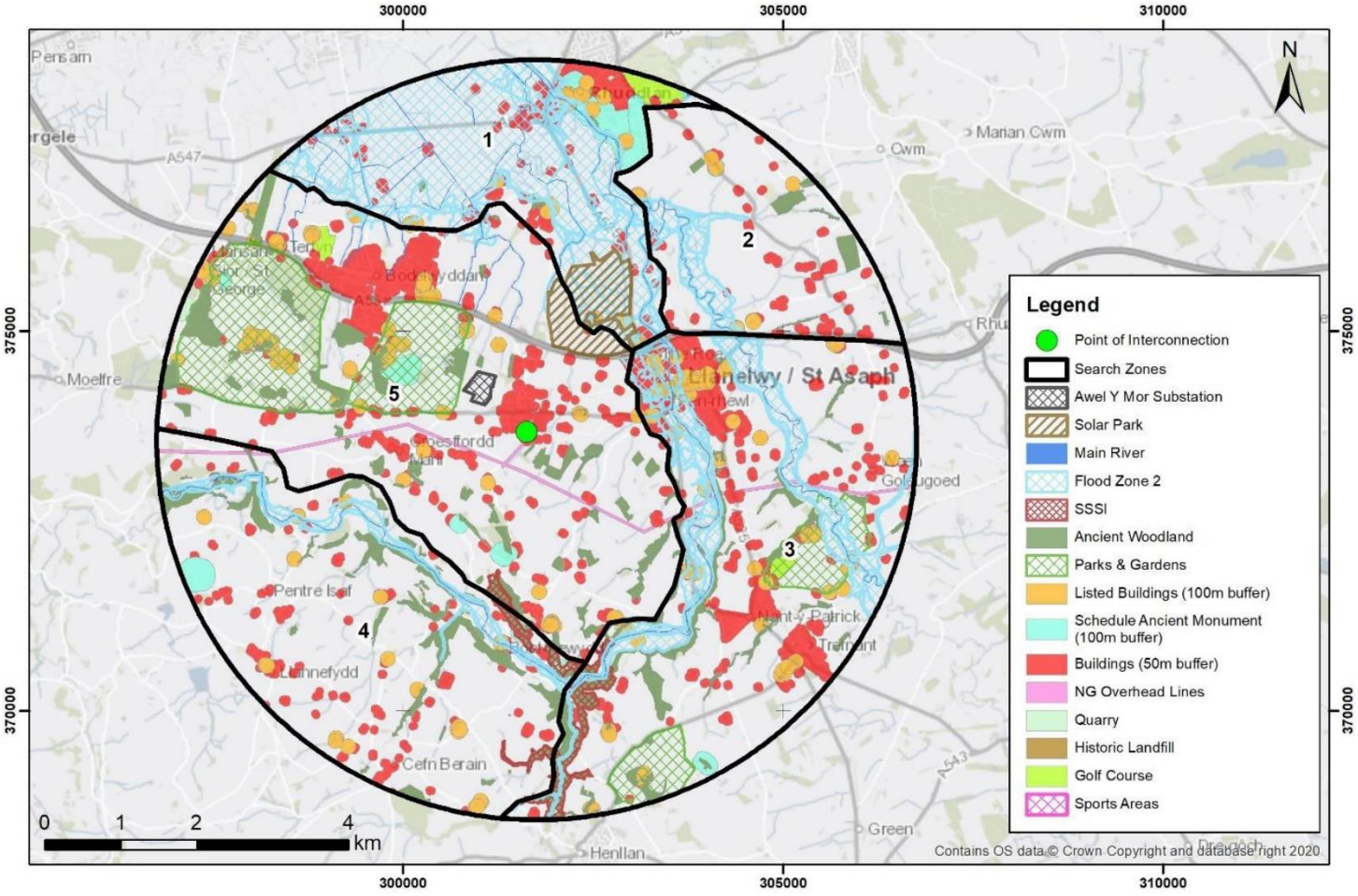

Figure 1.1: Mona Offshore Wind Project onshore substation search area and zones.

1.2.1.13 Five onshore substation search zones were identified (see Figure 1.1) with zone boundaries coinciding with the perimeters of hard constraint areas. The extents of Flood Risk Zone 2 (areas of higher risk flood) zones were used to define the boundary of Zone 1, extending south as far as the A55. Continuing the line of the A55 to the east created Zone 2, an area of relatively sparse constraint but from which connection to the Bodelwyddan National Grid Substation would mean crossing two river crossings or circumnavigation of the planned Elwy Solar Energy park to the west (Note: planning application for the Elwy Solar Energy Park was refused after the completion of initial site selection work. This does not affect the outcomes of the site selection process).

1.2.1.14 Zone 3, south of the A55, was defined by continuing the western limit of Zone 1 to the south, following the extent of Flood Zone 2 associated with the Afon Elwy. This zone is more densely constrained than Zone 2 to the north, and connection to the Bodelwyddan National Grid Substation is complicated by the town of St. Asaph in the northwest corner as well as the river running along the western edge. The final boundary broadly follows Afon Elwy west towards its source but is defined by an area (Zone 4) of high slopes around and to the south of the river. The remaining land in the middle, surrounding the Bodelwyddan National Grid Substation and extending to the east, is Zone 5.

1.2.1.15 An appraisal of each zone was made, with conclusions as to the viability of each summarised in Table 1.1. Only Zone 5 was retained for further assessment, the other four having been discounted from further consideration for the reasons outlined in Table 1.1.

Table 1.1: Onshore substation search zone appraisal.

Zone	Description	Status
1	Zone lies almost entirely within higher risk flood zones 2 and 3, conflicting with Horlock rules as well as National Grid policy – that equates to a BRAG Black finding. The increased flood risk also presents a design and construction challenge.	Discounted
2	Access to the zone from the west is all but prevented by the planned development and solar farms within the southern portion of Zone 1 – that equates to a BRAG Black finding. Access from the south is blocked by St. Asaph town and the necessity of crossing River Clwyd and Afon Elwy.	Discounted
3	South of the A55 the urban settlement of St. Asaph presents a barrier to cable connectivity and this barrier extends down the St. Asaph Road to Trefant effectively removing the land to the east of St. Asaph from further consideration – that equates to a BRAG Black finding. The western boundary of Zone 3 (where it adjoins Zone 5) runs along a ridge line in the topography. On the river Elwy side of this boundary there is a very long steep gradient slope deemed to present a highly challenging cable laying prospect – that equates to a BRAG Black finding. The remaining part of Zone 3 to the west of this slope, up to the settlement of St. Asaph Road is removed from further consideration.	Discounted
4	There are large areas of land in Zone 4 which are potentially suitable based on the constraints screened thus far. However, the northern boundary of Zone 4 (where it abuts Zone 5) traverses the foot of a steep hill line with a north facing aspect. This line of hills rises steeply to the south and then falls down into the River Elwy valley, before rising again to the south towards Llannefydd. The sequence of steep topography along the boundary with Zone 4 is deemed to represent a significant cable laying challenge and renders Zone 4 inaccessible – that equates to a BRAG Black finding.	Discounted
5	This area is relatively flat with rising topography to the south along the B5381 Roman Road and towards Plas-yn-Cefn in the south. There are increasing areas of built development in the St. Asaph Business Park, Bodelwyddan town to the north and large inaccessible areas of Registered Parks and Gardens to the west of the zone. These existing features will limit flexibility for cable routing but nevertheless the zone is deemed accessible. The land to the south of the PoI is relatively unconstrained.	Retained

1.2.1.16 Key areas removed from the area of search were the city of St. Asaph with its associated Conservation Area and listed buildings, as well as the Main River (Elwy), and its associated Flood Zones 2 and 3 to the east. The southern boundary was refined to avoid a further stretch of the River Elwy and its associated flood zones, along with the Coedwigoedd Dyffryn Elwy/Elwy Valley Woods SAC, Coedydd Ac Ogofau Elwy A Meirchion SSSI and the Lower Elwy Valley Historic Landscape, which encompasses scattered listed buildings and Scheduled Monuments.

1.2.1.17 The area of search (Zone 5) then formed the basis for the selection of available parcels of land to site potential onshore substations for site selection consideration. These available parcels of land are illustrated in Figure 1.2.

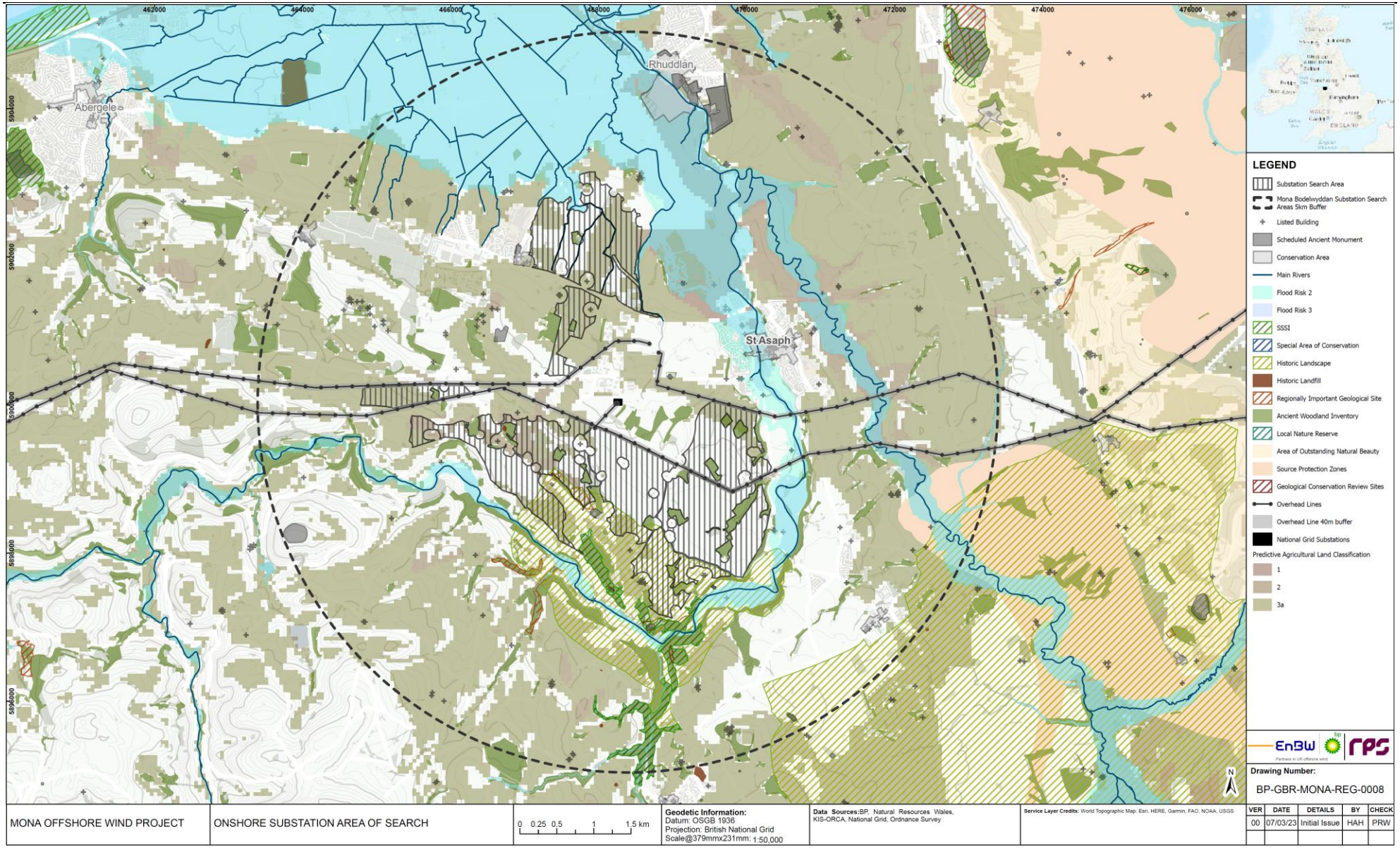

Figure 1.2: Onshore Substation Area of Search.

1.2.1.18 Long listing of the onshore substation took place through reference to the onshore substation area of search and available land parcels, combined with the application of the design principles, engineering assumptions, and the relevant guidance relating to the siting of above-ground electrical infrastructure (e.g. Horlock Rules). At this stage, 17 onshore substation locations were identified for further consideration.

1.2.1.19 During the preliminary long listing BRAG assessment it was recognised that there were potentially significant constraints present for several of the onshore substation options, with associated engineering feasibility challenges. Volume 1, Chapter 4: Site Selection and Consideration of Alternatives presents the analysis, with the justification for each of the onshore substation options taken forward to the medium list and for further consideration (and consultation).

1.2.1.20 The BRAG assessment was undertaken for each of the onshore substation site options individually as per the medium-list within Volume 1, Chapter 4: Site Selection and Consideration of Alternatives (1, 2, 3, 4, 5, 6, 7, 8, 16 and 17).

1.2.2 Methodology

1.2.2.1 A Black/Red/Amber/Green (BRAG) methodology has been used to inform site selection. This is considered appropriate to compare a number of sites for similar infrastructure, given the ability to capture and classify the main differentiating issues in 4 fundamental categories. A BRAG assessment of this type enables a clear and direct comparison between each site.

1.2.2.2 Development considerations captured within the BRAG assessment include archaeology/cultural heritage, ecology, landscape, hydrology and hydrogeology, engineering, community, landscape and visual, property and planning. These were assessed by a team of specialists comprising engineers, Environmental Impact Assessment (EIA) consultants, landscape, archaeology and ecological experts throughout the site selection process that have experience in undertaking site selection BRAG assessment for offshore wind projects. This was undertaken using the BRAG system which qualitatively assesses the influence of the consideration on future development, either using defined parameters, professional judgement, or assessing the issue relative to the other potential options.

