Partners in UK offshore wind

MONA OFFSHORE WIND PROJECT

Design Principles
F02_F03 (tracked)

Deadline: ~~2~~5

Application Reference: EN010137

Document Reference: J3 ~~F02~~F03

Document Number: MOCNS-J3303-RPS-10146

3 December~~August~~ 2024

F02_F03

Image of an offshore wind farm

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
F01	Application	Mona Offshore Wind Ltd	Mona Offshore Wind Ltd	Mona Offshore Wind Ltd	Feb 2024
F02	Deadline 2	Mona Offshore Wind Ltd	Mona Offshore Wind Ltd	Mona Offshore Wind Ltd	August 2024
F03	Deadline 5	Mona Offshore Wind Ltd	Mona Offshore Wind Ltd	Mona Offshore Wind Ltd	3 December 2024

Prepared by:

Mona Offshore Wind Ltd.

Prepared for:

Mona Offshore Wind Ltd.

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Glossary

Term	Meaning
Applicant	Mona Offshore Wind Limited.
Bodelwyddan National Grid Substation	This is the Point of Interconnection (POI) selected by the National Grid for the Mona Offshore Wind Project.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Project (NSIP).
Environmental Statement	The document presenting the results of the Environmental Impact Assessment (EIA) process for the Mona Offshore Wind Project.
Expert Working Group (EWG)	Expert working groups set up with relevant stakeholders as part of the Evidence Plan process.
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.
Local Authority	A body empowered by law to exercise various statutory functions for a particular area of the United Kingdom. This includes County Councils, District Councils and County Borough Councils.
Maximum Design Scenario	The scenario within the design envelope with the potential to result in the greatest impact on a particular topic receptor, and therefore the one that should be assessed for that topic receptor.
Mona 400kV Grid Connection Cable Corridor	The corridor from the Mona Onshore Substation to the National Grid substation.
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 will be located.
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 Wind Project Boundary	The area containing all aspects of the Mona Offshore Wind Project, both offshore and onshore.
Mona 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 infrastructure will be located
National Policy Statement (NPS)	The national policy statements designated by the Department for Energy Security & Net Zero in January 2024.
Non-statutory consultee	Organisations that an applicant may choose to consult in relation to a project who are not designated in law but are likely to have an interest in the project.
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.
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 (AfLs) are signed.
Outline Code of Construction Practice (CoCP)	A document setting out the standards and procedures to which the Applicant will adhere to in order to manage the potential environmental impacts of construction works associated with the Mona Offshore Wind Project.

Term	Meaning
Statutory consultee	Organisations that are required to be consulted by an applicant pursuant to the Planning Act 2008 in relation to an application for development consent. Not all consultees will be statutory consultees (see non-statutory consultee definition).
Wind turbines	The wind turbine generators, including the tower, nacelle and rotor.

Acronyms

Acronym	Description
AIL	Abnormal and Indivisibles Load
AoS	Area of Search
CoCP	Code of Construction Practice
DCC	Denbighshire Country Council
DCO	Development Consent Order
EIA	Environmental Impact Assessment
EnBW	Baden-Württemberg AG
ES	Environmental Statement
EWG	Expert Working Group
GCN	Great Crested Newts
GIS	Gas Insultated Substation
LEMP	Landscape and Ecological Management Plan
MHWS	Mean High Water Springs
NPS	National Policy Statement
NRW	Natural Resources Wales
oLEMP	Outline Landscape and Ecological Management Plan
OSP	Offshore Substation Platform
PEIR	Preliminary Environmental Information Report
RPZ	Root Protection Zone
SuDS	Sustainable Drainage Systems
SVC	Static Var Compensators
TCC	Temporary Construction Compound
ZTV	Zone of Theoretical Visibility

Units

Unit	Description
%	Percentage
“	Inch

Unit	Description
db	Decibel
GW	Gigawatt
km	Kilometres
kV	Kilovolts
m	Metre
m AoD	Metres above ordnance datum
m^2	Metres square
MW	Megawatt

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1 Introduction

1.1 Project overview

1.1.1.1 Mona Offshore Wind Limited (the Applicant), a joint venture of bp Alternative Energy Investments Ltd (hereafter referred to as bp) and Baden-Württemberg AG (hereafter referred to as EnBW) is developing the Mona Offshore Wind Project.

1.1.1.2 The Applicant has submitted an application to the Planning Inspectorate, on behalf of the Secretary of State, for a Development Consent Order (DCO) for the Mona Offshore Wind Project under the Planning Act 2008.

1.1.1.3 Mona Offshore Wind Project will comprise up to 96 wind turbines. The wind turbines will be situated in the east Irish Sea. Power generated by the wind turbines will be transmitted via export cables to a point of interconnection at the existing Bodelwyddan National Grid Substation, to the south of St Asaph Business Park in Denbighshire. Offshore export cables will be joined to onshore export cables at a landfall point located at Llanddulas. From landfall, the onshore export cables will run approximately 18 km (underground) to the Mona Onshore Substation. 400 kV grid connection cables will provide a connection between the Mona Onshore Substation and an extension of the existing Bodelwyddan National Grid Substation.

1.1.1.4 As part of the onshore cable connection, a new project onshore substation will be constructed to the south of the existing Bodelwyddan National Grid Substation. As the onshore export cables between the landfall and the Mona Onshore Substation and the 400 kV grid connection cables between the Mona Onshore Substation and the point of interconnection will be buried (other than some manhole-type covers, for link boxes, at ground level), the Mona Onshore Substation is the main aspect of above ground infrastructure for the onshore elements of the Project.

1.2 Purpose of this document

1.2.1.1 At this stage in the Project's development process, decisions on exact locations of infrastructure and the precise technologies and construction methods that will be employed have not been made. This includes the exact layout, equipment and technology of the Mona Onshore Substation.

1.2.1.2 These details will be determined during the detailed design that will take place between a decision on the application for development consent and the start of construction. Such details would be provided to Denbighshire County Council (DCC) (and Conwy County Council, where relevant) for approval prior to the commencement of construction works. The provision of detailed design for approval prior to commencement is secured within the DCO.

1.2.1.3 This document sets out the engineering / building design and landscape mitigation principles that the Applicant proposes to apply to the Mona Onshore Substation when undertaking detailed design.

1.2.1.4 These design principles will also be applied in conjunction with the outline Landscape and Ecology Management Plan (oLEMP) (document reference J22).

1.2.1.5 This document has been prepared in accordance with the design guidance contained in Overarching National Policy Statement (NPS) for Energy (EN-1), the NPS for Renewable Energy Infrastructure (EN-3) and the NPS for Electricity Networks Infrastructure (EN-5).

1.3 Project summary

1.3.1.1 Figure 1-1 shows the location of the Mona Offshore Wind Project. The Mona Offshore Wind Project consists of the following:

- Mona Array Area: This is where the wind turbines, foundations, inter-array cables, Offshore Substation Platforms (OSPs) as well as interconnector cables and offshore export cables 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 will be located
- Landfall: This is where the offshore export cables make contact with land and the transitional area where the offshore cabling connects to the onshore cabling
- Mona 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 infrastructure will be located
- Mona Onshore Substation: This is where the new substation will be located, containing the components for transforming the power supplied from the offshore wind farm up to 400 kV
- Mona 400 kV Grid Connection Cable Corridor: The corridor from the Mona Onshore Substation to the National Grid substation.

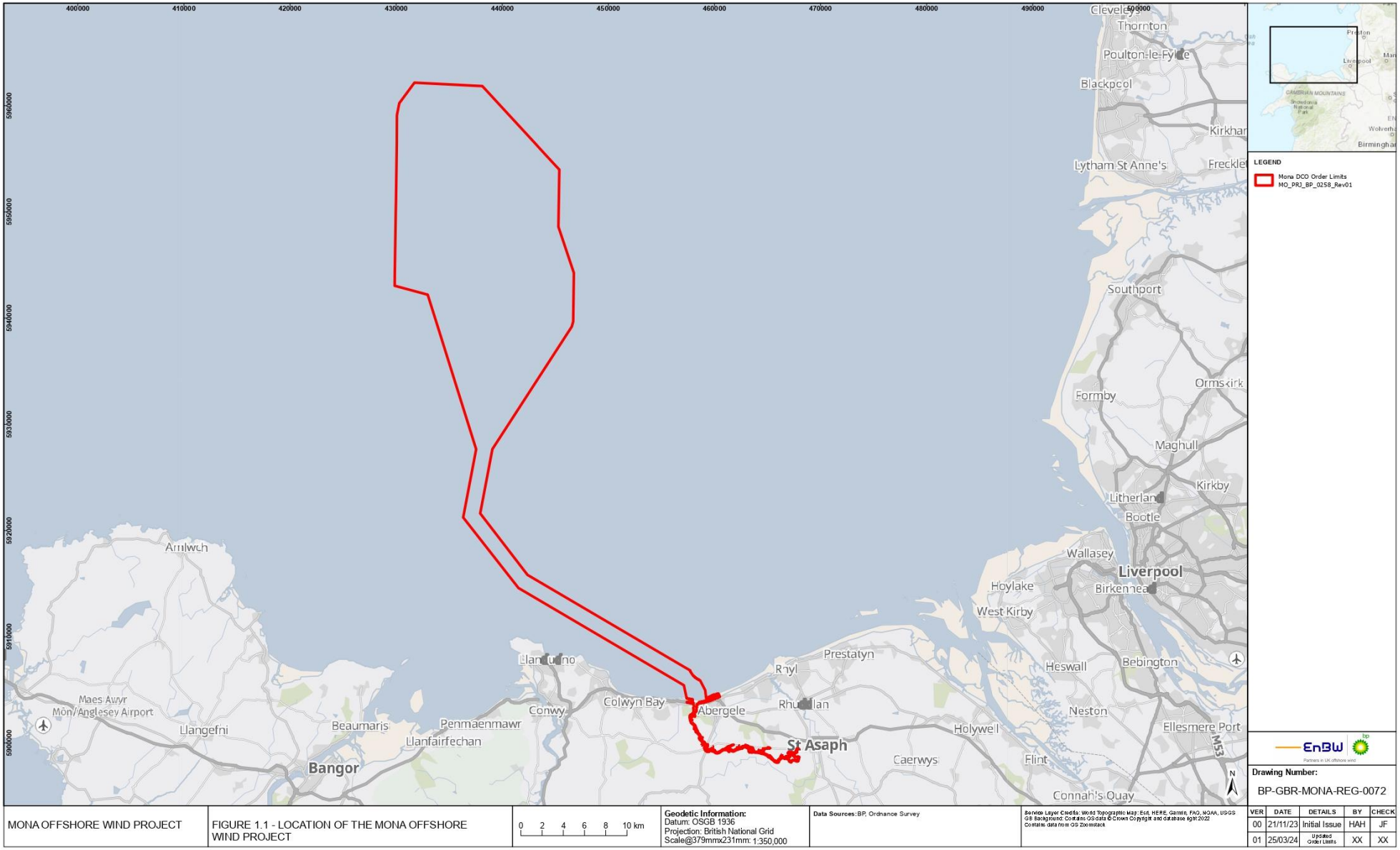

Figure 1-1: Location of the Mona Offshore Wind Project

1.4 The Maximum Design Scenario approach

1.4.1.1 Large-scale offshore wind developments such as Mona Offshore wind Project involve complex engineering and multi-year development programmes where it is not possible to identify the exact components to be used within the final development at the point of DCO application. Within the offshore wind industry, technology is constantly improving, with larger and more efficient turbines being developed which in turn affect a number of other onshore design aspects of the scheme such as:

- The arrangement of onshore export circuits and associated infrastrucutre
- Layout and technology requirements for the proposed onshore substation
- Precise siting of onshore infrastructure
- Construction methods.

1.4.1.2 As noted in Section 1.1 these details will be determined during detailed design that would take place between a decision on the application for development consent and the start of construction.

1.4.1.3 Therefore, the Mona Offshore Wind Project's onshore description is indicative and the maximum design scenario approach (often referred to as the 'Rochdale Envelope') has been used to provide certainty that the final project as built will not exceed the identified parameters, whilst providing the flexibility to accommodate further project refinement during the detailed design phase post-consent.

1.4.1.4 The maximum design scenario approach will ensure that anticipated changes in available technologies between the application date and the detailed design phase can be accommodated within the design, whilst retaining an Environmental Impact Assessment (EIA) that considers all options, with conclusions that are robust regardless of the final design eventually built out.

1.4.1.5 The use of the maximum design scenario approach has been recognised in NPS EN-1. NPS EN-1 (paragraphs 4.3.11 and 4.3.12, provides the following guidance:

"In some instances, it may not be possible at the time of the application for development consent for all aspects of the proposal to have been settled in precise detail. Where this is the case, the applicant should explain in its application which elements of the proposal have yet to be finalised, and the reasons why this is the case.

Where some details are still to be finalised, the ES should, to the best of the applicant's knowledge, assess the likely worst-case environmental, social and economic effects of the proposed development to ensure that the impacts of the project as it may be constructed have been properly assessed.