1.2.2.3 BRAG is a standard assessment tool used in the pre-EIA process to assess the potential risks to proposed development options.

1.2.2.4 Each development consideration is given a qualitative classification of Black/Red/Amber/Green. These classifications indicate the adverse or positive attributes to development respectively. It should be noted that if a site is awarded a Red classification, this will not necessarily prevent an option being taken forward as preferred into the next stage if, overall, it performs better than others. A Black classification should remove an option from further consideration.

1.2.2.5 The surveys and desk-based investigations undertaken to date and the performance of the options relative to one another, along with professional judgement, have influenced the criteria of the Black/Red/Amber/Green as well as the classifications given. Information about the considerations is provided within the individual cells of the BRAG assessment tables.

1.2.2.6 The method presents all the identified development considerations equally, i.e. there is no weighting of different development considerations relative to each other. Whilst any weighting is not incorporated in the BRAG assessment findings, professional judgement, specific guidance and feedback through the consultation process is taken into consideration to inform decisions.

1.2.2.7 The outcomes presented in this report are the result of careful consideration BRAG analysis undertaken by RPS (EIA), Wardell Armstrong (Engineering), Dalcour Maclaren (land, property and planning) and bp-EnBW (Applicant and project decision-making team).

1.2.3 Technical considerations

1.2.3.1 The design, layout and final location of the onshore substation and associated infrastructure is subject to ongoing assessment and will be dependent on land availability, environmental and technical constraints and consultation with stakeholders. Information on the likely design parameters and space requirements that have been used in this site selection process include:

- A footprint of up to 125,000 m^2 for the indicative onshore substation footprint (with an onshore substation building footprint within this of 105,000 m^2);
- Structures will be up to 20 m tall; and
- The onshore substation will require land for temporary construction works (e.g. welfare, parking, storage areas and associated temporary access tracks) and a temporary construction compound footprint of up to 250,000 m^2.

1.2.4 Assessment

1.2.4.1 The development considerations for the onshore substation BRAG assessment were:

- Ecology and nature conservation
- Hydrology, hydrogeology and flood risk
- Archaeology / cultural heritage
- Traffic and transport
- Land use (including predictive Agricultural Land Classifications)
- Noise and vibration
- Landscape and visual
- Tourism and socio-economics
- Engineering and design.

1.2.4.2 Criteria selected for the BRAG assessment are based on criteria for judging landscape capacity and sensitivity, for example proximity to valued landscapes, landscape character susceptibility, visual sensitivity/presence of visual receptors and opportunities to utilise existing features (such as woodlands) for screening and mitigation. Each criterion is given a classification of Black/Red/Amber/Green, indicating the relative scale of adverse or beneficial attributes to siting development, of the nature proposed, in each location. BRAG assessment classifications are based on professional judgement, desk study and a field survey visit to each site location.

1.2.4.3 Constraints identified at each potential onshore substation location are presented in Figure 1.3. The summary of the BRAG assessment's findings is presented in Table 1.2. This information was used to assess which of the options should progress to the next stage of site selection consultation – short listing for targeted community consultation.

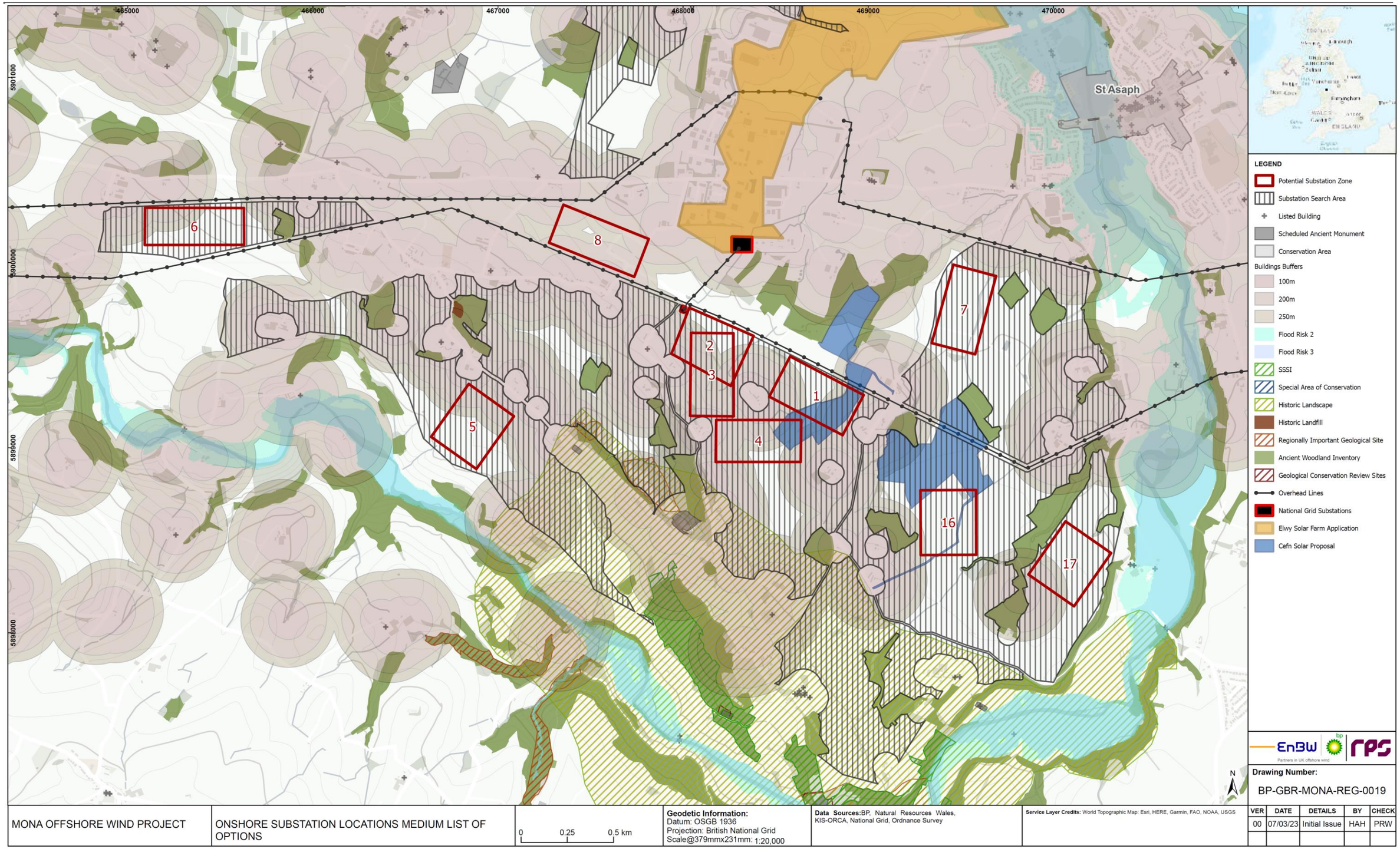

Figure 1.3: Onshore Substation Zones Medium List of Options.

Table 1.2: BRAG assessment table of development considerations for the 10 medium list potential onshore substation locations.

Topic	Onshore substation zone 1	Onshore substation zone 2	Onshore substation zone 3	Onshore substation zone 4	Onshore substation zone 5	Onshore substation zone 6	Onshore substation zone 7	Onshore substation zone 8	Onshore substation zone 16	Onshore substation zone 17
Ecology and nature conservation	Potential for indirect effects on nationally designated sites; and for direct effects on as yet unidentified non-statutorily designated sites. Potential for impacts on a range of protected species. Nothing which, at this stage, would be unlikely to be mitigatable, although habitat creation would be required.	Potential for indirect effects on nationally designated sites; and for direct effects on as yet unidentified non-statutorily designated sites. Potential for impacts on a range of protected species. Nothing which, at this stage, would be unlikely to be mitigatable, although habitat creation would be required.	Potential for indirect effects on nationally designated sites; and for direct effects on as yet unidentified non-statutorily designated sites. Potential for impacts on a range of protected species. Nothing which, at this stage, would be unlikely to be mitigatable, although habitat creation would be required.	Potential for indirect effects on nationally designated sites; and for direct effects on as yet unidentified non-statutorily designated sites. Potential for impacts on a range of protected species. Nothing which, at this stage, would be unlikely to be mitigatable, although habitat creation would be required.	Potential for indirect effects on nationally designated sites; and for direct effects on as yet unidentified non-statutorily designated sites. Potential for impacts on a range of protected species. Nothing which, at this stage, would be unlikely to be mitigatable, although habitat creation would be required.	Potential for indirect effects on nationally designated sites; and for direct effects on as yet unidentified non-statutorily designated sites. Potential for impacts on a range of protected species. Nothing which, at this stage, would be unlikely to be mitigatable, although habitat creation would be required.	Potential for indirect effects on nationally designated sites; and for direct effects on as yet unidentified non-statutorily designated sites. Potential for impacts on a range of protected species. Nothing which, at this stage, would be unlikely to be mitigatable, although habitat creation would be required.	Potential for indirect effects on nationally designated sites; and for direct effects on as yet unidentified non-statutorily designated sites. Potential for impacts on a range of protected species. Nothing which, at this stage, would be unlikely to be mitigatable, although habitat creation would be required.	Potential for indirect effects on nationally designated sites; and for direct effects on as yet unidentified non-statutorily designated sites. Potential for impacts on a range of protected species. Nothing which, at this stage, would be unlikely to be mitigatable, although habitat creation would be required.	Potential for indirect effects on nationally designated sites; and for direct effects on as yet unidentified non-statutorily designated sites. Potential for impacts on a range of protected species. Nothing which, at this stage, would be unlikely to be mitigatable, although habitat creation would be required.
Hydrology, hydrogeology and flood risk	No significant constraints associated with onshore water and sediment quality. Surface water flood risk can be managed and mitigated	No significant constraints associated with onshore water and sediment quality. Surface water flood risk can be managed and mitigated	No significant constraints associated with onshore water and sediment quality. Surface water flood risk can be managed and mitigated	No significant constraints associated with onshore water and sediment quality. Surface water flood risk can be managed and mitigated	No significant constraints associated with onshore water and sediment quality	No significant constraints associated with onshore water and sediment quality	No significant constraints associated with onshore water and sediment quality Watercourse present within site. If not avoided, likely to result in significant effects on watercourse, but does offer opportunity to drain to watercourse as part of SuDS scheme	No significant constraints associated with onshore water and sediment quality	No significant constraints associated with onshore water and sediment quality. Surface water flood risk can be managed and mitigated	No significant constraints associated with onshore water and sediment quality. Surface water flood risk can be managed and mitigated
Archaeology / cultural heritage	High potential for impacts associated with the setting of designated assets and historic landscape character. Potential for	High potential for impacts associated with the setting of designated assets and historic landscape character. Potential for	High potential for impacts associated with the setting of designated assets and historic landscape character. Potential for	High potential for impacts associated with the setting of designated assets and historic landscape character. Potential for	Potential for archaeological remains to survive with mitigation options likely available. Moderate to high risk of impacts associated with the	Potential for archaeological remains to survive with mitigation options likely available. Moderate to high risk of impacts associated with the	Moderate risk of impacts associated with the setting of designated assets.	Potential for archaeological remains to survive with mitigation options likely available. Moderate to high risk of impacts associated with	Moderate risk of impacts associated with the setting of designated assets	Moderate risk of impacts associated with the setting of designated assets

Topic	Onshore substation zone 1	Onshore substation zone 2	Onshore substation zone 3	Onshore substation zone 4	Onshore substation zone 5	Onshore substation zone 6	Onshore substation zone 7	Onshore substation zone 8	Onshore substation zone 16	Onshore substation zone 17
	archaeological remains to survive with mitigation options likely available.	archaeological remains to survive with mitigation options likely available.	archaeological remains to survive with mitigation options likely available.	archaeological remains to survive with mitigation options likely available.	setting of designated assets.	setting of designated assets.		the setting of designated assets.		
Traffic and transport	Access via the local unnamed road that runs west of the Substation 1 site would not be possible as the road is not wide enough for two vehicles and it would not be possible to widen without extensive work and land acquisition. The Substation 1 site should be discounted unless a new access (approx. 1km) can be constructed from the B5381. If a new access can be constructed the BRAG classification could be reduced to green.	Access via the local unnamed road that runs west of the Substation 2 site would not be possible as the road is not wide enough for two vehicles and it would not be possible to widen without extensive work and land acquisition. The Substation 2 site should be discounted unless a new access (approx. 1km) can be constructed from the B5381. If a new access can be constructed the BRAG classification could be reduced to green.	Access via the local unnamed road that runs west of the Substation 3 site would not be possible as the road is not wide enough for two vehicles and it would not be possible to widen without extensive work and land acquisition. The Substation 3 site should be discounted unless a new access (approx. 1km) can be constructed from the B5381. If a new access can be constructed the BRAG classification could be reduced to green.	Access via the local unnamed road that runs west of the Substation 4 site would not be possible as the road is not wide enough for two vehicles and it would not be possible to widen without extensive work and land acquisition. The Substation 4 site should be discounted unless a new access (approx. 1km) can be constructed from the B5381. If a new access can be constructed the BRAG classification could be reduced to green.	Access via the local unnamed road that runs north of the Substation 5 site would not be possible as the road is not wide enough for two vehicles and it would not be possible to widen without extensive work and land acquisition. The Substation 5 site should be discounted unless a new access (approx. 1.5km) can be constructed from the B5381. If a new access can be constructed the BRAG classification could be reduced to green.	There would be no significant constraints associated with the Substation 6 site.	Access via the local unnamed road that runs west of the Substation 7 site would not be possible as the road is not wide enough for two vehicles and it would not be possible to widen without extensive work and land acquisition. The Substation 7 site should be discounted unless a new access (approx. 0.9km) can be constructed from the B5381. If a new access can be constructed the BRAG classification could be reduced to green.	There would be no significant constraints associated with the Substation 8 site.	There are significant engineering and road safety constraints upon access, and construction traffic would also impact upon at St. Asaph.	There are significant engineering and road safety constraints upon access, and construction traffic would also impact upon at St. Asaph.
Land use (including predictive Agricultural Land Classifications)	Consideration to avoid residential property.	Consideration to avoid residential property. Encroachment into Grade 3a agricultural land	Consideration to avoid residential property. Encroachment into Grade 3a agricultural land	Consideration to avoid residential property.	Consideration to avoid residential property.	Site entirely within Grade 3a agricultural land	Consideration to avoid residential property. Encroachment into Grade 3a agricultural land	Consideration to avoid, mitigate or minimise impacts to PRoW and impacts to campus and business park. Consideration to avoid residential property. Encroachment into Grade 2 and 3a agricultural land	Consideration to avoid residential property.	Consideration to avoid residential property.