1.4.1.6 The design scenario approach is consistent with the Planning Inspectorate Advice Note Nine: Rochdale Envelope (Planning Inspectorate, 2018). Paragraph 1.2 of that note states that:

"The 'Rochdale Envelope' approach is employed where the nature of the Proposed Development means that some details of the whole project have not been confirmed (for instance the precise dimensions of structures) when the application is submitted, and flexibility is sought to address uncertainty. Such an approach has been used under other consenting regimes (the Town and Country Planning Act 1990 and the Electricity Act 1989) where an application has been made at a time when the details of a project have not been resolved."

1.4.1.7 The Mona Offshore Wind Project's draft DCO therefore takes the following approach to the Mona Onshore Substation:

- Prescribing the maximum dimensions of the key elements of the infrastructure including the height of any building and external electrical equipment and the total footprint of any buildings and / or compounds
- Requiring that details of the layout, scale and external appearance of the infrastructure and landscaping are approved by the relevant planning authority (DCC) before works commence.

1.4.1.8 These are secured as 'requirements' in the draft DCO that the Applicant must comply with in carrying out the development of the onshore substation. Further information on the contents of relevant DCO Requirements is providing in Section 5.1.1.1.

1.4.1.9 This established approach has been used in the majority of offshore wind applications in England and Wales.

1.5 The onshore substation infrastructure

1.5.1.1 The Mona Onshore Substation will contain a number of elements including but not limited to switchgear, busbars, transformers, capacitors, reactors, reactive power compensation equipment, filters, cooling equipment, control and welfare buildings, lightning protection masts and internal road access. A security fence is needed around the onshore substation compound.

1.5.1.2 Within the Mona Onshore Substation the largest building structure will dependant on the technology selected during the detailed design phase. The largest building structure will have a maximum height of 15 m above the finished ground level. All other equipment (e.g. transformers, harmonic filters) would not exceed 15 m above finished ground level with the exception of slender lightning masts which could be up to 30 m in height. The Mona Onshore Substation will be a Gas Insulated Substation (GIS) which has a smaller land take requirement than the alternative Air Insulated Substation design. The total permanent land requirement for the Mona Onshore Substation to the perimeter fence is 65,000 m^2. Overall 250,000 m^2 will be required to accommodate both on onshore substation footprint and the associated temporary construction areas.

1.5.1.3 Figure 1-2 provides an indicative GIS substation layout.

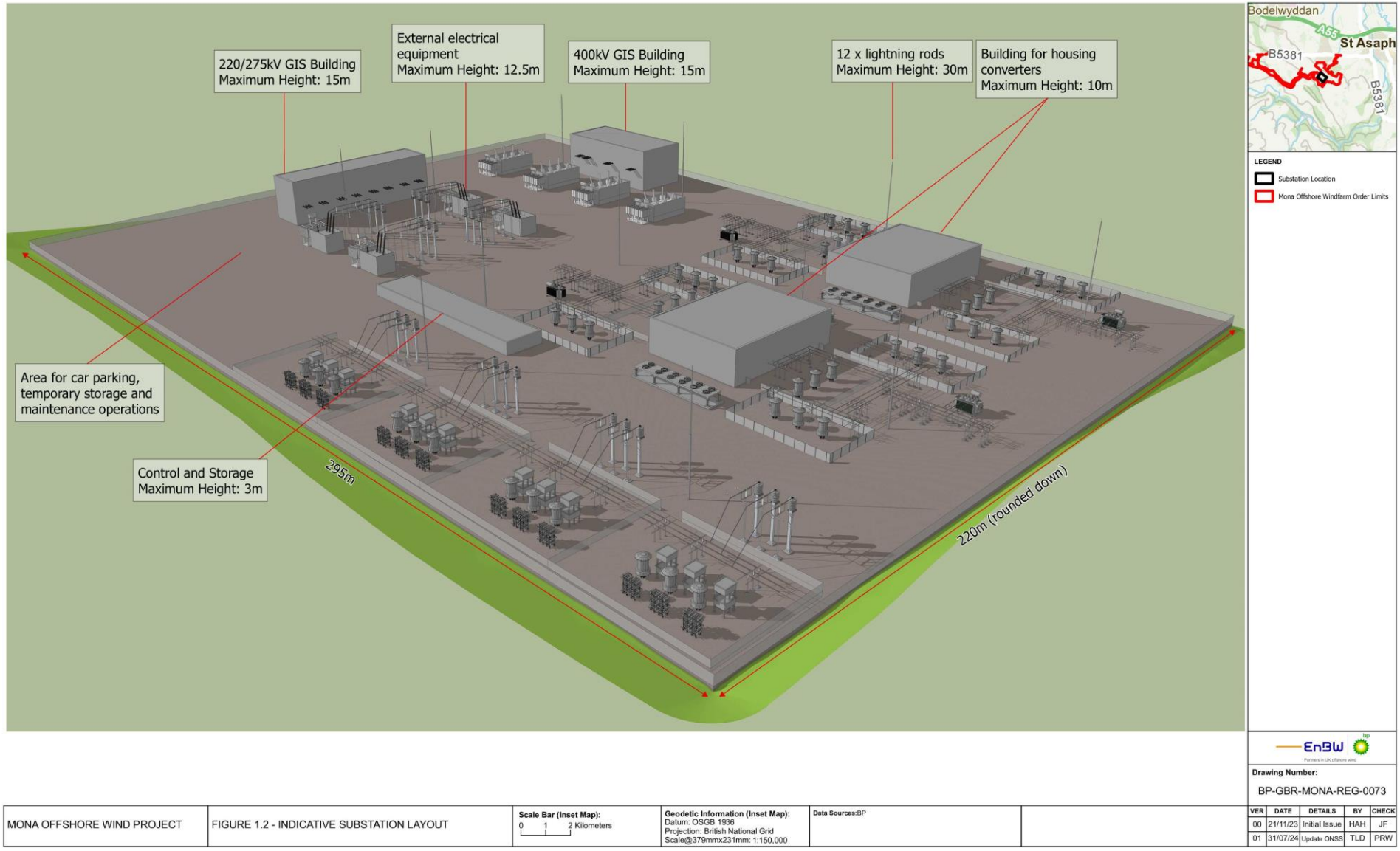

Figure 1-2: Indicative substation layout

1.6 National Infrastructure Design Principles

1.6.1.1 In October 2024, new guidance for Nationally Significant Infrastructure projects was published by the Planning Inspectorate. This guidance recommends that developers should explain how they respond to the four design principles of climate, people, place and value published by the National Infrastructure Commission.

1.6.1.2 This section details how the Applicant has applied these design principles in the design to date, and how they will be considered as the detailed design in developed post-consent.

1.6.2 Climate

1.6.2.1 The Applicant is committed to seeking opportunities to mitigate climate change; design the infrastructure with flexibility and resilience to adapt to changes in its environment and take advantage of new technology.

1.6.2.2 The Mona Offshore Wind Project has applied the following principles in relation to climate:

- **Maximise generation capacity** – Ensure that the Mona Offshore Wind Farm works within its constraints to maximise its energy generation capacity and positively contribute to the UK energy transition and net-zero target by 2050
- **Prioritise sustainability** – Priority will be given to managing and reducing carbon emissions throughout the project lifecycle (see the Greenhouse Gas Reduction Strategy (REP4-041) for further detail).
- **Resilient Design** – Design for resilience and adaptation to future climate change.

1.6.3 People

1.6.3.1 The Applicant has sought opportunities to minimise disruption to the quality of life for people who live and work nearby and taken steps to mitigate potentially adverse effects and disruption. The Applicant has also sought the views of local communities throughout the project to ensure the design complements the local character and culture and provides meaningful benefits to local communities.

1.6.3.2 The Mona Offshore Wind Project has applied the following principles in relation to people:

- **Be a considerate neighbour** – Behave as a considerate neighbour through both construction and operation.
- **Engage and consult** – Engage openly, transparently and meaningfully with stakeholders taking their feedback into account and making use of local knowledge to improve the project.

1.6.4 Place

1.6.4.1 The Applicant has looked for opportunities to use infrastructure to benefit the natural and built environment, to see how interventions can deliver improvements to sustain local ecosystems and support local plans for growth and investment.

1.6.4.2 The Mona Offshore Wind Project has applied the following principles in relation to place:

- **Landscape restoration** – Retain and protect existing trees, hedgerows and other vegetation wherever possible. Where landscape features have been removed, they will be restored wherever possible.
- **Ecological enhancement** – Design proposals will seek to deliver biodiversity benefit in relation to the above ground permanent infrastructure.

1.6.5 Value

1.6.5.1 The Applicant has sought to take a 'people and landscape led' approach putting these at the centre of design and decision making and utilised a collaborative multi-disciplinary team problem-solving approach to resolve concerns and design issues.

1.6.5.2 The Mona Offshore Wind Project has applied the following principles in relation to value:

- **Respect the landscape and avoid sensitive features** – The location of the infrastructure has been chosen to avoid sensitive features including settlements, landscape and habitat features (including designated nature conservation sites) and designated landscapes, as far as possible. Where this is not possible, the Applicant will ensure appropriate mitigation measures are put in place.

~~1.6~~1.7 Overview of site selection

~~1.6.1.1~~1.7.1.1 This section provides an overview of the site selection process for the Mona Onshore Substation. It is intended to provide background information to the site selection process and to help interested parties understand why the proposed onshore substation site has been chosen as part of the design process.

~~1.6.1.2~~1.7.1.2 A critical part of good design is the selection of the right site. The selection of a site for the Mona Onshore Substation needs to balance a variety of factors such as keeping the development away from populated areas and a wide range of other technical and environmental factors, whilst remaining an appropriate distance from the connection to the National Grid infrastructure.

~~1.6.1.3~~1.7.1.3 The Applicant undertook a comprehensive site selection exercise for the Mona Onshore Substation that considered a wide range of environmental and engineering factors. Further details of the site selection process are provided within Volume 1, Chapter 4 Site selection and consideration of alternatives of the Environmental Statement (document reference: F1.4).

~~1.6.1.4~~1.7.1.4 The site selection process included consultation at various stages which has included engagement with DCC, NRW, Welsh Government and other stakeholders. It also included public consultation.

~~1.6.1.5~~1.7.1.5 The guiding principles for locating the Mona Onshore Substation were to achieve an economic and efficient connection (i.e. as close as possible to the point of interconnection) whilst taking into account environmental constraints including siting principles in the Horlock Rules.

~~1.6.1.6~~1.7.1.6 Site selection started with the identification of a point of interconnection to the National Grid. The point of interconnection was identified by National Grid at the existing Bodelwyddan National Grid Substation. Initially, an Area of Search (AoS) was defined using a 3 km buffer from Bodelwyddan National Grid Substation, which was subsequently expanded to 5 km following an engineering review of the maximum electrical distances between the Mona Onshore Substation and Bodelwyddan National Grid Substation. Parts of the buffer area were then removed to avoid existing settlements and environment designations where possible in line with the design principles and the Horlock Rules.

~~1.6.1.7~~1.7.1.7 A long list of 17 possible onshore substation locations were identified by the Applicant, as shown in Figure 4.16 ~~inVolume~~in Volume 1, Chapter 4 Site selection and consideration of alternatives of the Environmental Statement (document reference F1.4). These options were appraised using a Black-Red-Amber-Green methodology which considered a wide range of topics to reduce the options down to a medium list of ten locations. The medium list was then presented to technical stakeholders as part of an Expert Working Group (EWG) meeting. Following feedback from stakeholders the medium list was reduced from ten locations to seven, which formed the short list.

~~1.6.1.8~~1.7.1.8 The short list of options formed the basis of a targeted onshore substation public consultation that ran from Monday 26 September 2022 to Monday 7 November 2022. Further details on this target consultation can be found in the Consultation Report (document reference E3). The feedback from this consultation was then combined with the results of environmental assessment work, technical studies and local knowledge to select two preferred substation options. These two options were assessed in the Preliminary Environmental Information Report (PEIR) and formed part of the Statutory Consultation which ran from 19 April 2023 to 4 June 2023.

~~1.6.1.9~~1.7.1.9 Following a review of the Statutory Consultation responses and the completion of additional environmental assessment and technical studies a single onshore substation location was selected which now forms part of the application for development consent. This decision was communicated publicly in August 2023 via a project newsletter, for details can be found in the Consultation Report (document reference E3).

1.8 Vision for the onshore substation and surrounding area

1.8.1.1 The Onshore Substation has been sited in close proximity to existing electrical infrastructure, including other substations and overhead lines, to reduce the proliferation of infrastructure over the wider landscape.

1.8.1.2 While it will not be possible to completely screen the Onshore Substation, a landscaping scheme will be implemented, which will aim to:

- To provide visual screening to residential properties, road users and walkers.
- To provide visual screening to users of the public bridleway to the northeast of the Mona Onshore Substation site and the public footpath to the west of the Mona Onshore Substation
- To provide a woodland context for the Mona Onshore Substation site that compliments the long-established woodland of the area, including the woods found on Cefn Meiriadog

- To provide greater connectivity between the existing woodlands, retained hedgerows and field boundary trees.

1.8.1.3 Further detail can be found in section 3.9.

1.8.1.4 In addition to the proposed landscaping specific to the Mona Offshore Wind Project, as a responsible developer, the Applicant will explore opportunities with other developers in the area (for example, National Grid, Awel y Mor Offshore Wind Farm and IGP Solar) in relation to further strategic landscaping in the area. However, this will be dependent on further details for these projects being available and the other developers' co-operation.

~~1.7~~1.9 Design of the onshore substation

~~1.7.1.1~~1.9.1.1 The Works Plans – Onshore (document reference B3) divide the area around the Mona Onshore Substation into a number of work areas within which specific works will be undertaken, as summarised below, further detail can be found within the Draft Development Consent Order (C1). These work areas form the maximum design scenario. These work areas are shown in Figure 1-3. The work areas will be further refined as part of the detailed design process post-consent, and agreed with DCC in order to define specific footprints:

- **Work No. 22** – creation of the substation platform
- **Work No. 22a** – construction of the onshore substation
- **Work No. 23** – temporary construction compound and permanent landscaping, ecological and environmental works, including watercourse realignment and attenuation ponds(s)
- **Work No. 24** – temporary construction compound and temporary and permanent landscaping, ecological and environmental works
- **Work No. 25** – installation of the 400 kV grid connection cables
- **Work No. 26** – connection to the Bodelwyddan National Grid Substation
- **Work No. 27** – construction access
- **Work No. 28** – temporary construction compound
- **Work No. 29** – permanent access
- **Work No. 30** – permanent access
- **Work No. 31** – temporary landscaping, ecological and environmental works
- **Work No. 32** – permanent landscaping, ecological and environmental works
- **Work No**. **33** – land profiling and permanent landscaping, ecological and environmental works
- **Work No. 34** – permanent landscaping, ecological and environmental works
- **Work No. 35** – landscaping maintenance works
- **Work No. 36** – permanent landscaping, ecological and environmental works
- **Work No. 37** – hedgerow enhancement works
- **Work No. 38** – permanent access

~~1.7.1.2~~1.9.1.2 The underground export cables that will be laid in Work No 21 are not subject to design principles, given they are underground. However, the location of the cables and width of the cable corridor impacts on the opportunity for landscaping as it is not feasible to plant tree species in restored hedgerows above cables due to the potential for roots to damage the cables. However, shrub species will be planted in these areas and tree species as close as possible to the cables. Where visual mitigation (screening) at the Mona Onshore Substation in the form of woodland or tree belts is required, the cables will pass underneath the area of land to be planted using trenchless techniques, to allow the planting of tree species.

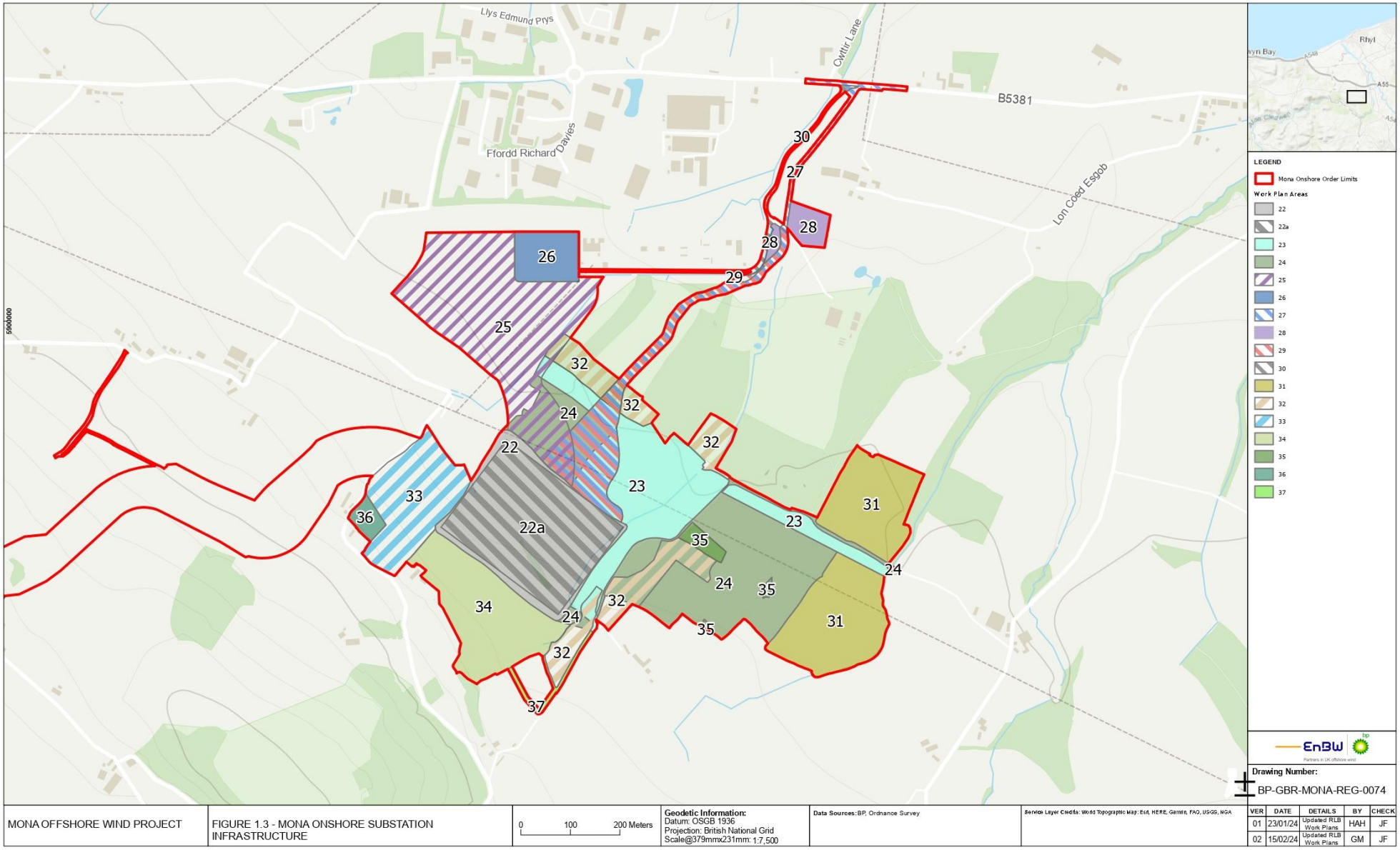

Figure 1-3: Mona Onshore Substation Infrastructure

2 ONSHORE SUBSTATION SITE CONTEXT

2.1.1.1 This section provides a description of the Mona Onshore Substation site and surrounding area along with key landscape and visual context for the proposed onshore substation that have informed the principles and parameters put forward in this document.

2.1.1.2 The Mona Onshore Substation is located within the administrative area of DCC, approximately 1.7 km to the southwest of St Asaph and 2.5 km to the southeast of Bodelywddan.

2.1.1.3 The Mona Onshore Substation lies to the south of St. Asaph Business Park, and south of the Bodelwyddan National Grid Substation and the substations for Gwynt y Môr and Burbo Bank offshore wind farms. Isolated farmsteads and houses are located along minor roads around the Mona Onshore Substation site. Small hamlets and villages are located at the junctions of minor roads, with towns associated with major roads.

2.1.1.4 The Mona Onshore Substation site is located on a northeast facing slope. The high point of the site is approximately 87 m AOD in the south (Work No. 33) with a low point approximately 46 m AOD in the northwest corner (Work No. 23).

2.1.1.5 The land on which the Mona Onshore Substation will be located is a mix of small to medium-sized fields. The farmland is predominantly laid to grass. Several fields have been merged together, by removing the hedgerows/allowing the hedgerows to decline, often leaving isolated trees marking the original location of the hedgerow. The hedgerows on the steeper land are in better condition, as are the hedgerows marking the boundaries of properties and along roads and tracks. There are large areas of mature/Ancient Woodland to the southwest (including Coed yr Odyn, Coed Celyn and at Bryn Meiriadog) and northeast (including Coed Cord and Coed Esgob) of the Mona Onshore Substation site.

2.1.1.6 The B5831, Glascoed Road, runs east to west to the north of the Mona Onshore Substation site. Minor roads cross the countryside to the south, skirting around Cefn Meiriadog. No public roads cross the site, although there are farm tracks and accesses to farmsteads and individual properties.

2.1.1.7 Existing 400 kV overhead power lines cross the Mona Onshore Substation site, to the north of the proposed location of the substation platform. They connect into Bodelwyddan National Grid Substation via a sealing end compound and gantries with overhead power lines located in a field immediately to the west of the Mona Onshore Substation Site.

2.1.1.8 Representative viewpoints supporting the Seascape, Landscape and Visual Impact Assessment are provided in Volume 7, Annex 6.3: Visual baseline technical report – onshore development of the Environmental Statement (document reference F6.8.3).

3 DESIGN PRINCIPLES AND PARAMETERS

3.1 Overview

3.1.1.1 The key design parameters (those that set the maximum overall size of the above ground infrastructure) and key principles for the Mona Onshore Substation are set out below. Considered together, the key parameters and principles will shape the final design of the Mona Onshore Substation.

3.2 Onshore substation construction area

3.2.1 Principles

3.2.1.1 The construction of the Mona Onshore Substation will utilise a new construction access from Glascoed Road to the north of the Mona Onshore Substation for construction access and delivery of Abnormal Indivisible Loads (AIL). The construction access will separate from the existing access to the Bodelwyddan National Grid Substation, Gwynt y Môr OFTO Substation and the Burbo Bank Extension OFTO Substation to avoid conflicts between construction traffic travelling to the Mona Offshore Wind Farm and operational traffic travelling to the operational substations.

3.2.1.2 The substation temporary construction zone is located to the north and east of the onshore substation footprint, which is well-screened to the north by existing woodland. The substation temporary construction zone has been sited to avoid mature trees and areas of woodland and their Root Protection Zones (RPZ). The layout of the TCCs, including site buildings, storage areas, access arrangements and drainage, will be approved by DCC through the final Onshore Construction Method Statement, that will form part of the Code of Construction Practice (CoCP).

3.2.1.3 If required, the Applicant will give consideration to installing temporary soil bunds to minimise temporary landscape and visual impacts. Where soil bunds are proposed within the onshore substation TCCs, the height and layout will be included within the final Onshore Construction Method Statement.

3.2.1.4 In advance of the start of the works specific construction mitigation measures will be agreed via approval of the final CoCP, and associated environmental management plans, by DCC (see Section 5.1.1.1).

3.2.2 Parameters

3.2.2.1 The construction access route will be located within the temporary onshore access areas and will be confirmed post consent during detailed design.

3.2.2.2 The onshore substation TCCs will be located within work areas 23, 24 and 28 defined in Figure 1-3.

3.3 Onshore substation layout

3.3.1 Principles

3.3.1.1 Prior to starting each stage of the site selection process, a series of transparent design principles and engineering assumptions were identified which governed the decisions made at each stage. These design principles and engineering assumptions covered environmental, physical, technical, commercial and social considerations and opportunities. The following siting principles have informed the placement of the Mona Onshore Substation footprint:

- Avoidance of key sensitive features where possible, and where not, ensure mitigation of impacts
- Minimise the disruption to populated areas
- Reduce encroachment into high value agricultural land (as much as possible) and to maximise the distance to residential receptors
- Minimise direct and indirect effects on onshore ecology receptors
- Minimise direct and indirect effects on cultural heritage receptors
- Minimise noise levels at nearby receptors
- Minimise potential impacts on 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

3.3.1.2 The final configuration of the onshore substation layout will be determined during the detailed design stage and will depend on the ultimate electrical system design including the number and rating of cables, the choice of electrical contractor, the manufacturer of the equipment and other engineering factors. The final onshore substation layout will be approved by DCC through a Requirement of the DCO (see Section 5.1.1.1).

3.3.2 Parameters

3.3.2.1 A maximum permanent footprint of the Mona Onshore Substation up to the perimeter fence is 65,000 m^2.

3.4 Onshore substation ground levels

3.4.1 Principles

3.4.1.1 The site topography is such that a degree of cut and fill will be required to provide a level platform upon which to construct the Mona Onshore Substation. In addition to the cut and fill requirements for the platform, excess material will be used for earth-modelling to the west of the substation. This will assist in the screening of the substation from the west, by providing a higher ground level for the proposed woodland planting (see Section 3.6).

3.4.1.2 The ground levels will be approved by DCC through a Requirement of the DCO (see Section 5.1.1.1).

3.4.2 Parameters

3.4.2.1 The level of this platform (finished ground level) is anticipated to be between 57 and 61 m AOD depending on the final topography and design.

3.5 Onshore substation buildings

3.5.1 Principles

3.5.1.1 The dimensions, colour and materials used for the onshore substation buildings will be determined by detailed design and approved by DCC through a Requirement of the DCO (see Section 5.1.1.1). The aspects of the substation where colour optionality can be considered will be dependent on supply considerations (such as availability or ability to produce equipment of a particular colour), as well as the relative visibility of particular aspects of the overall design. The approach to this would be as set out in NRW's document entitled Environmental Colour Assessment: benefits, process and application as well as with reference to the Landscape Institute Technical Information Note 04/2018: Environmental Colour Assessment (2018). In additional the Applicant will also seek advice from the Design Commission for Wales before finalising the design of the onshore substation buildings.