Topic	Onshore substation zone 1	Onshore substation zone 2	Onshore substation zone 3	Onshore substation zone 4	Onshore substation zone 5	Onshore substation zone 6	Onshore substation zone 7	Onshore substation zone 8	Onshore substation zone 16	Onshore substation zone 17
Noise and vibration	Closest identified noise sensitive receptor 200m from substation footprint boundary	Closest identified noise sensitive receptor 200m from substation footprint boundary	Closest identified noise sensitive receptor 200m from substation footprint boundary	Closest identified noise sensitive receptor 200m from substation footprint boundary	Closest identified noise sensitive receptor 200m from substation footprint boundary	Closest identified noise sensitive receptor 200m from substation footprint boundary	Noise sensitive site approximately 200-300m from operational footprint boundary	Closest identified noise sensitive receptor between 100m and 200m from substation footprint boundary	Closest identified noise sensitive receptor between 100m and 200m from footprint boundary	Noise sensitive site approximately 200-300m from operational footprint boundary
Landscape and visual	Visual effects on nearby properties at close proximity. There is potential for some mitigation but this will take time to take effect. Cumulative effects with other sub-stations and pylon routes ensure a degree of clustering, however it is not adjacent so combined visibility by receptors is also cumulatively detrimental.	Visual effects on nearby properties at close proximity. There is potential for some mitigation but this will take time to take effect. Cumulative effects with other sub-stations and pylon routes ensure a degree of clustering, however it is not adjacent so combined visibility by receptors is also cumulatively detrimental.	Visual effects on nearby properties at close proximity. There is potential for some mitigation but this will take time to take effect. Cumulative effects with other sub-stations and pylon routes ensure a degree of clustering, however it is not adjacent so combined visibility by receptors is also cumulatively detrimental.	Visual effects on nearby properties at close proximity. There is potential for some mitigation but this will take time to take effect. Cumulative effects with other sub-stations and pylon routes ensure a degree of clustering, however it is not adjacent so combined visibility by receptors is also cumulatively detrimental.	Significant visual and potential residential amenity effects on residential receptors and community facility/business, which could be mitigated with offsite planting closer to properties. Widest Zone of Theoretical Visibilty (ZTV) with potential views across the valley.	Significant visual and potential residential amenity effects on residential receptors and community facility/business, which could be mitigated with offsite planting closer to properties. Widest ZTV with potential views across the valley.	Significant visual and potential residential amenity effects on residential receptors and community facility/business, which could be mitigated with offsite planting closer to properties.	Significant visual and potential residential amenity effects on residential receptors and community facility/business, with very little opportunity for mitigation due to the surrounding flat topography and visibility from wide-ranging views. Mitigation would rely heavily on offsite planting closer to properties which is difficult to secure as part of the development	Some interaction for visual receptors and valued local landscapes, but capacity to accommodate development exists.	Some interaction for visual receptors and valued local landscapes, but capacity to accommodate development exists. Potential to mitigate visibility due to available space for planting and earthworks. However, there is the possibility that the substation may be visible from higher ground locations to the east due to their elevation and lower lying woodland. At this stage in the process it is difficult to tell. If this is the case its position on the edge of what would appear as a slightly upland location above the valley may seem incongruous. This should be checked before proceeding with this site.
Tourism and socio-economics	No risks from current data	No risks from current data	No risks from current data	No risks from current data	No risks from current data	No risks from current data	No risks from current data	Consideration of mitigation required for impacting PRoW	No risks from current data	No risks from current data

Topic	Onshore substation zone 1	Onshore substation zone 2	Onshore substation zone 3	Onshore substation zone 4	Onshore substation zone 5	Onshore substation zone 6	Onshore substation zone 7	Onshore substation zone 8	Onshore substation zone 16	Onshore substation zone 17
Engineering and design	Site gradient, underlying geology, potential mining and appropriate vehicular access constraints present risks for this option.	Site gradient, underlying geology, potential mining and appropriate vehicular access constraints present risks for this option.	Site gradient, underlying geology, potential mining and appropriate vehicular access constraints present risks for this option.	Site gradient, underlying geology, potential mining and appropriate vehicular access constraints present risks for this option.	Site gradient and underlying geology constraints present risks for this option. Constraints regarding drainage connection identified but elevation difference means not a significant issue. Multiple utilities diversions required.	Site gradient and underlying geology constraints present risks for this option. Constraints regarding drainage connection identified but elevation difference means not a significant issue. Construction compounds are likely to be subject to spatial constraints. Diversion of gas main and overhead electricity line required.	Site gradient, appropriate vehicular access and drainage connection constraints present risks for this option. One complex (likely requiring trenchless technique) crossing identified on route connecting to NG Substation. Diversion of gas main and overhead electricity line required.	Site gradient and underlying geology constraints present risks for this option. Constraints regarding drainage connection identified but elevation difference means not a significant issue. Multiple utilities diversions required.	Appropriate vehicular access and drainage connection constraints present risks for this option. One complex (likely requiring trenchless technique) crossing identified on route connecting to NG Substation Diversion of overhead electricity line required. Connection to utilities to supply substation	Site gradient constraints present risks for this option. Appropriate vehicular access and drainage connection constraints present major risks for this option. Two complex (likely requiring trenchless technique) crossings identified on route connecting to NG Substation. Diversion of overhead electricity lines and gas main required. Connection to utilities to supply substation present a risk for this option.

1.2.5 Conclusion

1.2.5.1 Onshore Substation Option 8 was not taken forward primarily due to the Black classification identified for landscape and visual criteria. This was related to the potential impact on nearby residential receptors in terms of visual amenity, and critically the likelihood that mitigation would not be achievable given the local topography constraints.

1.2.5.2 Onshore Substation Options 16 and 17 were not taken forward primarily due to the Black classification identified for traffic and transport. This was related to the access constraints for making these options achievable. Creating new access routes from existing highways to these two zones presented a significant health and safety concern and therefore these options were deselected.

1.2.5.3 The remaining options were all considered potentially viable options, based on the information available at that time, to be taken to the next stage of site selection refinement and consultation. The remaining seven options comprised the medium list of options for the next stage of refinement process for the onshore substation site which was to take to a series of targeted non-statutory community consultation events. The targeted non-statutory community consultation was designed specifically to seek feedback on the shortlisted locations; intending to combine the ongoing environmental assessment and technical studies with local knowledge to help narrow the location for the onshore substation for PEIR assessment.:

1.2.5.4 These shortlisted onshore substation options for non-statutory community consultation are shown in Figure 1.4 (with indicative footprint size shown for information only).

1.2.5.5 A summary of the consultation responses on the short-listed onshore substation options is presented in Table 4.19 of volume 1, chapter 3: Site Selection and Consideration of Alternatives.

1.2.5.6 Following consultation responses, a further review of the shortlist of onshore substation options was undertaken. Responses to onshore substation options 1 and 2 were comparatively more favourable to those of onshore substation options 3 and 4 – despite their immediate proximity. Onshore substation option 3 required significant excavations due to the topography in the south of the potential footprint. Onshore substation option 4 overlaps the proposed St Asaph Solar Farm footprint. As a result, onshore substation options 3 and 4 were discarded.

1.2.5.7 Due to the location of onshore substation options 1 and 2 being in close proximity to one another, only one of the two options were considered relevant to take forward to the shortlist, as further micro-siting of the option would take place following the LVIA modelling. When compared against onshore substation 2, onshore substation 1 has similar risks, although has a slightly increased distance from the National Grid substation and pylons and therefore has a slightly more settled rural character and as such was identified as less favourable of the two locations at this stage from an LVIA perspective. In addition, onshore substation option 1 overlaps the proposed St Asaph Solar Farm footprint. As such onshore substation option 2 was selected for the shortlist of onshore substation locations.

1.2.5.8 Consultation responses to onshore substation option 5 was the most negative and, in conjunction with the constraints associated with steep gradients, access and landscape visibility, this option was discounted as a result. Further engineering review of onshore substation option 6 identified that the location of this option on a ridgeline with steep gradients was not preferable from an engineering, access or landscape perspective. In addition, the Zone of Theoretical Visibility (ZTV) modelling confirmed that the onshore substation option 6 would be visible from the other side of the valley. Due to this, onshore substation option 6 was not taken forward to the shortlist of options.

1.2.5.9 Onshore substation option 7 received mixed consultation responses (with some comments describing it as the best location and some as the worst location) but also very positive comments. Onshore substation option 7 also retains the flexibility to orient along an east-west axis or a north-south axis and therefore has a larger Onshore Substation Zone identified.

1.2.5.10 Therefore, following the discounting of the options outlined above, the following two options comprise the final options for the onshore substation to be taken into the PEIR assessment:

- Onshore substation option 2
- Onshore substation option 7.

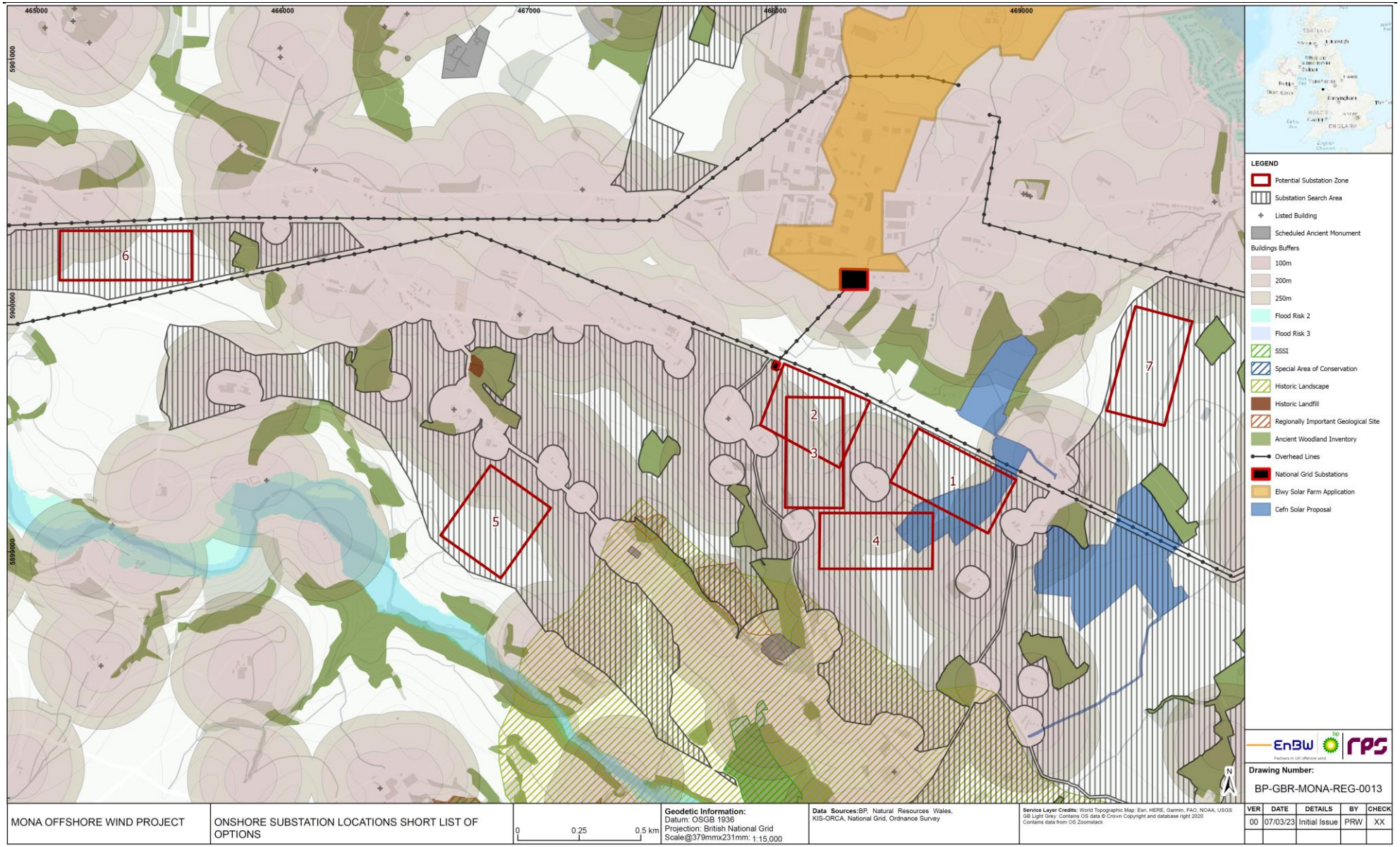

Figure 1.4: Onshore Substation Zones Short List of Options.