3.5.1.2 It is proposed that a Façade Options Report (or equivalent) be written to determine the best colours/colour treatment for different elements of the onshore substation buildings. The report will explain and illustrate the evolution of the design concepts and will examine a selection of different options for the façades. In addition, it provides an outline of the guidance that has been used to hone initial design options. It will consider the visual objectives of the project, which can be one or a combination of the following:

- Suppression – colours used to reduce impact
- Integration – use of materials and colour already existing in the surrounding area
- Distraction – colour used as a target/series of targets, to distract from other parts of the development
- Creative expression – colour used as a design element.

3.5.1.3 The objectives of the choice of colour for the Mona Onshore Substation will be primarily suppression. Integration and distraction techniques may also be used to help mitigate the visual impact of the development.

3.5.1.4 The results of an initial baseline colour assessment, which will eventually form part of the Façade Options Report, are presented in Annex 1.

3.5.2 Parameters

3.5.2.1 The main onshore substation building will be up to 15 m in height. If all electrical equipment is combined into one building the likely maximum dimensions are 80 m by 140 m. If the substation is made up of multiple buildings the likely maximum dimensions of the main building will be 40 m by 90 m.

3.5.2.2 There will be a number of other buildings within the onshore substation, all of which will not exceed 15 m in height. Examples of other buildings include:

- Static Var Compensators (SVC) buildings
- Control buildings (possibly in the form of containers)

- Storage / backup power units (possibly in the form of containers)
- Workshops (possibly in the form of containers)

3.6 Onshore substation equipment and materials

3.6.1 Principles

3.6.1.1 In addition to the buildings, the Mona Onshore Substation will include several items of external electrical equipment that are likely to include (but is not limited to):

- Switchgear
- Busbars
- Transformers
- Capacitors
- Reactors
- Reactive power compensation equipment
- Filters
- Cooling equipment
- Control and welfare buildings
- Lightning protection rods (if required)

3.6.1.2 Quieter equipment will be selected, where available and practicable. Noise attenuation panels and / or barriers which may be visible from outside the Mona Onshore Substation may be required in order to mitigate operational noise levels and could be building-like in appearance depending on design. The level of operational noise arising from the Mona Onshore Substation will be controlled through a Requirement of the DCO (see Section 5.1.1.1).

3.6.1.3 Materials will be stored within the Onshore Substation during the operation and maintenance phase, including oil. The Mona Onshore Substation will be designed to ensure the delivery of this material cannot lead to a pollution event for example through the inclusion of bunds within the delivery area. These measures will be confirmed during detailed design.

3.6.1.4 The final number, location and dimension of external onshore substation equipment will be approved by DCC through a Requirement of the DCO (see Section 5.1.1.1).

3.6.2 Parameters

3.6.2.1 All electrical equipment (e.g. transformers, switchgear) will not exceed a height of 15 m above finished ground level with the exception of slender lightning masts which could be up to 30 m in height. Up to 12 lightning masts would be required.

3.6.3 Onshore substation operational access

3.6.4 Principles

3.6.4.1 Access arrangements for the operational phase of the Mona Onshore Substation will comprise an access road between the Mona Onshore Substation and B5381 Glascoed Road and internal access roads within the onshore substation footprint. The operational access will utilise part of the existing access to the Bodelwyddan National Grid Substation, Gwynt y Môr OFTO Substation and the Burbo Bank Extension OFTO Substation.

3.6.4.2 The final routing of the access road will be approved by DCC through a Requirement of the DCO (see Section 5.1.1.1).

3.6.5 Parameters

3.6.5.1 The operational access track between the Mona Onshore Substation and Glascoed Road will be located within the permanent onshore substation access areas and will be confirmed during detailed design.

3.6.5.2 Within this area, the permanent access road will be 8 m wide, with further additional width required for drainage, cut / fill and the bell mouth tie-in to Glascoed Road. The typical construction width will be 15 m.

3.7 Onshore substation security and lighting

3.7.1 Principles

3.7.1.1 The Mona Onshore Substation will not be manned, and lighting will only be required during operation and maintenance activities. Directional lighting will be needed for safety and security. Task-specific lighting will be needed externally, however, this will only be required on a very infrequent basis. If lighting is required along the access track from Glascoed Road to the Mona Onshore Substation, this would be low level, bollard lighting that would only be used when visits to the site are being made.

3.7.1.2 The Mona Onshore Substation will also require security fencing around the site perimeter. The security fence around the perimeter of the Mona Onshore Substation shall comply with the relevant National Grid Technical Standard. The external substation perimeter security (fencing and gates) is typically required to be a Category 2 ‘Standard’ fence system. This is minimum 2.5 m high electrified fence, fronted by either a mesh or palisade barrier. Whilst galvanised palisade fence has traditionally been the preferred choice for substation fence construction, further investigation will be carried out during detailed design to consider the use of colourised steel mesh panel fencing.

3.7.1.3 The final security fencing and lighting details will be approved by DCC through a Requirement of the DCO (see Section 5.1.1.1).

3.7.2 Parameters

3.7.2.1 Permanent fencing around the perimeter of the site of up to 3 m in height or in accordance with the National Grid standard at the time of construction.

3.8 Onshore substation drainage

3.8.1 Principles

3.8.1.1 Development of the Mona Onshore Substation will result in the construction of low permeability surfacing, increasing the rate of surface water runoff from the site. A surface water drainage scheme is required to ensure existing runoff rates to the surrounding water environment area maintained at pre-development rates. An Outline Operational Drainage Management Strategy been provided as part of the Outline CoCP (document reference J28).

3.8.1.2 The Mona Onshore Substation will contain welfare facilities so foul drainage facilities will be required. Where existing foul water drainage infrastructure cannot be utilised a packaged sewage treatment plant shall be provided to treat foul water.

3.8.1.3 Relevant sustainable drainage systems (SuDS) principles (as set out in the Outline Operational Drainage Management Strategy as provided as part of the Outline CoCP (document reference J28) will be applied to the substation development. The final surface water and foul drainage details will be approved by DCC through a Requirement of the DCO (see Section 5.1.1.1).

3.8.2 Parameters

3.8.2.1 The detailed design (post-consent) of the operational drainage management strategy will be based on a series of infiltration / soakaway tests carried out on site and the attenuation volumes outlined in the Outline Operational Drainage Management Strategy (document reference J28). The tests will be undertaken prior to construction and in accordance with the BRE Digest 365 Guidelines to determine the suitable of ground for accepting a drainage discharge.

3.8.2.2 Approximately 10,000 m^2 of permanent attenuation will be required to manage the surface water runoff from the operational platform. This is likely to be provided by an attenuation pond which would discharge into an existing surface water drainage ditch with the outfall constrained to the greenfield run-off rate of the site.

3.9 Onshore substation landscape proposals

3.9.1 Landscape design principles

3.9.1.1 The LANDMAP Visual and Sensory Aspect Area, in which the Mona Onshore Substation is located is DNBGHVS033. The landscape management guidelines for this area are as follows:

- Existing management remarks - *"A mature landscape defined by tree lined hedgerow and individual specimen trees within field parcels. This landscape needs to be carefully managed of the overall appearance is to be maintained"* (LANDMAP Data Sheet VS30)
- Principal management recommendation – *Maintain strong wooded character, but diversify with additional broadleaves"* (VS31)
- Guideline - *"Long Term - enhance dominant vegetation. Medium Term - Instigate phased replacement/enhancement of hedgerow trees and wooded field boundaries"* (VS32)

- Key qualities that should be conserved - *"Balance of individual mature trees, mixed woodland and open arable land"* (VS33)
- Key qualities that should be enhanced - *"Long to medium term management to ensure character is maintained"* (VS34)
- Key qualities that should be changed - *"Intensification of arable farming that may degrade field boundaries"* (VS35)
- Key elements that should be conserved - *"Individual mature specimen parkland trees and woodland blocks"* (VS36)
- Key elements that should enhanced - *"Field boundaries and margins to improve biodiversity."* (VS37).

3.9.1.2 In summary, the landscape management guidelines for LANDMAP Aspect Area DNBGHVS033 are to maintain the existing character, conserve the vegetation that is present, increase broadleaved woodlands and restore hedgerows.

3.9.1.3 There will be an unavoidable, direct impact on the land that is taken up by the footprint of the substation, as there is with all development on undeveloped and greenfield sites. However, there is an opportunity to lessen the effects of the Mona Onshore Substation on the existing landscape character and views and visual amenity, through mitigation, as well as the possibility of improving of the existing landscape and visual situation as a result of the proposed ecological mitigation measures (Section 3.10). Landscape and ecological proposals are set out on ~~Figure 2.4~~Figure 3-1 and in the oLEMP (document reference J22). The means by which the proposals will be realised are also set out in the oLEMP (document reference J22). This document is a plan of the management of the land included within the Mona Onshore Substation. It is a live document, so that it can be revisited should unforeseen event occur, such as the spread of disease affecting a particular species of tree, or a storm resulting in the loss of woodland/trees.

3.9.1.4 With regards to views, the existing woodlands to north of the Mona Onshore Substation footprint include areas of Ancient Woodland. Together with other vegetation and built elements in the wider landscape, this woodland provides an element of visual screening for some visual receptors from this direction. Similarly, the topography and woodlands to the south of the Mona Onshore Substation provides screening from most views from the south. To the east glimpses of the proposed substation, between woodland and mature trees within hedgerows would be possible. The Zone of Theoretical Visibility (ZTV) for the Mona Onshore Substation indicates that it would be visible from higher land to the east, including land within the Clwydian Range and Dee Valley Area National Landscape. However, due to distance and the intervening woodland blocks and mature trees in hedgerows, the Mona Onshore Substation is barely visible. The majority of more open views are close and in the main, to the west.

3.9.1.5 Outline planting mitigation principles have been developed for the Mona Onshore Substation site to complement the existing landscape structure – that of a mainly pastoral, farmed landscape, divided by hedgerows, some with mature trees, some containing trees that mark the alignment of historic/remnant hedgerows, interspersed with mostly straight-edged woodland blocks. The landscape and ecology strategy includes areas of proposed woodland, similar in character to blocks to the north and south, areas identified for ecological mitigation in the form of habitat enhancement and areas with potential for further planting following design progression and consultation. The proposed woodland and hedgerow tree planting would achieve a replacement tree planting ratio of at least 3:1 as recommended by The Woodland Trust (The Woodland Trust, 2021).

3.9.1.6 The proposed woodland comprises of native woodland species and would be located around the Mona Onshore Substation. The key aims of the landscape proposals are as follows:

- To provide visual screening to residential properties, road users and walkers.
- To provide visual screening to users of the public bridleway to the northeast of the Mona Onshore Substation site and the public footpath to the west of the Mona Onshore Substation
- To provide a woodland context for the Mona Onshore Substation site that compliments the long-established woodland of the area, including the woods found on Cefn Meiriadog
- To provide greater connectivity between the existing woodlands, retained hedgerows and field boundary trees.

3.9.1.7 The mitigation woodland planting would comprise a mix of faster growing 'nurse' species and slower growing climax species. Nurse species grow more quickly so that after 15 years they would be approximately 7 to 10 m in height. They would provide shelter to bring on the core species. Whilst the nurse species would be sufficiently fast growing to provide screening of the lower parts of the Mona Onshore Substation after 15 years, the climax species would provide a preferred native woodland with a more robust structure closer in character to the adjacent areas of Ancient Woodland to the north and south. The species mix and management of the woodland would be discussed with the relevant consultees including DCC, NRW and The Woodland Trust.

3.9.1.8 Proposed woodland planting would be spaced to maximise growth rate and ultimate screening potential. An example of this would be to plant appropriately one tree per m^2 in natural groups and not too regimented (i.e. in randomly spaced species groups of 3, 5 and 7 plants). However, the precise detail of these spacings should form part of the planting schedule to be consulted on at a more detailed stage, with relevant consultees including DCC and NRW.

3.9.1.9 The proposed woodland planting would be in addition to strengthening existing hedgerow field boundaries and restoring historic hedgerow boundaries. The restored hedgerows are based on:

- 1830s/1840s tithe map (Figure 1.7 to 1.14 of Volume 7, Annex 5.1: Desk Based Assessment of the Environmental Statement (document reference F7.5.1))
- 1871 to 1874 First Edition 6" to the mile OS map (Figure 1.15 to 1.22 of Volume 7, Annex 5.1: Desk Based Assessment of the Environmental Statement (document reference F7.5.1)).

3.9.1.10 By restoring hedgerows, existing, isolated trees that were once part of hedgerows would again be seen as part of the landscape structure and have a historic reference/context. The strengthened and restored hedgerows, with tree species were possible, would connect the mature woods to the north and south of the Mona Onshore Substation and strengthen links to smaller areas of woodland around the Mona Onshore Substation thereby complimenting the existing landscape structure.

3.9.1.11 Consideration has also been given to the setting of a Grade II Listed barn (now known as Pentre Meredydd) to the east of the property now named Tyddyn-Meredydd. An area of wildflower meadow is proposed to the north of the Listed Building. Due to the steep slope of the land and this area of meadow, the Listed barn will retain open views over the proposed woodland, to the north and over the wooded coastal plain.

3.9.1.12 In addition to the woodland planting and the hedgerow strengthening and restoration, wildflower meadows are proposed.

3.9.1.13 A ditch (dry in summer) that is associated with a field boundary, would be lost under the eastern edge of the Mona Onshore Substation platform. This would be re-routed to the east of the platform. The alignment would be more curved, slowing the water down and allowing areas of habitat enhancement, that do not currently exist along the existing ditch.

3.9.1.14 To the west of the substation platform the current landscape is an open field. It is anticipated that the onshore export cables will emerge from a trenchless crossing at this point. As woodland/trees cannot be planted over the cable, the method of screening the lower part of the substation will be earth-modelling. The earth-modelling can provide a form of false cutting which would screen the human-scale elements, removing much of the 'clutter' of the substation as well as screening the perimeter fencing from the most open views (Crowe, 1958).

3.9.1.15 The screening of the perimeter fence will allow a sense of unity between the substation and the landscape, a continuum of the rhythm of the landscape – integration rather than separation. The woodland will provide a zone of simplicity, without reference to the human-scale, as proposed by Sylvia Crowe. The zone may be of clear open ground, or of massed trees. The reconciliation between objects (in this case the Mona Onshore Substation) and the landscape is made by understanding that the Mona Onshore Substation falls into the category of a *"solid construction, planted firmly in the ground. The relationship of these* [objects] *to the landscape is that they should grow from it"…"They are essentially part of the land, and in one way or another they should relate to their terrestrial surroundings"* (Crowe, 1958).

3.9.1.16 The mitigation proposed will not screen the substation completely. However, the controlling of the view and partial screening (of strategic points, to break up views) rather than attempting to obscure as many views as possible is a valid design principle employed by Brenda Colvin, Sylvia Crowe and Derek Lovejoy and others in their work for the Central Electricity Generating Board from the 1950s onwards. It remains a valid design response, as discussed in Landscape: The Journal of the Landscape Institute (2021).

3.9.1.17 Further information on landscape proposals is provided within the oLEMP (document reference J22). A final LEMP will be developed, based on the detailed Mona Onshore Substation design, and will be approved by DCC through a Requirement of the DCO (see Section 5.1.1.1).

3.9.2 Parameters

~~3.9.2.1~~ ~~Figure 2.4 of the oLEMP~~Figure 3-1 shows the area that has been included within the Mona Onshore Development Area to facilitate suitable landscape management measures and screening within the final LEMP.

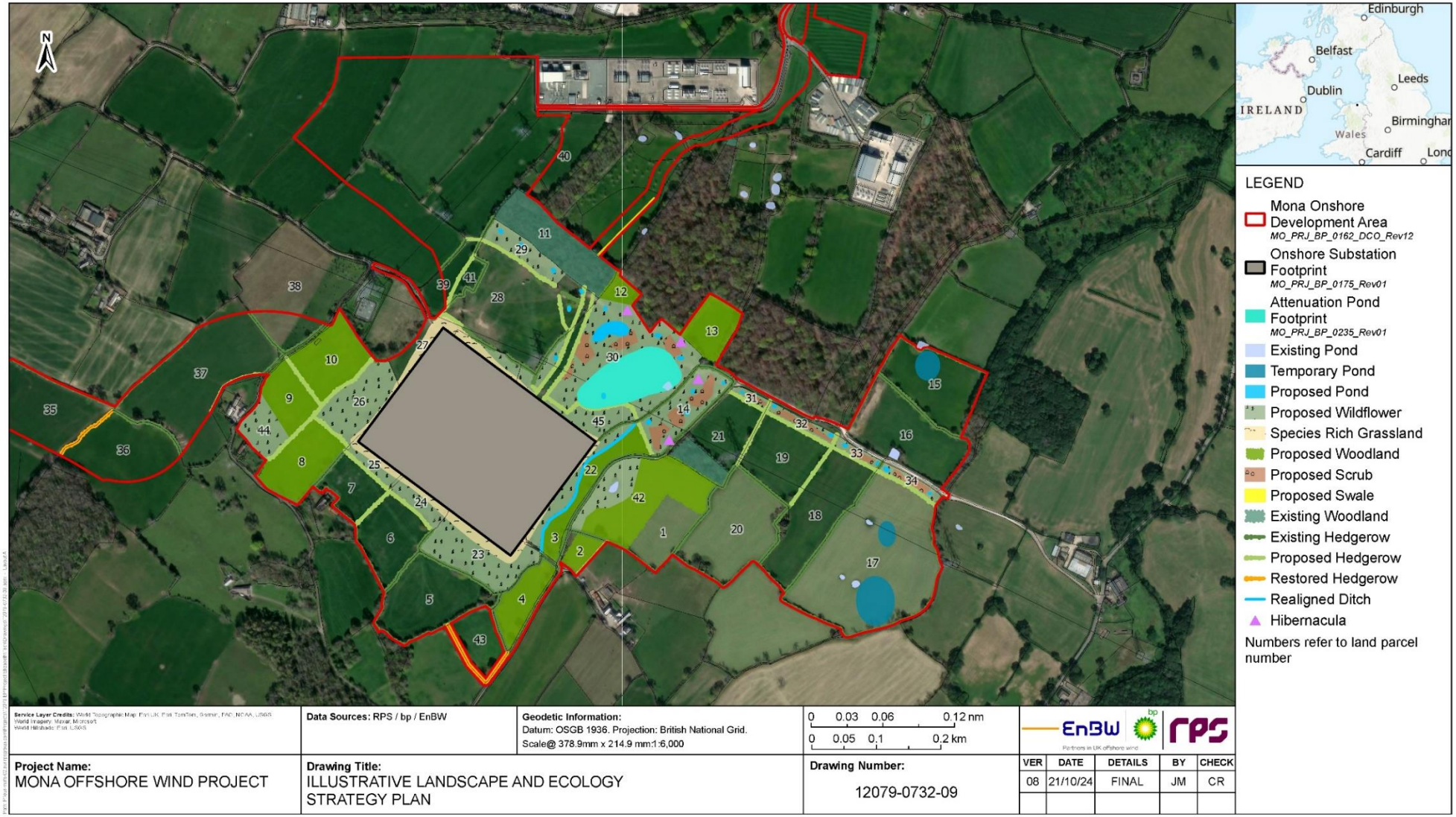

Figure 3-1: Illustrative landscape and ecology strategy plan.

3.10 Onshore substation ecological mitigation

3.10.1 Principles

3.10.1.1 The following provides a summary of the proposals for ecological mitigation and enhancement that are set out in the oLEMP (document reference J22).

3.10.1.2 The Mona Onshore Substation footprint, plus adjacent TCCs and accesses, affect agricultural grassland of low intrinsic ecological value, plus hedgerows and mature trees which are of greater interest. This area is also used by the local Great Crested Newt (GCN), dormouse and bat populations.

3.10.1.3 Compensation for loss of hedgerows and trees will be provided by reinstating native, species-rich hedgerows with trees, as close to the lost hedgerows/historic hedgerows locations as possible and creating new hedgerows where this is not possible (shown on the ~~Illustrative Landscape and Ecology Strategy, Figure 2.4 of the oLEMP (Document Reference J22)).~~Figure 3-1). Additional compensation for the loss of trees will be provided by the proposed screening planting around the Mona Onshore Substation . The proposed woodland and hedgerow tree planting would achieve at least a replacement tree planting ratio of 3:1 as recommend by The Woodland Trust (The Woodland Trust, 2021).

3.10.1.4 Permanent loss of hedgerows at the Mona Onshore Substation, which may be used by sheltering GCN, foraging and commuting bats and dormice will be compensated via creation on new broadleaved woodland and species rich hedgerows comprising locally appropriate species. These will be located to link or buffer existing woodlands, scrub and hedgerows.

3.10.1.5 Drainage / management of surface water at the Mona Onshore Substation will not represent a hazard to GCN. In particular, gulley pots will be avoided wherever possible, or where the prove essential shall be set away from any adjacent kerbs to prevent entrapment of GCN.

3.10.1.6 A final LEMP will be developed, based on the detailed Mona Onshore Substation design, and will be approved by the DCC through a Requirement of the DCO (see Section 5.1.1.1).

3.10.2 Parameters

3.10.2.1 ~~Figure 2.4 of the oLEMP (Document Reference J22)~~The Illustrative Landscape and Ecology Strategy (Figure 3-1) shows the areas that will provide ecological mitigation and enhancement around the Mona Onshore Substation. ~~Figure 2.4~~Figure 3-1 also shows, in principle, how woodland and hedgerow planting could be undertaken at the Mona Onshore Substation to satisfy both landscape and ecological objectives. In addition, it identifies areas where grassland management will be undertaken primarily for the benefit of GCN, but with consequential benefit for other animal species too.

4 THE DESIGN REVIEW PROCESS

4.1 Overview

4.1.1.1 This section sets out the design review process that the Applicant would undertake post-consent. The review process will be over seen by the project's Design Champion (Section 4.2).

4.1.1.2 In order to secure the principles set out in Section 3, and recognising the functional and safety requirements of the substation design, the Applicant will create a 'design guide'. The Applicant will engage with consultees including DCC and the Design Commission for Wales on the emerging design to inform the development of the design guide.

4.1.1.3 The design guide will set out the position for each of the principles set out in Section 3 and include the rationale for the design choices that the Applicant intends to take. The guide will demonstrate how the emerging design is within the maximum design scenario and also how the emerging design accommodates mitigation measures from the EIA.

4.1.1.4 The design guide will inform the final detailed design that is presented to DCC for the discharge of relevant DCO Requirements.

4.2 Project Design Champion

4.2.1.1 The National Infrastructure Strategy (HM Treasury, 2020) highlights that "*good design is an essential element in securing high performance of infrastructure from the start*" and requires all projects to appoint a board level Design Champion to be accountable for delivering coherent good design.

4.2.1.2 The Applicant has appointed Dirk Dollmann in the role of Design Champion for the Mona Offshore Wind Project. Dirk Dollmann is a Senior Manager within EnBW and is the Project Director for the Mona Offshore Wind Project. He has a wealth of experience in delivering good design on offshore wind farm projects across Europe, including Baltic 2, Hohe See and Albatros wind farms.

4.2.1.3 The Design Champion is accountable for delivering good design and holds the project team to account in terms of a macro vision of design. The Design Champion will guide and champion an iterative design process to test the best way of achieving the design principles outlined above.

4.3 Design Review Panel

4.3.1.1 The Applicant will implement a Design Review Panel, to review, comment and advise on the Mona Onshore Substation design as it develops through the design guide and then detailed design. The panel will consider the National Infrastructure Commission framework of "climate, people, places and value" and will ensure that good quality sustainable design and integration of the proposed Mona Onshore Substation into the landscape is achieved.

4.3.1.2 The Design Review Panel will be a multi-disciplinary team, independent from the project team, who are informed by the relevant national and local policies, guidance and standards applicable to substation design. The Panel will be led by the project Technical Advisory Group that consists of experts from across the joint venture organisations (bp and EnBW), to ensure past experience and lessons learned from previous projects' design work is reviewed and utilised in the Mona Onshore Substation design. Subject matter experts from external contractors and consultants can also be brought in to provide an external viewpoint and to offer experience and lessons that complement the Applicant's experience.

4.3.1.3 The Design Champion will not be part of the Design Review Panel but will be responsible for ensuring that recommendations from the Design Review Panel are acted upon, through incorporation within the design.

4.4 Indicative staging for the design review process

4.4.1.1 Figure 4-1 outlines the stages of the design review process that will take place post-consent to reach a detailed design that will be presented to DCC for the discharge of relevant DCO Requirements.