1.3 Design Refinement and Updated BRAG Process Overview

1.3.1 Overview

1.3.1.1 Following the statutory consultation and further studies, a design refinement exercise was undertaken on the options presented at PEIR. Refinement was carried out with the aim of reducing the options down to the parameters required for a project design for the next stage of the Environmental Impact Assessment (EIA). This refinement was in response to statutory consultation feedback from PEIR, formal and information consultation with landowners, further design refinements, engineering optimisation, and findings from additional environmental appraisals and surveys that were ongoing during and after statutory consultation on the PEIR. During the site selection process, the Mona Offshore Wind Project identified that the following onshore parameters were required for the project design for the next stage of the EIA:

- Landfall - no change to parameter set (previously shared during PEIR consultation – transition joint bay dimensions [1,200m^2] and landfall construction compound [30,000m^2]);
- Onshore cable corridor – reduced from approximately 300m to 74m width (with wider corridors for optionality at key locations); and
- Onshore substation – operational footprint reduced from 125,000m^2 to 65,000m^2 in size and construction compound footprint reduced from 250,000m^2 to 125,000m^2 in size.

1.3.1.2 These are the parameters of the final design options that will be considered in more detail in order to identify the next stage of the site selection process and selection of a single option to be taken to the Application.

1.3.2 Landfall

1.3.2.1 Only minor changes were made to the landfall during the refinement process. The following key changes were made:

- Landfall footprints were refined to show the feasible trenchless technique ‘funnel’ across which cables could be installed during the landfall drill. This was identified through additional technical work rs;
- Support activities via accesses to the west and east of the landfall were refined following additional technical work and early engagement with the supply chain regarding trenchless technique contractors:
  - Access to Pensarn Beach from the west was removed due to no existing access location down to the beach and access difficulties due to the presence of the beach groynes;
  - Access to Pensarn Beach from the east was refined to commit to access only being taken closer to MLWS. This allows the vegetated shingle bank associated with the Traeth Pensarn SSSI to be excluded from the Mona Offshore Wind Project order limits. Note that access from the east will still cross the Traeth Pensarn SSSI (but avoiding the designated features, as discussed and agreed with NRW at a separate technical meeting in September 2023);
  - A laydown area of 20m x 40m utilising the existing Pensarn Beach car park from the east was added as an overnight parking location for any support

vehicles on the beach associated with the installation of the trenchless technique;

- Access to the trenchless technique 'funnel' area immediately north of the railway line was refined down to utilise the access for the Llanddulas Beach Landfill.

- Following additional technical assessment and early engagement with the supply chain regarding trenchless technique contractors it was identified that a 'long drill' option would mitigate potential impacts compared to a 'short drill'. As such, the Mona Offshore Wind Project has committed to dropping the 'short drill' option and has committed to a 'long drill' option with an exit point below MLWS. See Volume 1, Chapter 4, Site Selection and Consideration of Alternatives for more detail.

1.3.3 Onshore cable route

1.3.3.1 The following steps were undertaken to facilitate the BRAG assessment of onshore cable route options (as identified in section 1.4.1.3).

- The shortest route from the landfall to the onshore substation was identified;
- The 74m corridors reduced / minimised any interaction with environmental constraints identified by stakeholders;
- Interaction with other environmental constraints, such as watercourses and hedgerow crossings, and routing through separation buffers surrounding properties, was minimised as part of the BRAG process;
- It was assumed in the first instance that complex crossings (e.g. critical infrastructure, SSSI, Main Rivers) would be subject to trenchless techniques, and the remainder of the routes would be crossed using open-cut trenching, unless specifically identified as suitable for and requiring trenchless techniques during the engineering assessment;
- New information obtained during utilities searches was used to refine the corridors and reduce interactions;
- The corridors were narrowed to less than 74m in locations where a 74m corridor could not be achieved due to existing 'hard' constraints. The corridors were never reduced below the design parameter for a final corridor of 30m;
- The corridors were also widened in selected areas where flexibility could be required prior to detailed design, for example in the location of a particularly sensitive trenchless technique (e.g. beneath the Llanddulas Limestone and Gwrych Castle Wood SSSI, or near the Ancient Woodland and historic mining areas south of Groesfford Marli);
- Assuming other refinement requirements could be met, the corridors were aligned to field margins as much as possible.

1.3.3.2 Refining the onshore cable corridors down to 74m ensured that the options were presented in much greater detail than they appeared in the original routing exercise (within Volume 1, Chapter 4, Site Selection and Consideration of Alternatives). This refinement allowed the BRAG assessment to consider micro-siting in greater detail and allow for greater interrogation of the options.

1.3.4 Onshore substation

1.3.4.1 The following steps were undertaken to facilitate the updated BRAG assessment of onshore substation Option 2 and Option 7 (as identified in section 1.3).

- Production of indicative construction layouts, including construction access, for the two onshore substation options;
- Production of indicative cut and fill balance to provide indicative onshore substation platform levels and orientations to inform further landscape BRAG assessment for the two onshore substation options. The orientation of the onshore substation options were chosen to place them as far away from residential receptors as practicable, whilst maintaining appropriate distances from the Ancient Woodland (as well as avoiding the National Grid overhead lines). Further to this, the temporary construction compounds for each onshore substation were sited to place them as far as practicable from residential receptors whilst also utilising the available screening of the existing woodland and to screen works from the Glascoed Road;
- Production of an indicative onshore substation internal layout (for both options) to inform further landscape BRAG assessment;
- Early supply chain with engagement with onshore substation contractors to inform a reduction in maximum height of the onshore substation by 5m (from 20m) resulting a maximum building height of 15m following statutory consultation feedback regarding the size of the onshore substation infrastructure; and
- Early supply chain engagement with onshore substation contractors to facilitate a commitment to a GIS onshore substation. This also means that the maximum footprint of the onshore substation has reduced by 60,000m2 (from 125,000m2). This results in a maximum footprint of 65,000m2 following statutory consultation feedback regarding the size of the onshore substation infrastructure.

1.3.4.2 Further information on the onshore substation refinements and commitments can be found in Volume 1, Chapter 4, Site Selection and Consideration of Alternatives.

1.4 Updated BRAG and Identification of Final Scheme Details

1.4.1 Overview

1.4.1.1 The aim of the updated BRAG and identification of preferred options was to refine the onshore cable route down to a single corridor; and to refine the onshore substation down to a final location for application.

1.4.1.2 The BRAG assessment was updated where required and used to identify the final option(s). This was only undertaken for the areas that had retained optionality within the PEIR assessment. Specifically, these related to four locations (defined by the engineering technical studies as Sections 3, 4, 5 and 7) along the onshore cable route:

- East of the junction between Abergele Road and Glascoed Road (Section 3);
- At Llanfair Talhaiarn (Section 4);
- At Llannefydd (Section 5); and
- South of Groesfford Marli (Section 7).

1.4.1.3 These locations are illustrated in Figure 1.5.

1.4.1.4 The selection of a final location for application also related to selecting between the two onshore substation options (and associated operational access road) that were included in the PEIR assessment – Option 2 (immediately south of the Bodelwyddan National Grid substation) and Option 7 (south of St Asaph).

1.4.2 Onshore cable route

1.4.2.1 Constraints information on each of the onshore cable route options is shown below in Table 1.3. The information in the table was populated using the stakeholder feedback obtained during the initial site selection of the onshore cable route (see section 4.8.5 of volume 1, chapter 4, Site Selection and Consideration of Alternatives) and feedback obtained through the PEIR consultation plus engineering optimisation, and findings from additional environmental appraisals and surveys that were ongoing during and after statutory consultation on the PEIR. This information was used to assess which of the individual options should progress to the final option for Application.

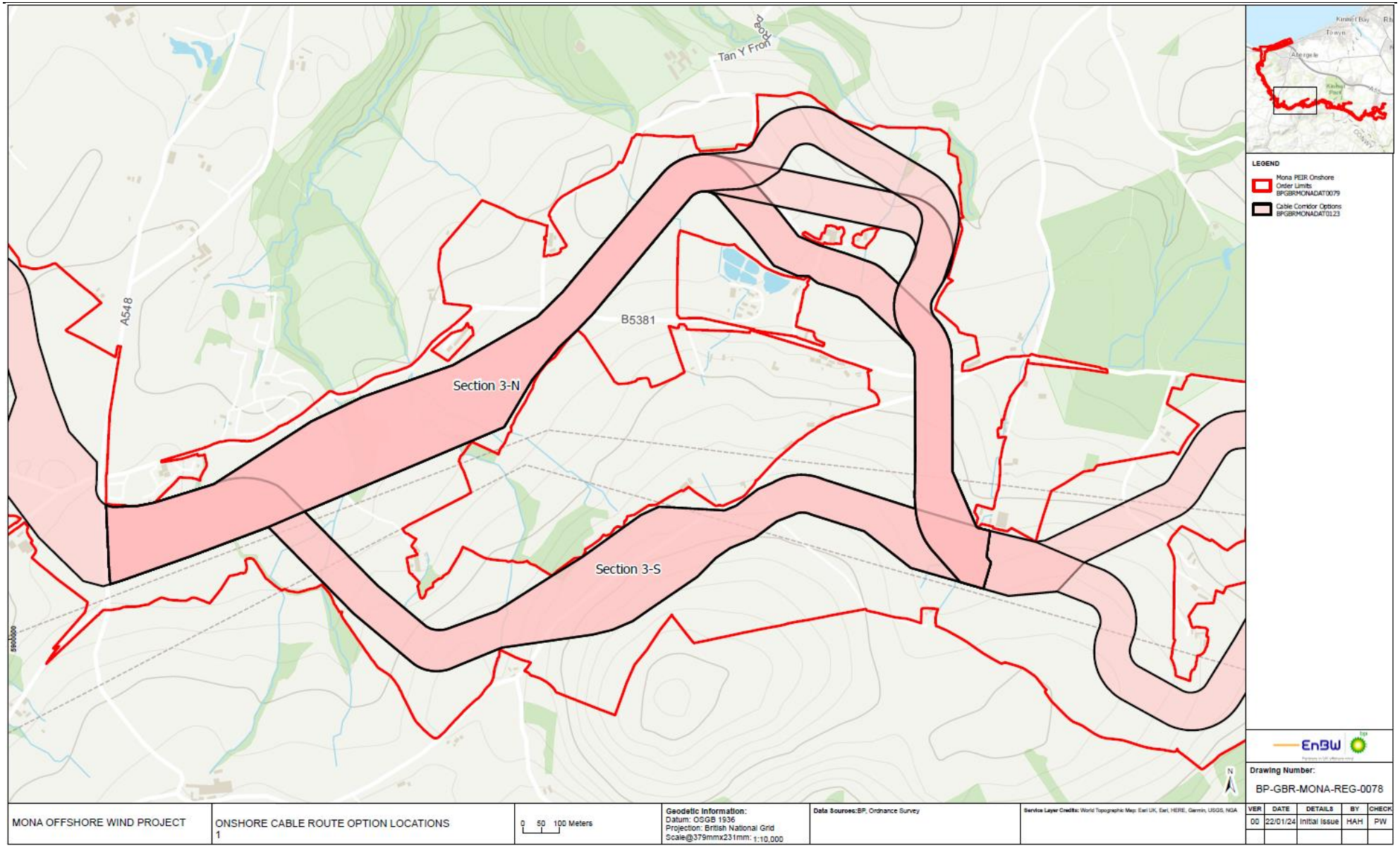

Figure 1.5: Onshore Cable Route Option Locations (Section 3N and 3S).

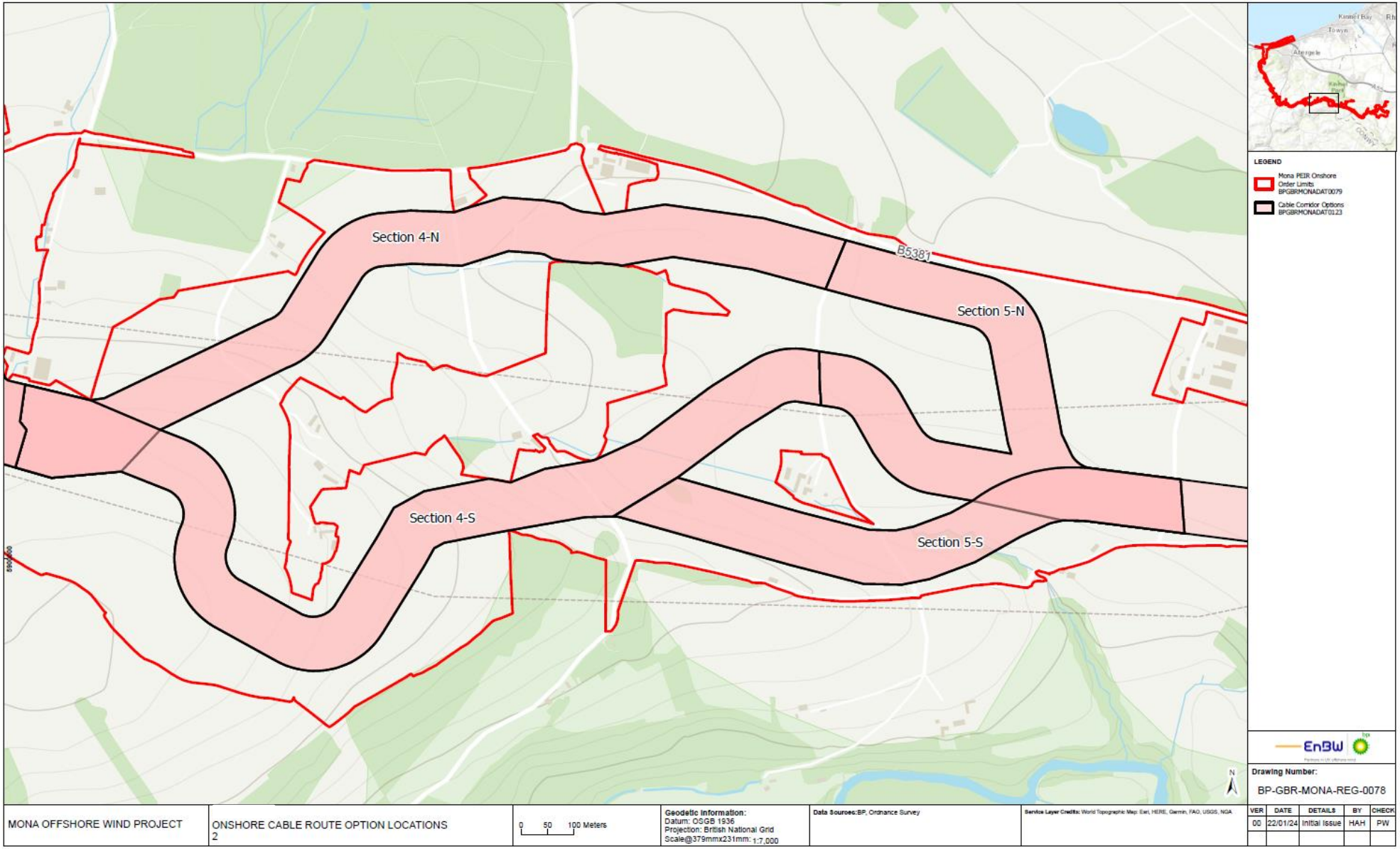

Figure 1.5: Onshore Cable Route Option Locations (Section 4N and 4S, and Section 5N and 5S).