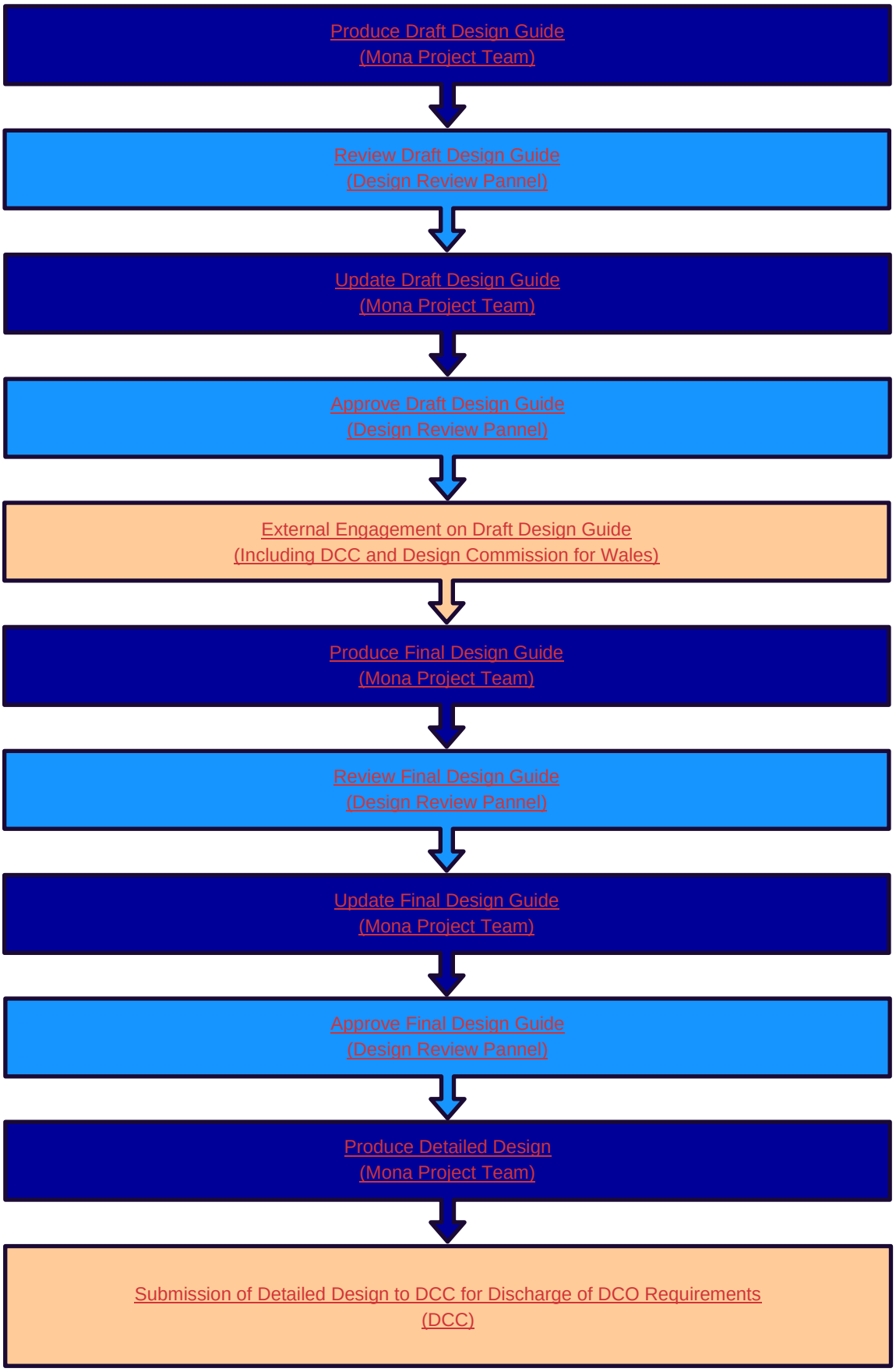

Figure 4-1: Indicative staging for the design review process

5 BENEFICIAL OUTCOMES

5.1.1.1 The Mona Offshore Wind Project would make a positive contribution to reducing carbon emissions and make a significant contribution to UK and Welsh Government renewable energy targets. The UK's ambition is to lead the world in combatting climate change, reducing reliance on fossil fuels and embracing a future where renewable energy powers homes and businesses. At the centre of this drive is a commitment to reducing UK greenhouse gas emissions and reaching net zero by 2050. The UK government has an ambition to generate 50 GW of clean, renewable energy from offshore wind by 2030. The Mona Offshore Wind Project has a critical role to play, both in helping the UK to achieve its net zero ambitions and, specifically, in reaching offshore wind generation goals. Further, the increase in the amount of renewable energy generated by the Mona Offshore Wind Project will contribute to increased overall energy security and network resilience, which is required to meet future energy demand.

5.1.1.2 As well as the national benefits of reducing carbon emissions and increasing energy security, the Mona Offshore Wind Project will have a positive impact on the regional economy. It is estimated that the construction phase of the project will generate 70 FTE years[1] of employment within North Wales and 20 FTE years during the operation and maintenance phase (see Volume 8, Annex 3.1: Socio- economics technical impact report (document reference: F8.3.1)). Requirement 19 of the draft Development Consent Order (document reference: C1) requires the Applicant to develop a Skills and Employment Plan, in line with the Outline Skills and Employment Plan (document reference: J24). The Skills and Employment Plan will ensure the economic benefits associated with the Mona Offshore Wind Farm are realised.

5.1.1.3 The local environment in the vicinity of the onshore substation will be enhanced as a result of the scheme of woodland planting and habitat creation as described in sections 3.9 and 3.10 and the oLEMP (document reference J22). Beneficial outcomes for the local environment at the onshore substation include but are not limited to:

- Creation of new habitats, including woodland, species rich hedgerows and ponds
- Improved habitat connectivity
- Restoration and reintroduction of historic landscape characteristics e.g. historic field boundaries
- Increased woodland cover that compliments the long-established woodland of the area

[1] The term 'FTE year' in employment terms is often used in construction labour reporting, in which one construction FTE year represents the work done by one full-time employee in a year comprising a standard number of working days.

~~5~~6 ONSHORE SUBSTATION LANDSCAPE AND DESIGN PRINCIPLES IN THE APPLICATION FOR DEVELOPMENT CONSENT

~~5.1~~6.1 Overview

~~5.1.1.1~~6.1.1.1 This section sets out the DCO Requirements that are relevant to detailed design of the Mona Onshore Substation alongside landscaping and ecological mitigation. Under these DCO Requirements, DCC would be consulted with, post consent, and provided with information that is based on the detailed design of the Mona Onshore Substation.

~~5.2~~6.2 DCO Requirement 5 Substation works

~~5.2.1.1~~6.2.1.1 Requirement 5 states that construction of the Mona Onshore Substation must not commence until the following details have been submitted to, and approved by DCC, in consultation with NRW:

- the layout
- scale
- proposed finished ground levels
- hard surfacing materials
- the dimensions, colour and materials used for the buildings
- security fencing
- vehicular and pedestrian access, parking and circulation areas
- proposed and existing functional services above and below ground, including drainage, power and communications cables and pipelines, manholes and supports.

~~5.2.1.2~~6.2.1.2 The details submitted under the heading above must be in accordance with the detailed design parameters set out in Requirement 6 and substantially in accordance with the outline design principles set out within ~~this~~these Design Principles.

~~5.3~~6.3 DCO Requirement 6 Substation works

~~5.3.1.1~~6.3.1.1 Requirement 6 states that the onshore works must not exceed the parameters assessed in the Environmental Statement and ~~is~~ set out in Table 6-1**.**

Table 6-1 Onshore Design Parameters

Parameter	Value
The highest part of any building above finished ground level (m)	15
Highest part of any external electrical equipment, excluding lightning rods, above finished ground level (m)	12.5
Total area of the fenced compound (excluding the accesses) (m^2)	65,000
Total number of lightning rods within fenced compound area	12

Parameter	Value
Maximum height of lightning rods above finished ground level	30

~~5.4~~6.4 DCO Requirement 7 Provision of landscaping

~~5.4.1.1~~6.4.1.1 Requirement 7 states that works on the Mona Onshore Substation ~~will~~must not be commenced until a written landscape scheme and associated work programme, that is in accordance with the oLEMP, has been submitted to and approved by DCC following consultation with NRW as appropriate.

~~5.5~~6.5 DCO Requirement 8 Implementation and maintenance of landscaping

~~5.5.1.1~~6.5.1.1 Requirement 8 states that all landscaping works must be carried out in accordance with the landscaping plans approved under Requirement 7 and any trees or shrubs planted which within 5 years of planting are removed, die or are seriously damaged or diseased must be replaced.

~~5.6~~6.6 DCO Requirement 9 Code of Construction Practice

~~5.6.1.1~~6.6.1.1 Requirement 9 states that no work may commence until for that stage a CoCP has been submitted to, and approved by DCC, in consultation with NRW and the relevant highways authority as appropriate.

~~5.7~~6.7 DCO Requirement 10 Highway access

~~5.7.1.1~~6.7.1.1 Requirement 10 states that no permanent means of access to a highway is to be used by vehicular traffic, or any permanent alteration to an existing means of access to a highway used by vehicular traffic may be formed until written details of the design, layout and siting of that new or altered access have been submitted to and approved by the relevant planning authority in consultation with the relevant highway authority.

~~5.8~~6.8 DCO Requirement 12 Landscape and Ecology Management Plan

~~5.8.1.1~~6.8.1.1 Requirement 12 states that a written Landscape and Ecological Management Plan (LEMP) should be developed for the Mona Onshore Substation, in line with the oLEMP provided with the DCO application. The LEMP must undergo consultation with NRW and then be approved by DCC before construction of the Mona Onshore Substation commences. The LEMP must include an implementation timetable and must be implemented as approved.

~~5.9~~6.9 DCO Requirement 16 Control of operational artificial light emissions

~~5.9.1.1~~6.9.1.1 Requirement 16 states that the Mona Onshore Substation must not be brought into operation until a written scheme from the management and mitigation of artificial light emissions has been submitted to, and approved, by DCC.

~~5.10~~6.10 DCO Requirement 17 Control of noise during the operational stage

~~5.10.1.1~~6.10.1.1 Requirement 17 states that the noise rating level for the operation of the Mona Onshore Substation must not exceed 34db at Tan y Bryn Uchaf (301667, 372765) at a position representative of the façade, in free-field conditions, of any building authorised or lawfully occupied for residential accommodation purposes at the date of the granting of the Order.

~~5.11~~6.11 DCO Requirement 18 Operational drainage

~~5.11.1.1~~6.11.1.1 Requirement 18 states that construction of the Mona Onshore Substation must not commence until a written operational drainage management strategy has undergone consultation with NRW and then been submitted to, and approved by, DCC. The operational drainage management strategy much be substantially in accordance with the principles set out in the outline operational drainage strategy.

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Annex 1: BASELINE COLOUR ASSESSMENT FOR THE MONA ONSHORE SUBSTATION

A.1. Introduction

A.1.1.1.1 As part of the first step of the in creating the Façade Options Report the Applicant has undertaken an initial photographic survey to gather information on the colours within the baseline landscape setting. This annex sets out the findings of the survey and the next steps in developing the colour assessment.

A.1.1.1.2 The focus of the Baseline Colour Study is to identify the existing colours of the landscape (built and natural) against which the Mona Onshore Substation would be viewed, and then to offer a range of colours that would blend into the existing landscape when applied to walls and roofs.

A.1.2 Photographic Survey

A.1.2.1.1 A photographic survey was undertaken by a qualified and experienced landscape consultant on 16 and 17 September 2024. Photographs were taken of various types of buildings in the vicinity of the Mona Onshore Substation site.

A.2. Survey Results

A.2.1.1.1 The photographs we grouped into the following building types:

- Industrial
- Commercial/business
- Farms/converted farm buildings
- Community/domestic buildings

A.2.1.1.2 Observations were recorded during the survey on the local building materials and colour and are presented below. A colour palate of the main colours appearing on the existing buildings and the natural landscape in the vicinity of the Mona Onshore Substation site are presented in Appendix A.

A.2.2 Industrial buildings

A.2.2.1.1 The National Grid Bodelwyddan and the Gwynt y Môr OFTO substations are constructed of pale grey metal, which in certain lights is highly reflective and appears white), especially in the wooded environment.

A.2.2.1.2 The difference in the effect of blue green and yellow or grey green is seen at the Biogen anaerobic digestion plant, where the yellow green of the silos and the barn blend in more readily than the domed blue green roof of the anaerobic digestor, which although a smaller element of the development is more conspicuous in its rural setting. The Reflexallen UK Ltd. building also demonstrates the incongruity of use of blue green in the landscape, in this example it is the fencing.

A.2.2.1.3 The Woodward Foodservice building and the new warehouse off Holywell Road are other examples of large buildings clad in yellow green façades. However, as their structures are more uniform, there are no shadows to break up the scale of the

buildings, unlike the shadows cast by the different buildings on the Biogen anaerobic digestion complex.

A.2.2.1.4 The Reflexallen UK Ltd. building also demonstrates the effect of a large single plane on a building with domestic scale architecture around it. Despite its recessive colour, in this light, the single uniform plain is visible amongst the trees.

A.2.2.1.5 The Warehouse behind Qioptiq Ltd. breaks up its single plane apex façade with the application of asymmetric colour. The larger part being a darker colour and the smaller, a lighter colour. The eye is drawn to the smaller lighter section of the building. The lighter colour section is divided again by a strip of windows, rather than individual windows, which also assists in reducing scale, as they are perceived as a single architectural element, rather than belying their domestic scale.

A.2.3 Commercial/business

A.2.3.1.1 Where the façades of large buildings are broken up by form, structure and materials, their scale/mass is visually reduced, such as the Clwyd Alyn Housing Association and Carlton Court.

A.2.3.1.2 The use of turquoise and a blue/green to highlight architectural features, as on the Clwyd Alyn Hosing Association buildings and Carlton Court would not work well in the wooded landscape of the Mona Onshore Substation site, at which a yellower green or grey green would be more recessive.

A.2.3.1.3 The Tweedmill Shopping Outlet and the SPAR Convenience Store both use different materials to assist in visually decreasing the scale of the buildings. The different articulations of the SPAR building also creates shadows which assist in this, although the colour of the signage does not assist in integrating the building into the landscape.

A.2.4 Farms/converted farm buildings

A.2.4.1.1 The rust red of the listed barn and the older brick chimney stacks sit well in the rural landscape, as do the farm gates and rusting red roof at Tyn y Ffordd Fawr.