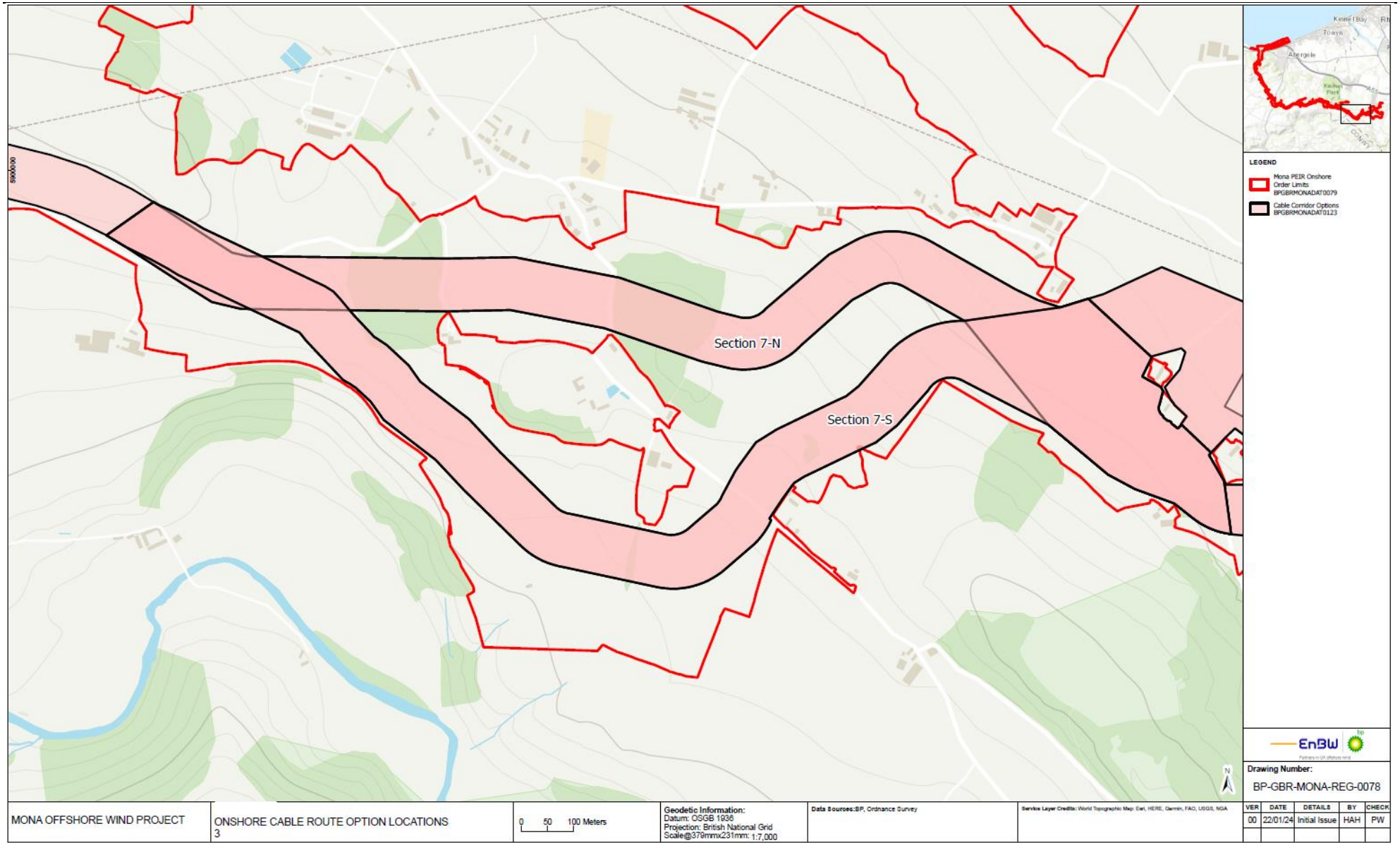

Figure 1.5: Onshore Cable Route Option Locations (Section 7N and 7S).

Table 1.3: BRAG assessment table of development considerations for the 4 sections of onshore cable route optionality

Topic	Section 3N	Section 3S	Section 4N	Section 4S	Section 5N	Section 5S	Section 7N	Section 7S
Ecology and nature conservation	The sward provides potential habitat for bats and dormice. The construction of a haul road will result in habitat loss and fragmentation.	The trenchless technique in this section would avoid the hedgerows that connect to the woodland block. The haul road would be routed through the existing gaps between trees to minimise habitat loss. There is also potential to avoid hedgerow if routed slightly further south.	Hedgerow with mature trees near Talgrwn Bach will be crossed using trenchless technique which will reduce the amount of habitat lost but the haul road will require removal of some trees. Two younger hedgerows near B3581 will be severed by open cut trenching of the corridor.	Construction of the haul road would cause disruption to hedgerows linking woodland blocks to the north and south. The hedgerow may provide potential foraging habits for bats.	Two hedgerows will be affected by open cut and one hedgerows will be impacted by the haul road. The haul road should be routed to avoid the larger trees in the hedgerow.	One hedgerow and potentially two mature trees may be lost	Whilst the woodland blocks could be avoided by using trenchless technique, the haul road would have to be routed through both blocks. This would lead to loss of woodland habitat including potential habitat for bats and dormice.	Haul road and sections of open cut corridor will be directed to existing gaps between mature trees to minimise tree loss. However, some loss of mature trees will occur on the hedgerow to the south of Plas Hafod Kennels where there are no existing gaps for the haul road.
Hydrology, hydrogeology and flood risk	Traverses 4 ordinary water courses. This option is closer to the Tan-y-Mynydd Trout farm and construction	Traverses 4 ordinary water courses	Runs parallel to an ordinary watercourse for approximately 600 metres. Ordinary watercourse is	Traverses one ordinary water course which is a tributary of the Elwy River (Clwyd to Melai) Ordinary	No main or ordinary watercourses impacted	No main or ordinary watercourses impacted	No main or ordinary watercourses impacted	This route is closer to a tributary of the Elwy River (Clwyd to Melai), a salmonid river

Topic	Section 3N	Section 3S	Section 4N	Section 4S	Section 5N	Section 5S	Section 7N	Section 7S
	may have potential impacts on the groundwater fed lakes. Non-designated geological features (drumlins) are also located within this section.		a tributary of Elwy River (salmonid river currently at good status)	watercourse is a tributary of Elwy River (salmonid river currently at good status)				currently at good status
Archaeology / cultural heritage	Standard baseline archaeological potential	Standard baseline archaeological potential	Slightly higher archaeological potential as demonstrated by geophysical survey, but not as substantial as Section 4S	Elevated archaeological potential with geophysical survey demonstrated key concentration of potential features.	Standard baseline archaeological potential	Standard baseline archaeological potential	Standard baseline archaeological potential - NB geophysical survey incomplete in this area	Standard baseline archaeological potential - NB geophysical survey incomplete in this area
Traffic and transport	Options have similar highway considerations	Options have similar highway considerations	Crosses more roads in comparison to south option with associated disbenefits	Crosses fewer roads in comparison to north option with associated benefits	Options have similar highway considerations	Options have similar highway considerations	Options have similar highway considerations	Options have similar highway considerations

Topic	Section 3N	Section 3S	Section 4N	Section 4S	Section 5N	Section 5S	Section 7N	Section 7S
Land use (including predictive Agricultural Land Classifications)	Assumes appropriate mitigation in place for PRoW, farm holdings and settlements. Majority of impacts will be temporary and associated with construction activities	Assumes appropriate mitigation in place for PRoW, farm holdings and settlements. Majority of impacts will be temporary and associated with construction activities	Assumes appropriate mitigation in place for PRoW, farm holdings and settlements. Majority of impacts will be temporary and associated with construction activities	Assumes appropriate mitigation in place for PRoW, farm holdings and settlements. Majority of impacts will be temporary and associated with construction activities	Assumes appropriate mitigation in place for PRoW, farm holdings and settlements. Majority of impacts will be temporary and associated with construction activities	Assumes appropriate mitigation in place for PRoW, farm holdings and settlements. Majority of impacts will be temporary and associated with construction activities	Assumes appropriate mitigation in place for PRoW, farm holdings and settlements. Majority of impacts will be temporary and associated with construction activities	Assumes appropriate mitigation in place for PRoW, farm holdings and settlements. Majority of impacts will be temporary and associated with construction activities
Noise and vibration	There are some receptors nearby however this route is preferable to Section 3S.	This route meanders closer to a receptor so is slightly less preferable to the alternative.	This section passes by fewer receptors and, where it does, the receptors are closer to the B5381 and thus are likely to be exposed to higher existing noise levels.	There are some receptors close to the route but the key issue is the low existing noise levels likely resulting in more onerous impact assessment criteria.	Not many receptors near this section and it's close to the B5381 so likely higher existing noise levels.	This route is fairly close to receptors but further than Section 5 South Alt.	There is some woodland along this route which may require trenchless technique to cross. There are a number of receptors nearby.	No woodland to cross through but likely to have a quiet existing noise climate so more onerous thresholds
Landscape and visual	This option includes a collection of	The trenchless technique in this section	trenchless technique proposed for	trenchless technique proposed for	Loss of mature trees by this option can be	One hedgerow and potentially two mature	Whilst the woodland blocks could	There will be some loss of mature trees

Topic	Section 3N	Section 3S	Section 4N	Section 4S	Section 5N	Section 5S	Section 7N	Section 7S
	woodland blocks and connecting hedgerows. This comprises woodland that was originally part of a much larger woodland block. Although trenchless technique is proposed, the construction of the haul road would cut through the asard resulting in the loss of mature trees - any loss of mature trees affects the characteristics of the SLA.	would avoid the hedgerows that connect to the woodland block. The haul road would be routed through the existing gaps between trees to minimise loss of mature trees.	one section of hedgerow crossing the route but the haul road may result in the loss of individual trees. Hedgerow within corridor would have to be avoided by micrositing. Mature trees to be avoided .	field surrounded by mature trees and the haul road would be routed to gaps between existing trees. Fewer other trees along this section.	avoided with this option	trees may be lost	be avoided by using trenchless technique, the haul road would have to be routed through both blocks. This would lead to loss of many mature trees.	within hedgerows for the haul road where there are no existing gaps.
Tourism and socio-economics	Assumes appropriate mitigation in	Assumes appropriate mitigation in	Assumes appropriate mitigation in	Assumes appropriate mitigation in	Assumes appropriate mitigation in	Assumes appropriate mitigation in	Assumes appropriate mitigation in	Assumes appropriate mitigation in

Topic	Section 3N	Section 3S	Section 4N	Section 4S	Section 5N	Section 5S	Section 7N	Section 7S
	place for PRoW.	place for PRoW.	place for PRoW.	place for PRoW.	place for PRoW.	place for PRoW.	place for PRoW.	place for PRoW.
Engineering and design	This section contains 1 potentially high risk, multiple moderate risk crossings and also has a slight pinch point. Additionally, there are some significant areas of the route within flood zones in the area near the trout fishery.	No major crossing risks have been identified that would constitute a complex crossing. However, 28his section has a large number of utility crossings, includes 1 moderate level pinch point and is steeply sloped across most of the section. There is a significant hill with very steep side that the cable route crosses in this section. The slope may not be beyond the limitations of	This section includes some low to moderate level crossings. The main constraint present is in the form of pinch points, which will be able to be alleviated by a temporary narrowing of the cable route through effected areas.	This section only contains minor or lower risk level crossings. However, it also contains an area with very steep slopes. The slope may not beyond the limitations of trenching techniques but may be too steep for the haul road and may pose a high risk to the construction feasibility.	This section may contain one moderate level complex crossing. BRAG scoring varies dependant on route alignment in section 4: 4-N – Amber 4-S- Green	This is a very small section with few crossings, however the one complex crossing in this section does pose a moderate risk. This section is also very sloped and runs parallel to a steep ridge line for a large portion of the section. The slope may not beyond the limitations of trenching techniques but may be too steep for the haul road and may pose a high risk to the	This section contains multiple moderate to high level risk crossings and has a reasonably large number of total constraints. This section also passes through an area noted for historical mining and may pose a high risk to the construction feasibility.	Multiple moderate level constraints encountered in this section, as well as a high number of minor constraints. Possibility of historical mining and multiple tight pinch points.

Topic	Section 3N	Section 3S	Section 4N	Section 4S	Section 5N	Section 5S	Section 7N	Section 7S
		trenching techniques but may be too steep for the haul road and may pose a high risk to the construction feasibility.				construction feasibility.		

Conclusion

1.4.2.2 Option 3N has been discounted and not taken forward due to carrying more engineering and environmental constraints (associated with the mature wooded hedgerows and the number of crossings / narrowing of onshore cable corridor that would be required to facilitate this route – potential impacts on onshore ecology and landscape and visual) than the alternative option (Option 3S). Both routes carry engineering risks associated with gradients and steepness of slope, but Option 3N also carried a potential interaction with the Tan-y-Mynydd Trout Fishery. Feedback received during the PEIR consultation indicated the potential tributaries feeding into the trout farm and their sensitivity and a Project decision was taken to avoid it entirely.

1.4.2.3 Option 4S has been discounted and not taken forward primarily due to the steepness of gradient associated with this section of the onshore cable route compared to the alternative (Option 4N); and the difficulty in the potential use of trenchless techniques.

1.4.2.4 Option 5S has been discounted and not taken forward primarily due to the steepness of gradient associated with this section of the onshore cable route compared to the alternative (Option 5N); and the difficulty in the potential installation of a haul road. There is also a requirement for a complex crossing along this section of the onshore cable route.

1.4.2.5 Option 7N has been discounted and not taken forward due to the constraints associated with the Ancient Woodland and historic landfill (as well as an area of historic minig) located along the route. To overcome these constraints would require complex trenchless techniques and would also require a complex haul road solution. Activities would be required to route through, or create significant diversions around, the Ancient Woodland blocks. The alternative option (Option 7S) does pass closer to the River Elwy but has significantly fewer complex constraints.

1.4.2.6 These optionality decisions were presented to the Site Selection EWG and announced via newsletter and online publication in August 2023:

- https://www.morganandmona.com/assets/files/MONA-Onshore-Substation-announcement-newsletter.pdf.

1.4.2.7 The final order limits including the final route of the onshore cable corridor are illustrated in Figure 4.22 in Volume 1, Chapter 4: Site Selection and Consideration of Alternatives.

1.4.3 Onshore substation

1.4.3.1 The design, layout and final location of the onshore substation and associated infrastructure was refined following technical assessments and statutory consultation feedback received through publication of the PEIR, formal and information consultation with landowners, further design refinements, engineering optimisation, and findings from additional environmental appraisals and surveys that were ongoing during and after statutory consultation on the PEIR. – as outlined in section 3.3. Information on the likely design parameters and space requirements that have been used in this site selection process include:

- A footprint of up to 65,000m^2 for the indicative onshore substation footprint;
- Structures will be up to 15 m tall; and

- The onshore substation will require land for temporary construction works (e.g. welfare, parking, storage areas and associated temporary access tracks) and a temporary construction compound footprint of up to 150,000 m^2. A potential construction layout was produced for the purposes of the BRAG assessment as shown in Figure 1.6.

1.4.3.2 Constraints information on the two remaining onshore substation options is shown below in Table 1.4. The information in the table was populated using the stakeholder feedback obtained during the initial site selection of the onshore substation (see section 4.8.5 of volume 1, chapter 4, Site Selection and Consideration of Alternatives) and feedback obtained through the PEIR consultation. This information was used to assess which of the individual options should progress to the final option for Application.

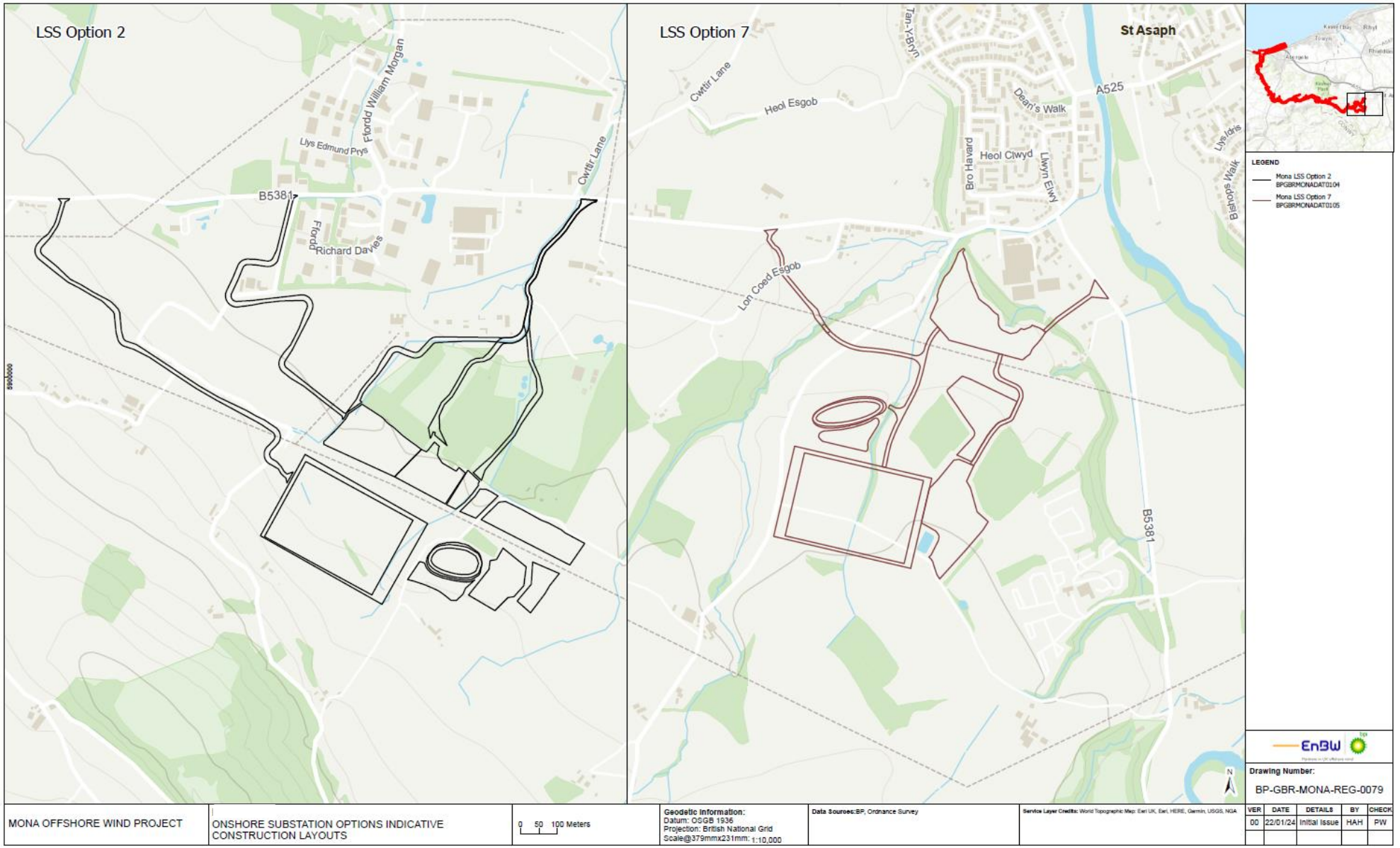

Figure 1.6: Onshore Substation Options Indicative Construction Layouts

Table 1.4: BRAG assessment table of development considerations for the 2 shortlisted potential onshore substation locations

Topic	Option 2 (south of National Grid Bodelwyddan substation)	Option 7 (south of St Asaph)
Ecology and nature conservation	Mature trees on site which may support bats, however fewer in number than substation option 7. Fewer other constraints with respect to watercourses, great crested newts (GCN) and the number of mature trees. The grassland is of lower ecological value. However, the proximity of the compounds to the ancient woodland could lead to damage the roots, from air pollution and fragmentation of the access tracks. *Potential to mitigate key impacts* The opportunities for the substation platform to avoid individual mature trees and hedgerow in the centre of the site is limited by design of the substation (and need to retain flexibility) and the presence of National Grid's overhead lines across the site. However, land is available within the substation search area for mitigation and enhancement, with the potential to link in with wider mitigation schemes for GCN.	Loss of hedgerow habitat along the ordinary watercourse that contains a significant number of Category A (mature oaks) trees (when compared to substation option 2). The trees have potential to support protected species including bats and dormice. The attenuation pond would result in the loss of a pond that has potential for GCN (likely presence as there is a large meta population in this section and the pond is good quality. The riparian habitat has potential to support water vole and important invertebrate (both aquatic and terrestrial) and botanical communities. Other protected species on the substation site include reptiles, badgers and breeding birds. The welfare compound (on the eastern side) and the temporary spoil area are very close to the blocks of woodland. Many of these blocks are ancient woodland and they would require a buffer of at least 15m (possibly up to 30m). The access track from the welfare compound to the material storage location cuts through hedgerows that link to the ancient woodland blocks. These hedgerows have potential to provide foraging routes for bats and other protected species. There are multiple access tracks crossing the existing ordinary watercourse resulting the loss and fragmentation of the high value habitat. Access to the substation site would require the loss of further mature trees and the permanent severance of a hedgerow. *Potential to mitigate key impacts*

Topic	Option 2 (south of National Grid Bodelwyddan substation)	Option 7 (south of St Asaph)
		The restoration of the ordinary watercourse and riparian habitat would require a greater area of land and the site would have difficulty accommodating this with the current proposed layout of the onshore substation.. NRW s42 consultation response stated that realignment of watercourses that are tributaries of Main Rivers are not generally permitted. There is no alternative route for the access to the substation.
Hydrology, hydrogeology and flood risk	Substation option 2 is located close to an ordinary watercourse. A direct impact may occur as a result of culverting to provide access (access option 6) and potentially along the eastern boundary of the substation footprint however the impact would be significantly less than option 7.	The Ordinary Watercourse, which is a tributary of the Elwy River an important Salmonid River and currently achieving good ecological status, is the main constraint from a WFD perspective for this option. Culverting of a watercourse for over 200 metres is not recommended, particularly if there are fisheries interests but even if it is low sensitivity, it is still removing aquatic habitat; the space a water course diversion looks difficult to accommodate within the layout provided. Potential indirect impacts from the realignment of the watercourse on more sensitive reaches downstream in the Elwy should also be considered. NRW's Engineering in the Water Environment Good Practice Guide: Riparian Vegetation Management, recommends a minimum of 10 metre riparian buffer for enhancing wildlife. A minimum of 5 metres is required, based on General Binding Rule 19 of NRW's Controlled Activities Regulations, to reduce erosion and poaching at a water course. *Potential to mitigate key impacts* The restoration of the ordinary watercourse and riparian habitat would require a greater area of land and the site

Topic	Option 2 (south of National Grid Bodelwyddan substation)	Option 7 (south of St Asaph)
		would have difficulty accommodating this with the current proposed layout of the onshore substation. NRW s42 consultation response stated that realignment of watercourses that are tributaries of Main Rivers are not generally permitted.
Archaeology / cultural heritage	High potential for impacts associated with the setting of designated assets and historic landscape character. Potential for archaeological remains to survive with mitigation options likely available.	Moderate potential for impacts associated with the setting of designated assets. Potential for archaeological remains to survive with mitigation options likely available
Traffic and transport	On the basis that there a several potential options to access the substation and the majority do not require the crossing of the public highway, this is the preferred option	There is only one option route for the substation access. The topography is undulating and may require significant improvements to be suitable for construction traffic. The route requires the crossing of a public road.
Land use (including predictive Agricultural Land Classifications)	Encroachment into Grade 3a best and most versatile agricultural land Consideration of location of area in relation to field boundaries and accesses and impact on operation of farm holding.	Encroachment into Grade 3a best and most versatile agricultural land Consideration of location of area in relation to field boundaries and access and impact on operation of farm holding – substation option 7 results in greater overall land take. Consideration of proximity of construction works and substation to caravan park. Requires realignment of a farm track.

Topic	Option 2 (south of National Grid Bodelwyddan substation)	Option 7 (south of St Asaph)
Noise and vibration	Noise-sensitive receptors situated much closer to the boundary of the substation (200m from the closest receptor) and thus will require a greater amount of acoustic mitigation to adhere to noise criteria. There is a greater number of receptors close by and thus more will be affected by the substation operation. Access track appears to be situated closer to receptors than for Option 7 – not necessarily a problem long-term but during construction may result in a greater impact.	Fewer noise-sensitive receptors nearby with the closest being situated further away from the substation boundary Closest receptors appear to be caravans to the east which are occupied for only part of the year (although the site is open for 10.5 months of the year, not all properties are likely to be occupied). Access track is situated further away from the nearest receptors.
Landscape and visual	Substation option 2 lies at the base of the low ridge at Cefn Merriadog which rises steeply to the south to form a wooded backdrop to views. The site comprises small to medium sized pasture fields with hedgerow boundaries and scattered mature oak trees filter views across the farmland. Woodland copses to the north and south provide further enclosure. This option is not located in a sensitive local landscape area and would be visible from the smallest area of the landscape however, would result in the loss of the largest number of landscape features. Development in this location would be most closely associated with existing nearby development of a similar character. Visual effects on nearby properties at close proximity could be mitigated with planting.	Substation option 7 comprises medium sized pasture fields with hedgerow boundaries and scattered mature oak trees filter views across the farmland. Woodland copses and a tree lined stream to the west provide further enclosure in the landscape and separation from the Gwynt y Mor Offshore Wind Farm substation. A thick tree belt on eastern side of site visually separates the site from the settlement fringes of St Asaph. The area has a predominantly rural character, influenced to some extent by overhead power lines. This option is not located in a sensitive local landscape area however, it would be visible from a large area of the landscape and would result in the loss of a moderate number of landscape features. Visual and potential residential amenity effects on residential receptors and community facility/business, which could be mitigated with offsite planting closer to properties.