A.2.5 Community/domestic buildings

A.2.5.1.1 The majority of the traditional domestic and community buildings in and around the Mona Onshore Substation site are constructed of a pale stone, some white-washed, with slate roof tiles. Chimney stacks are often of red brick.

A.2.5.1.2 The pale stone and white-washed buildings are visible and reflective in the landscape. The pale stone used on churches and domestic-scale architecture with more detailing and shadows works well within the landscape.

A.2.5.1.3 The dark grey of the slate roofs also sits well in this landscape as seen on the Denbighshire Memorial Park and Crematorium. Whereas the red clay tiles used on some of the modern housing stand out in the rural setting.

A.2.5.1.4 The more recent use of dark grey ‘slate’ tiles on some residential properties is visually very heavy. However, white/light-washed façades and either slate or grey-brown tiled roofs sit more easily in their landscape setting. This is also in part due to the visual permeability of this linear development.

7.1.1.1 Paler colours, such as the natural stone of the older domestic architecture are not appropriate for the Mona Onshore Substation, in its treed and wooded environment.

The Glan Clwyd Hospital appears white/pale grey when seen in the treed/wooded landscape, from higher ground.

A.3. Summary

A.3.1.1.1 The colour swatch palette in Appendix A was prepared by selecting a cross section of spot colours from the photographic survey. The selected colours were then converted to the Natural Colour System® (NCS) in order to provide a visual assessment of the landscape compared to a calibrated colour scale for building materials.

A.3.1.1.2 The initial findings of the Baseline Colour Study are that darker and more neutral colours work best to suppress the scale and integrate buildings into the landscape.

A.4. Next Steps

A.4.1.1.1 A follow-up photographic study will be undertaken in the winter months to record the light and colour changes of buildings and vegetation throughout the year in within the locality of the Mona Onshore substation.

A.4.1.1.2 The Applicant will also undertake a review of other substations/large buildings to understand the colours that assist with suppression and integration of buildings of this size and nature.

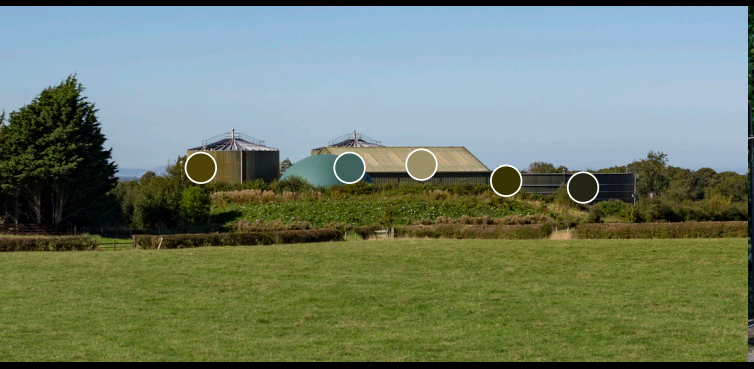
A.4.1.1.3 The Applicant will assemble a palette of colours including primary, neutral, contrast and accent colours that could be used for the building materials of the Mona Onshore Substation. The colour palette will be tested in close and distant views, including elevated views, such as those from the Clwydian Range and Dee Valley National Landscape.

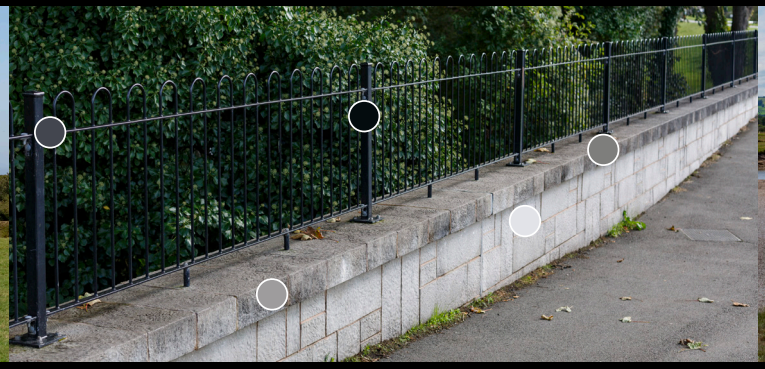
Appendix A - Outline Colour Options Assessment

Mona Outline Colour Options Assessment

Appendix A

November 2024





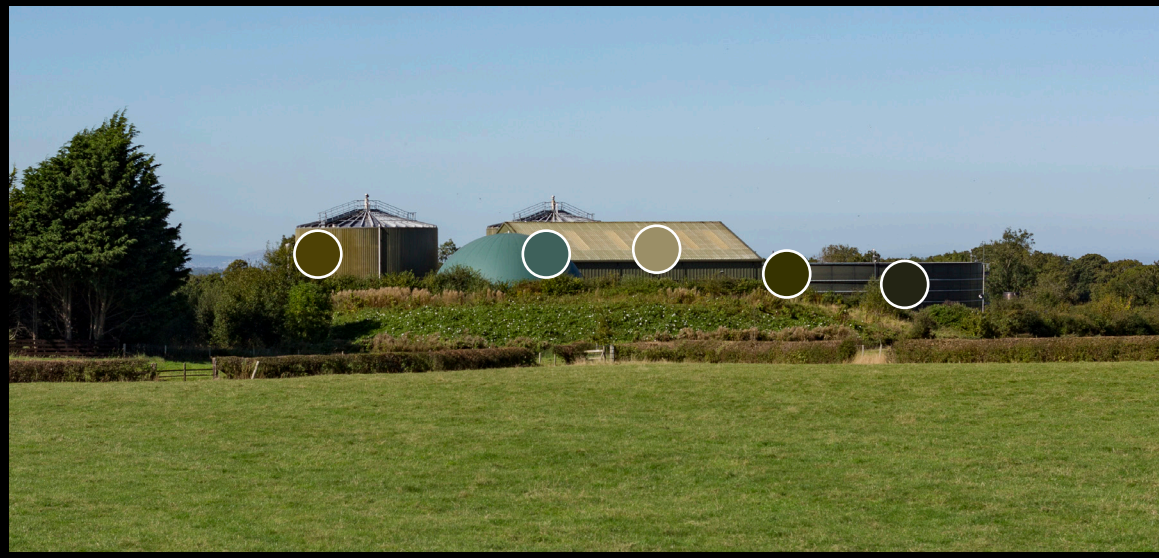
MAKING COMPLEX EASY

A TETRA TECH COMPANY

Mona Outline Colour Options Assessment

Buildings

Industrial
Commercial/business
Farms
Community – large
Community – small
Domestic – large
Domestic – small



Industrial

NG Bodelwyddan
& Gwynt y Môr
Substation

8010-R90B | 7005-R80B | 5010-R90B | 3000-N | 5502-B

Biogen, Holywell Road,
St. Asaph

7020-G90Y | 6020-B70G | 4020-G90Y | 7020-G70Y | 8505-G80Y

New warehouse off
Holywell Road, St. Asaph

6010-R90B | 8005-B50G | 2005-Y80R | 4005-G50Y | 4020-G50Y

Reflexallen UK Ltd,
Kinmel Park, Bodelwyddan

1502-R | 0500-N | 7010-R90B | 7020-G | 4010-Y50R

Industrial

Woodward Foodservice,
Kinmel Park, Bodelwyddan

8505-R80B | 5040-B90G | 5005-G80Y | 3030-Y10R | 4010-Y50R

Warehouse behind
Qioptiq Ltd, St. Asaph

8010-R70B | 8005-R80B | 5020-R70B | 8502-B | 4550-G40Y

Commercial/business

ClwydAlyn Housing Association, St. Asaph Business Park

8505-R50B | 5502-B50G | 0601-B | 1555-B10G | 4502-Y

Carlton Court, St. Asaph Business Park

3005-Y80R | 5010-R90B | 6020-B70G | 0515-G | 8005-B80G

Tweedmill Shopping Outlet, Llannerch Park, St. Asaph

7005-R80B | 3005-R80B | 8502-R | 4030-Y30R | 0502-R50B

Spar Convenience Store, Bodelwyddan

8505-R80B | 6005-B | 3000-N | 4500-N | 6005-G80Y

Farms

Waen Meredydd,
farm buildings

7502-B | 2002-Y20R | 8505-R80B | 5005-R | 1515-G20Y

Tyddyn Meredydd and
Pentre Meredydd
(Grade II listed building)

6020-Y80R | 4050-Y60R | 7005-R20B | 5010-Y50R | 1505-Y60R

Tyn y Ffordd Fawr,
Cefn, St. Asaph

5040-Y80R | 2005-R50B | 6500-N | 4030-Y | 2010-R70B

Tyn y Ffordd Bach,
Cefn, St. Asaph

6005-Y80R | 8010-R70B | 3500-N | 6005-R | 1505-Y30R

Community – large

Wrexham University
St. Asaph Campus
(distant view)

8010-R70B | 4005-R80B | 1005-Y60R | 0300-N | 5020-Y40R

Wrexham University
St. Asaph Campus

5005-B20G | 7500-N | 5010-Y50R | 1040-Y20R | 6010-R70B

North Wales Police HQ,
St. Asaph

6502-R | 0300-N | 9000-N | 4020-R80B | 0505-Y40R

Glan Clwyd Hospital,
Bodelwyddan

4005-Y | 1070-Y30R | 1050-G20Y | 8500-N | 0502-R50B

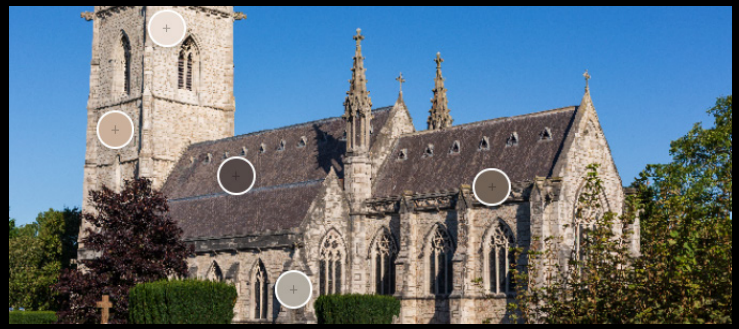
Community – small

Denbighshire Memorial Park and Crematorium, St. Asaph

6010-R70B | 0500-N | 4020-R90B | 4010-Y50R | 5010-Y70R

St. Margaret's Church, Bodelwyddan

7005-Y80R | 2010-Y40R | 3005-G80Y | 6005-Y20R | 1002-Y50R



St Mary's Church, Cefn

5502-R | 6502-R | 4005-Y80R | 3005-Y20R | 1005-Y80R

Domestic – large

Livingstone Place,
St. Asaph

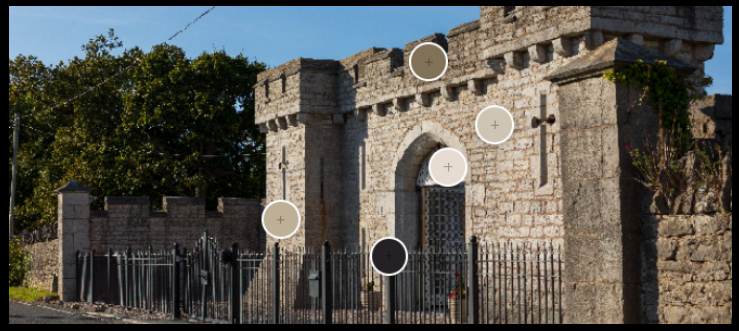
6005-R20B | 5502-B | 2030-Y | 4040-Y80R | 3010-Y

Ty Celyn, The Village,
Bodelwyddan

3010-Y20R | 4020-Y20R | 7005-Y50R | 7500-N | 0804-Y70R

Glascoed Lodge,
Glascoed Road, Abergele

2005-Y50R | 0804-Y70R | 8502-R | 3010-Y | 6010-Y10R



Domestic – small

Cefn residential settlement, Mairwen, Cefn

6500-N | 2005-Y50R | 8005-R50B | 7020-Y70R | 7020-R10B

Residential properties off Upper Denbigh Road, St. Asaph

5030-Y80R | 7502-R | 3020-Y60R | 2020-R10B | 2050-Y90R

Residential properties off Abbey Road, Rhuddlan

6010-R70B | 3005-R50B | 6030-Y80R | 5030-Y70R | 8010-R70B

Residential properties on Glascoed Road (rear view), St. Asaph

0505-Y70R | 3050-Y80R | 6005-Y50R | 5010-R70B | 6010-Y70R

Buildings Summary

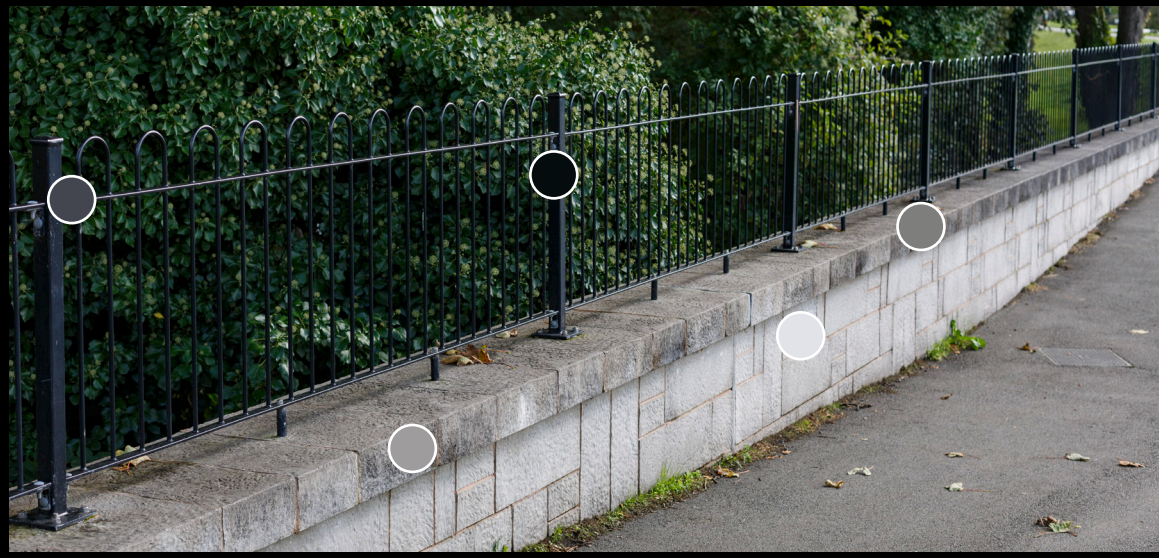
Colours appearing repeatedly in this landscape character type