Topic	Option 2 (south of National Grid Bodelwyddan substation)	Option 7 (south of St Asaph)
Engineering and design	This site is slightly restricted on space especially due to its close proximity to the planned works for Awel y Mor OWF. Historical mine workings potentially present in this area could also effect the viability of this onshore substation location. Smaller footprint dimensions reduce the severity of spacing constraints making this option more viable.	This site is highly restricted on space due to the gas mains and woodland blocks (Ancient Woodland). Use of this site may also require re-routeing a watercourse that runs though the onshore substation zone. Even with the reduced dimensions of the footprint this onshore substation location is still very constrained in terms of spacing and would likely require reorienting of onshore substation footprint to increase viability as an LSS location.

Conclusion

1.4.3.3 Statutory consultation feedback received on the onshore substation options was limited. And the majority of community consultation responses received were either in favour or objection depending on the respondee's proximity to the proposed onshore substation locations; and generally objecting to the size of the onshore infrastructure.

1.4.3.4 Denbighshire County Council's comments focussed predominantly on the alteration of the character of the area in relation to its economic, social and environmental well-being; cumulative impacts; and the general size and height in relation to landscape impacts and greenfield development.

1.4.3.5 Natural Resources Wales provided an indicative preference that Option 2 is further away from the AONB and therefore is likely to be preferable from a ZTV perspective. In addition, a realignment of the tributary of the River Elwy associated with Option 7 is generally not permitted.

1.4.3.6 Onshore substation Option 7 has been discounted and not taken forward based on the consultation responses received and the technical considerations identified through the updated BRAG assessment.

1.4.3.7 This is primarily driven by the construction feasibility and limiting the 'spread' of the construction footprint and potential landscape impacts associated with this; and the potential loss of the significant riparian habitat associated with Option 7 (as well as the required realignment of that watercourse and NRW's objection to this) and the potential ecological and hydrological implications associated with this onshore substation location.

1.4.4 Onshore substation access

1.4.4.1 A number of potential operational accesses were considered for the final onshore substation location (as per section 1.4.3 i.e. Option 2). A total of six routes were considered, each with an operational width of 8m.

1.4.4.2 These options were presented to the Site Selection EWG in August 2023. Discussion focussed on potential overlap and / or interaction with the cumulative projects in the area (including the existing National Grid Bodelwyddan substation) and the Ancient Woodland to the north of the final onshore substation location (i.e. Option 2):

- The shortest route from the existing public highway to the onshore substation was identified;
- The 8m corridors avoided reduced / minimised any interaction with environmental constraints identified by stakeholders;
- Reduced / minimised any interaction with other environmental constraints, such as watercourses and hedgerow crossings, and routing through separation buffers surrounding existing infrastructure;
- New information obtained during utilities searches was used to refine the routes and reduce interactions;
- Assuming other refinement requirements could be met, the routes were aligned to field margins.

1.4.4.3 These onshore substation operational accesses are displayed in Figure 1.7. Constraint information on the six onshore substation operational access roads is shown below in Table 1.5.

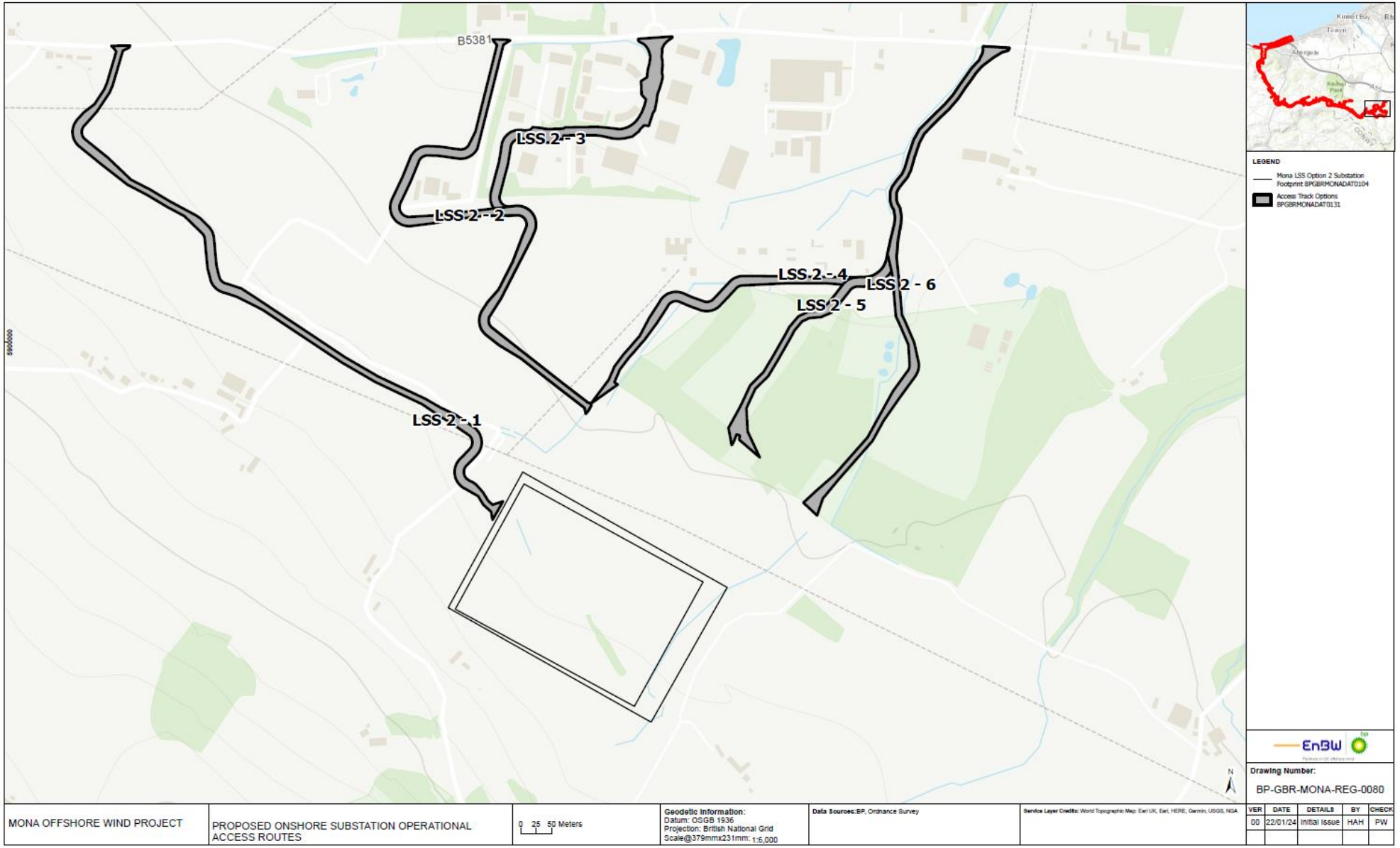

Figure 1.7: Proposed Onshore Substation Operational Access Routes.

Table 1.5: BRAG assessment table of development considerations for the 6 onshore substation operational access routes

Topic	Onshore Substation Access 1 (LSS2-1)	Onshore Substation Access 2 (LSS2-2)	Onshore Substation Access 3 (LSS2-3)	Onshore Substation Access 4 (LSS2-4)	Onshore Substation Access 5 (LSS2-5)	Onshore Substation Access 6 (LSS2-6)
Ecology and nature conservation	Whilst this is marginally the longest route it has the least potential on ecological features. The track will likely bisect three hedges and may result in the loss of mature trees at one of the hedges prior to joining an existing access track. The route is the furthest away from woodland parcels.	The proposed route bisects five hedges and crosses an ordinary watercourse at its entry to the onshore substation site and compounds. The route is worse than LSS-2-3 as there are more hedgerows bisected and greenfield land used.	The proposed route bisects three hedges and crosses an ordinary watercourse at its entry to the onshore substation site and compounds. This option uses a greater length of existing roads and is a shorter route impacting less ecological features compared to LSS-2-2.	The proposed route bisects at least three hedgerows. The route runs alongside an ancient woodland parcel to the southwest and southeast. Vehicle movements and dust/noise may be difficult to mitigate given the proximity and therefore could result in adverse impacts to protected sites. The route runs along an ordinary watercourse for approximately 900 metres.	The proposed route bisects at least two hedgerows. The route runs alongside an ancient woodland parcel to the southeast. There may be a loss of ancient woodland at the bell mouth where the access road joins the site. This potential loss of ancient woodland in addition to vehicle movements and dust/noise could result in adverse impacts to protected sites The route runs along an ordinary watercourse for approximately 400 metres	The proposed route bisects at least two hedgerows. The route bisects and fragments ancient woodland and runs along the boundary of ancient woodland to east and west. The loss and fragmentation of ancient woodland in addition to vehicle movements and dust/noise will likely result in an adverse impact. The route runs along an ordinary watercourse for approximately 450 metres

Topic	Onshore Substation Access 1 (LSS2-1)	Onshore Substation Access 2 (LSS2-2)	Onshore Substation Access 3 (LSS2-3)	Onshore Substation Access 4 (LSS2-4)	Onshore Substation Access 5 (LSS2-5)	Onshore Substation Access 6 (LSS2-6)
Hydrology, hydrogeology and flood risk	Whilst this is marginally the longest route it has the least potential to have an impact on any water course.	Ordinary watercourse within the Pont Robin Cut (Bodelwyddan) will require culverted or bridged crossing at entrance to site. This route is worse than LSS-2-3 as there is more greenfield land used.	Ordinary watercourse within the Pont Robin Cut (Bodelwyddan) will require culverted or bridged crossing at entrance to site. Potentially less impactful as LSS-2-2 as uses more existing hardstanding route.	The proposed route runs along an ordinary watercourse within the Pont Robin Cut (Bodelwyddan) for approximately 900 metres. Assuming this water course is an open channel along this length then there is a greater potential for water quality impacts during construction and operation of the track. Whether culverting is required is not known at present, but the length of the routes suggests that there may be sections that would require culverting	The proposed route runs along an ordinary watercourse within the Pont Robin Cut (Bodelwyddan) for approximately 400 metres. Assuming this water course is an open channel along this length then there is a greater potential for water quality impacts during construction and operation of the track. Whether culverting is required is not known at present, but the length of the route suggests that there may be sections that would require culverting	The proposed route runs along an ordinary watercourse within the Pont Robin Cut (Bodelwyddan) for approximately 450 metres. Assuming this water course is an open channel along this length then there is a greater potential for water quality impacts during construction and operation of the track. Whether culverting is required is not known at present, but the length of the route suggests that there may be sections that would require culverting

Topic	Onshore Substation Access 1 (LSS2-1)	Onshore Substation Access 2 (LSS2-2)	Onshore Substation Access 3 (LSS2-3)	Onshore Substation Access 4 (LSS2-4)	Onshore Substation Access 5 (LSS2-5)	Onshore Substation Access 6 (LSS2-6)
Archaeology / cultural heritage	The proposed route is not located within immediate proximity of any designated heritage assets or known below-ground archaeological assets. The geophysical survey has not identified any meaningful concentration of archaeological anomalies along the proposed course. As the proposed route covers the longest distance over previously undisturbed areas (ie fields) there is a slightly greater risk that, as of yet, unidentified below-ground archaeological	The proposed route is not located within immediate proximity of any designated heritage assets or known below-ground archaeological assets. The geophysical survey has not identified any meaningful concentration of archaeological anomalies along the proposed course. Where the proposed route crosses previously undisturbed areas, there is a risk that, as of yet, unidentified below-ground archaeological remains would be disturbed during the	The proposed route is not located within immediate proximity of any designated heritage assets or known below-ground archaeological assets. The geophysical survey has not identified any meaningful concentration of archaeological anomalies along the proposed course. Although a proportion of the route would be along existing hardstanding tracks/roads, where the proposed route crosses previously undisturbed areas, there is a risk that, as of yet,	The proposed route is not located within immediate proximity of any designated heritage assets or known below-ground archaeological assets. The geophysical survey has not identified any meaningful concentration of archaeological anomalies along the proposed course. Although a proportion of the route would be along existing hardstanding routes, where the proposed route crosses previously undisturbed areas, there is a risk that, as of yet,	The proposed route is not located within immediate proximity of any designated heritage assets or known below-ground archaeological assets. The geophysical survey has not identified any meaningful concentration of archaeological anomalies along the proposed course. Although a proportion of the route will be routed along existing hardstanding routes, where the proposed route crosses previously undisturbed areas, there is a risk that, as of yet,	The proposed route is not located within immediate proximity of any designated heritage assets or known below-ground archaeological assets. The geophysical survey has not identified any meaningful concentration of archaeological anomalies along the proposed course. Although a proportion of the route will be routed along existing hardstanding routes, where the proposed route crosses previously undisturbed areas, there is a risk that, as of yet,

Topic	Onshore Substation Access 1 (LSS2-1)	Onshore Substation Access 2 (LSS2-2)	Onshore Substation Access 3 (LSS2-3)	Onshore Substation Access 4 (LSS2-4)	Onshore Substation Access 5 (LSS2-5)	Onshore Substation Access 6 (LSS2-6)
	remains would be disturbed during the construction of the access track. On this basis, this option has marginally greater risk associated with it, in terms of anticipated archaeological fieldwork requirements, than the five other options..	construction of the access track. As the risk posed is the same for proposed routes LSS-2-2 to LSS-2-6	unidentified below-ground archaeological remains would be disturbed during the construction of the access track. The risk posed is the same for proposed routes LSS-2-2 to LSS-2-6.	unidentified below-ground archaeological remains will be disturbed during the construction of the access track. The risk posed is the same for proposed routes LSS-2-2 to LSS-2-6 .assessment.	unidentified below-ground archaeological remains will be disturbed during the construction of the access track. The risk posed is the same for proposed routes LSS-2-2 to LSS-2-61.	unidentified below-ground archaeological remains will be disturbed during the construction of the access track. As the risk posed is Tame for proposed routes LSS-2-2 to LSS-2-6.
Traffic and transport	Longest distance for traffic movements along B5381. Crosses a main access to several farm properties at its eastern end.	Second shortest distance for traffic movements along B5381. Requires use of existing access through the business park	Shortest distance for access for vehicle movements along B5381, assuming that access through the business park is acceptable. Requires use of existing access through the business park.	Medium distance for traffic movements along B5381 (greater than options LSS2-2 & LSS2-3, but less than LSS2-1). Classified the same as LSS2-1, as difference (c.520m along the B5381 compared to	Medium distance for traffic movements along B5381 (greater than options LSS2-2 & LSS2-3, but less than LSS2-1). Classified the same as LSS2-1, as difference (c.520m along the B5381 compared to	Medium distance for traffic movements along B5381 (greater than options LSS2-2 & LSS2-3, but less than LSS2-1). Classified the same as LSS2-1, as difference (c.520m along the B5381 compared to

Topic	Onshore Substation Access 1 (LSS2-1)	Onshore Substation Access 2 (LSS2-2)	Onshore Substation Access 3 (LSS2-3)	Onshore Substation Access 4 (LSS2-4)	Onshore Substation Access 5 (LSS2-5)	Onshore Substation Access 6 (LSS2-6)
				c.850m) is not deemed sufficient to warrant a lesser classification. Northern 420m is an existing road that has been used for previous projects already. Currently in use as the access to the National Grid substation, and potental conflict with shared use of this road.	c.850m) is not deemed sufficient to warrant a lesser classification. Northern 320m would re-introduce an access that has been used for previous projects already.	c.850m) is not deemed sufficient to warrant a lesser classification. Northern 320m is would re-introduce an access that has been used for previous projects already.
Land use (including predictive Agricultural Land Classifications)	The proposed route is the longest route and would result in the greatest loss of agricultural land. It would also sever at least one large agricultural field. Access from the proposed route may have to be provided for agricultural vehicles using fields to the south of the proposed route.	LSS2-2-2 is the second longest route across agricultural. Severance impacts would be minimised as the proposed alignment of the route is parallel to the field boundaries. The proposed route crosses an existing track to farm buildings: access would have to be maintained through	The proposed route would use the existing road into the St Asaph Business Park and would be adjacent to field boundaries for the remainder of the route to the TCC, thereby minimising the potential for severance. The proposed route crosses an existing track to farm buildings: access	The initial stretch of the proposed route would be adjacent to the existing access road to National Grid and Gwynt y Mor substations. This would lead to the limited loss of agricultural land and access to an agricultural compound. The loss of agricultural land for the remaining section of the route	The initial stretch of the proposed route would be adjacent to the existing access road to National Grid and Gwynt y Mor substations. This would lead to the limited loss of agricultural land and access to an agricultural compound. The loss of agricultural land for the remaining section of the route	The initial stretch of the proposed route would be adjacent to the existing access road to National Grid and Gwynt y Mor substations. This would lead to the limited loss of agricultural land and access to an agricultural compound. The loss of agricultural land for the remaining section of the route

Topic	Onshore Substation Access 1 (LSS2-1)	Onshore Substation Access 2 (LSS2-2)	Onshore Substation Access 3 (LSS2-3)	Onshore Substation Access 4 (LSS2-4)	Onshore Substation Access 5 (LSS2-5)	Onshore Substation Access 6 (LSS2-6)
		traffic management. New access points may also have to be created into fields adjacent to the proposed route.	would have to be maintained through traffic management. New access points may also have to be created into fields adjacent to the proposed route.	would be comparable with LSS-2-5. However, the field to the south of the National Grid Substation would be severed and at least one of the parcels is likely to become unviable for agricultural purposes.	would be comparable with LSS-2-4, however the potential for severance would be less.	would be greater than LSS-2-4 and LSS-2-5. There would be severance of at least three land parcels and internal access tracks.
Noise and vibration	This route is the longest and has the highest number of noise-sensitive receptors nearby (25-30 in close proximity to the road). As such, this is the least preferable option since it will likely give rise to noise impacts at a number of receptors.	There is only one noise-sensitive receptor close to this route. The access track is proposed to be routed around this receptor in proximity. As such, during construction n, the occupant will not be able to move to a room with a façade facing away from the route since the track is routed to pass around the whole building.	This route is directed through St Asaph Business Park and thus there are fewer receptors nearby. However, there are a greater number of receptors than the LSS-2-4 to LSS-4-6 and thus is less favourable.	This route does not pass by many receptors and deviates away from any distant receptors towards the onshore substation. As such, this option is less likely to give rise to noise impacts.	Similar to LSS-2-4, however, since this route does not deviate away from receptors towards the onshore substation, it is slightly less favourable than LSS-2-4.	The first section of this route shares the same receptors as LSS-2-4 and LSS-2-5. However, this route is then directed towards receptors slightly and thus is slightly less favourable than LSS-2-4 and LSS-2-5.

Topic	Onshore Substation Access 1 (LSS2-1)	Onshore Substation Access 2 (LSS2-2)	Onshore Substation Access 3 (LSS2-3)	Onshore Substation Access 4 (LSS2-4)	Onshore Substation Access 5 (LSS2-5)	Onshore Substation Access 6 (LSS2-6)
		This will likely cause significant disturbance.				
Landscape and visual	Marginally the longest route it has little potential to have an impact on any landscape elements, including: • Woodlands • Copses • Tree belts • Trees • Hedgerows • Watercourses. It is routed through a more open landscape and it will be more visible. However, this is preferable to	This option joins route LSS-2-3 to the south of St. Asaph Business Park, thereby avoiding the removal of part of the tree belt to the south of the business park. It would have some impact on hedgerows and hedgerow trees and a watercourse on its southern section. The use of more green field land than LSS-2-3 does not offset the loss of the mature tree belt that LSS-2-3 would require.	This is routed through St. Asaph Business Park and would require the removal of part of the tree belt to the south of the park. Joins route LSS-2-2 to the south of the business park. It shares the same route as LSS-2-2 for its southern section, where it would have the same impact on the water course. The proposed route should be at least 15 m from mature trees (including	The northern section of the route is adjacent to the existing track (to Gwynt y Môr and Burbo Bank substations). This section of the route is common to LSS-2-4, LSS-2-5 and LSS-2-6. LSS-2-3 and LSS-2-4 continue to the south of the Gwynt y Môr substation. LSS-2-4 crosses through/close to a wide tree belt, before running alongside a mature hedgerow. It will impact upon a small	The northern section of this route is the same as LSS-2-4 up to the southeast corner of the Gwynt y Môr substation, at which point it turns south to run along the western edge of Coed Cord (Ancient Woodland) immediately before joining the material laydown and storage compound. The route passes through a narrow gap between two areas of woodland: the gap would have to be widened – resulting in the removal of mature trees. If this can be	The proposed route splits from LSS-2-4 and LSS-2-5 to the east of the Gwynt y Môr substation. It crosses three hedgerows with veteran trees and also passes to the east of Coed Cord between this wood and another, un-named, area of Ancient Woodland, to the east. A watercourse also runs through this gap between the two areas of woodland. If the access is to be retained, a permanent culvert would be required.

Topic	Onshore Substation Access 1 (LSS2-1)	Onshore Substation Access 2 (LSS2-2)	Onshore Substation Access 3 (LSS2-3)	Onshore Substation Access 4 (LSS2-4)	Onshore Substation Access 5 (LSS2-5)	Onshore Substation Access 6 (LSS2-6)
	removing landscape elements. The proposed route should be at least 15 m from mature trees (including trees in hedgerows) and should be routed to avoid mature trees when crossing hedgerows.	It is shorter than LSS-2-1 and so has less of an impact on the views than that route does. It also crosses less hedgerows than LSS-2-1, so more landscape elements would remain intact. It is routed through more open countryside than LSS-2-3 so is more visible. However, this is preferable to removing landscape elements (mature trees/woodland). The proposed route should be at least 15 m from mature trees (including trees in hedgerows) and should be routed to avoid mature trees when crossing hedgerows.	trees in hedgerows) and should be routed to avoid mature trees when crossing hedgerows.	watercourse, where it enters the welfare and parking compound. The proposed route should be at least 15 m from mature trees (including trees in hedgerows) and should be routed to avoid mature trees when crossing hedgerows.	done to the western area of woodland (not Ancient Woodland and potentially coniferous planting) this would be the way the loss of trees could be mitigated in some way. Coed Cord should not be encroached upon. If it is, it would change the BRAG assessment of this route option. The proposed route is possibly the least visible of all the options. The proposed route should be at least 15 m from mature trees (including trees in hedgerows) and should be routed to avoid mature trees when crossing hedgerows.	The track should be at least 15 m from mature trees (including trees in hedgerows) and should be routed to avoid mature trees when crossing hedgerows.

Topic	Onshore Substation Access 1 (LSS2-1)	Onshore Substation Access 2 (LSS2-2)	Onshore Substation Access 3 (LSS2-3)	Onshore Substation Access 4 (LSS2-4)	Onshore Substation Access 5 (LSS2-5)	Onshore Substation Access 6 (LSS2-6)
Engineering and design	Red due to interface with existing farm access, length and possible crossing / clash with the Awel-y-Mor corridor.	Red due to the requirement for access through the business park, utilities constraints, and possible crossing / clash with the Awel-y-Mor corridor.	Red due to the requirement for access through the business park, and possible crossing / clash with the Awel-y-Mor corridor.	Not feasible due to available space, existing drainage and the gas main along the southern edge of the National Grid substation.	No significant constraints aside from utilities which are classified as red on a provisional precautionary basis subject to confirmation of the precise location of underground electricity assets and associated restrictions and protection requirements. This utilities risk is not considered sufficient to result in an overall classification of red when balanced against the amber / green classifications for all other categories.	All categories amber or green, with the exception of utilities which are classified as red on a provisional precautionary basis subject to confirmation of the precise location of underground electricity assets and associated restrictions and protection requirements. This utilities risk is not considered sufficient to result in an overall classification of red when balanced against the amber / green classifications for all other categories.

Conclusion

1.4.4.4 LSS Accesses 2, 3, 4 and 6 have been discounted and not progressed.

1.4.4.5 LSS Accesses 2, 3 and 4 have all identified engineering considerations that do not make them feasible solutions for the onshore substation access.

1.4.4.6 LSS Access 6 has potentially significant impacts on landscape and visual and onshore ecology associated with the requirement to remove hedgerows and woodland in order to route from the public highway to the onshore substation.

1.4.4.7 The remaining two options LSS Access 1 and LSS Access 5 represented the longest route (LSS Access 1) and shortest route (LSS Access 5) from the public highway to the onshore substation.

1.4.4.8 It was considered that LSS Access 1 had the potential to be the more 'intrusive' option in comparison to LSS Access 5 due to the need to implement new infrastructure across the length of the route leaving a larger 'legacy' imprint. It also crossed the most public highways meaning that HGV traffic traveling to the onshore substation would need to give way to passing traffic. This would potentially have an impact on the construction programme. LSS Access 1 also routed to the west from the St Asaph Business Park meaning it would overlap with Awel y Mor construction traffic (as the Awel y Mor construction access to the onshore substation is also in this direction).

1.4.4.9 LSS Access 5 required cooperation with a number of other parties as the route passed through Gwynt y Mor mitigation land, used the National Grid existing access (for operational purposes – although this carried the additional benefit that no new access bellmouth would be required), ran in close proximity to Ancient Woodland (within the 50m root protection buffer) and passed over a Wales and West high-pressure gas main. Confirmation would be needed from all parties that the project could manage each of these constraints to satisfaction.

1.4.4.10 Both LSS Access 1 and LSS Access 5 were presented to the Site Selection EWG at the August 2023 progress update, with feedback sought from NRW regarding the interaction with the Gwynt y Mor mitigation land and the proximity to the Ancient Woodland. No objections were raised with the solutions proposed.

1.4.4.11 The Applicant met with National Grid, Gwynt y Mor Offshore Transmission Owners and Wales and West Utilities (as the utility providers that held protective provision rights over the use of the existing National Grid access road) in Q3 2023 in relation to LSS Access 5 and no objections were raised to the solutions proposed in order to retain feasibility. As a result, LSS Access 5 was selected as the final operational access to the onshore substation.

1.5 Summary

1.5.1.1 Following the statutory consultation on the PEIR, a number of modifications and refinements were made to the Mona Offshore Wind Project as a result of responses to the statutory consultation, formal and information consultation with landowners, further design refinements, engineering optimisation, and findings from additional environmental appraisals and surveys that were ongoing during and after statutory consultation on the PEIR. Responses from the consultation have been reviewed and appropriate revisions to project design and environmental studies have been implemented as detailed in the above sections.

1.5.1.2 The Mona Offshore Wind Project site selection work (as informed through stakeholder engagement, landowner discussions and technical studies) enabled the refinement of the project to the point of a final application that has benefited significantly from stakeholder feedback and the associated iterative design process. The following aspects of the proposed project have been refined to the details that are included within the application for development consent:

- A refined landfall at Llanddulas which includes a commitment to trenchless techniques under the intertidal zone, sea defences, North Wales coastal footpath, historic landfill, Network Rail, A55 trunk road, A547 and Gwrych Castle Grade II listed wall;
- A single onshore cable corridor route of 74m to 100m width with associated accesses and temporary construction compounds;
- Commitment to a number of trenchless technique crossings at waterbodies, hedgerows, public highway and utilities (see Volume 5, Annex 4.3 Crossing Schedule);
- A single and refined HVAC onshore substation site, with associated accesses and temporary construction compounds; and
- Commitment to a GIS onshore substation with reduced maximum footprint of 65,000m^2 and reduced maximum height of 15m.