Industrial
Commercial/business
Farms
Community – large
Community – small
Domestic – large
Domestic – small

Mona Outline Colour Options Assessment

Built Elements

Agricultural
Industrial/commercial
Residential/community/public open space

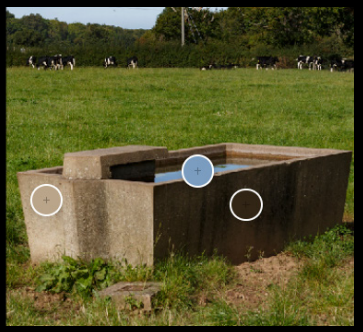


Agricultural

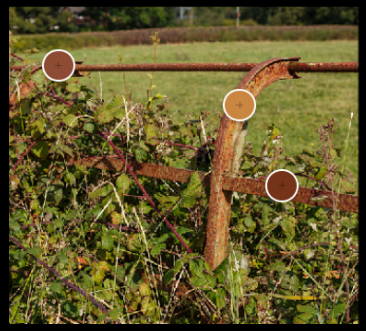
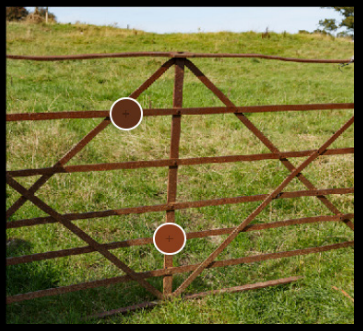
8505-B20G | 8010-R70B | 3010-Y10R | 8505-Y | 2030-R80B

3005-Y50R | 4030-G50Y | 5020-Y20R | 4550-Y70R | 3010-R80B

5030-Y60R | 3050-Y20R | 5040-Y60R | 4550-Y60R | 7020-Y60R



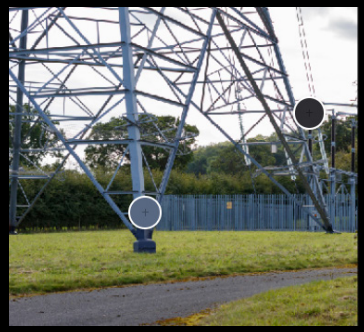
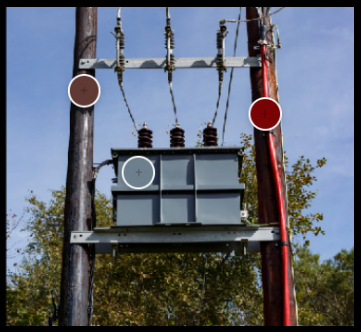
Industrial/commercial

5020-R70B | 8500-N | 5010-R90B | 6020-Y80R | 3560-R

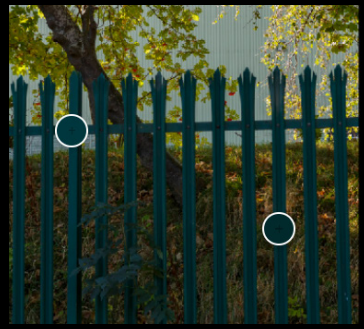
4020-Y10R | 2005-Y40R | 1505-Y30R | 5010-R90B | 2010-R70B

2010-R80B | 5020-R80B | 5040-Y10R | 8500-N | 3010-G80Y

7020-B30G | 8010-B30G | 7020-G30Y | 6030-G | 7020-G

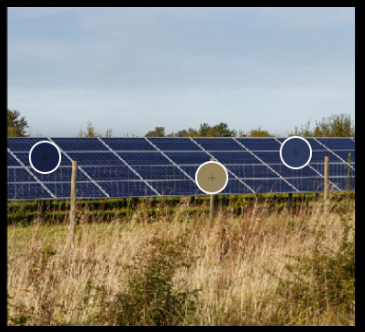





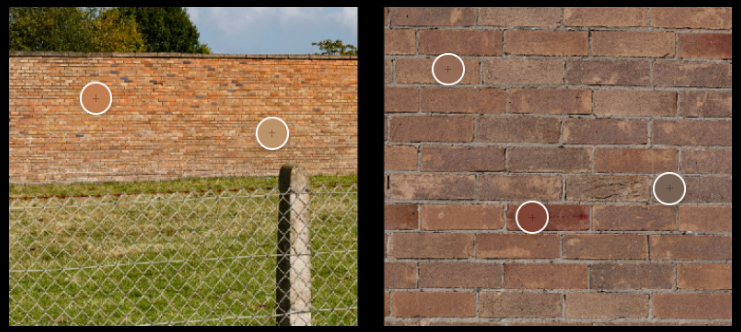

Industrial/commercial

2005-R80B | 0502-Y50R | 7020-R70B | 6020-R70B | 4020-Y

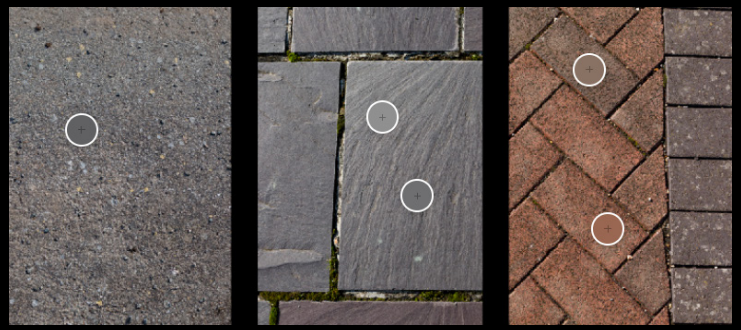


Residential/community/public open space

3040-Y40R | 3020-Y30R | 5020-Y50R | 6010-Y50R | 5030-Y70R

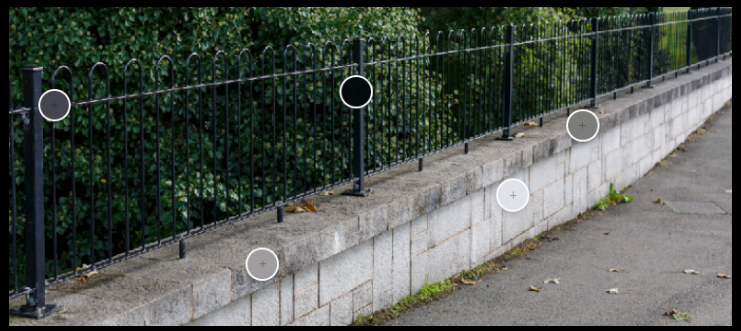


6500-N | 4500-N | 6000-N | 5020-Y60R | 5010-Y50R



4550-G50Y | 5020-G50Y | 8005-B20G | 7010-Y10R | 9000-N

9000-N | 7005-R80B | 5500-N | 3502-R50B | 0603-R60B



Residential/community/public open space

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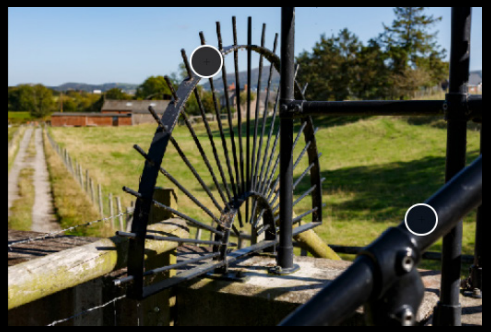
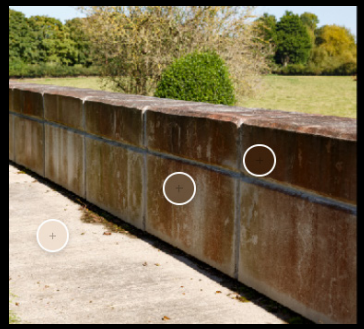
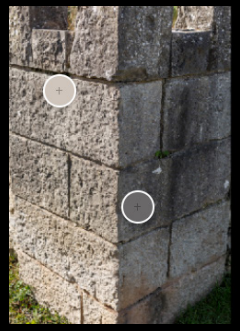
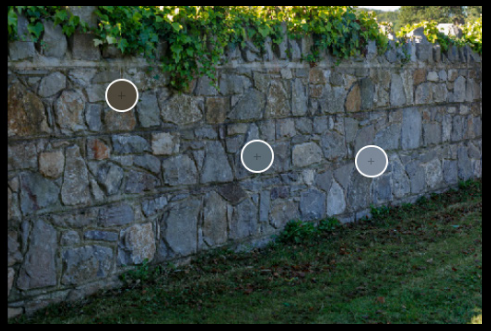


0804-Y50R | 6020-Y10R | 8010-Y50R | 5020-Y80R | 6502-B

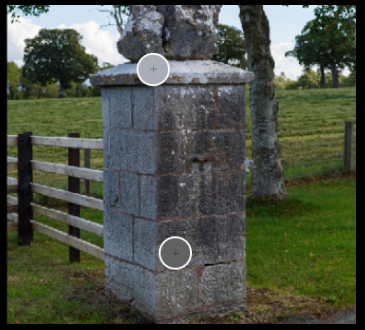


2005-Y60R | 6500-N | 7005-Y | 6010-R90B | 4010-R70B





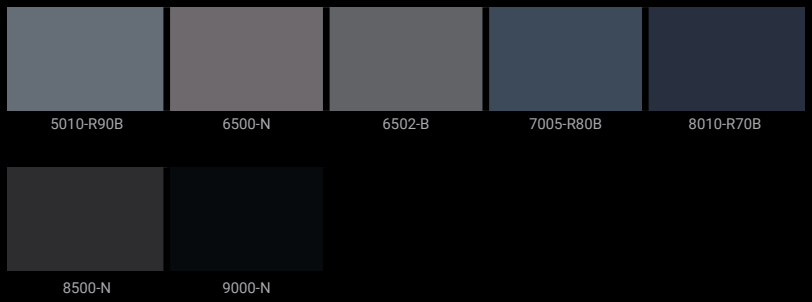
7005-R80B | 4000-N | 4010-R10B | 3005-R80B | 6502-B



Built Elements Summary

Colours appearing repeatedly in this landscape character type

Agricultural
Industrial/commercial
Residential/community/public open space



Mona Outline Colour Options Assessment

Natural Landscape

Geology, soils and water
Woodland and vegetation
Livestock
Skyscape/cloudscape

Geology, soils and water

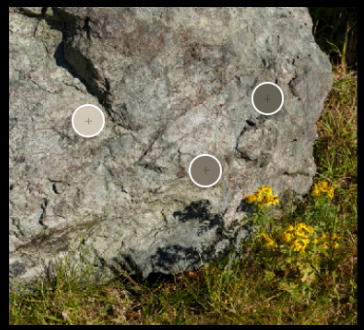
2030-Y30R | 2010-Y40R | 4020-Y40R | 4500-N | 6500-N

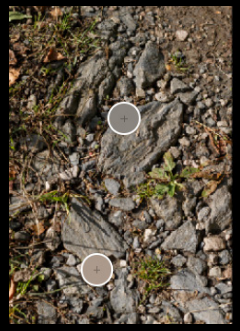
2005-Y | 5005-Y | 6010-G70Y | 4502-R | 2002-R

4502-Y | 3005-Y50R | 5005-Y80R | 6502-B | 5010-Y50R

5040-G80Y | 5020-Y30R | 4020-Y30R | 6020-Y20R | 5040-G40Y







Geology, soils and water

5005-Y50R | 4020-Y20R | 8010-Y50R | 7005-Y20R | 8505-R

6020-B | 5540-G60Y | 6005-Y80R | 6020-Y10R | 7020-G30Y

5030-G90Y | 5040-Y10R | 5540-G40Y | 8010-G70Y | 3050-G50Y

3020-R70B | 5020-R70B | 7010-R70B | 6010-R50B | 3030-R70B

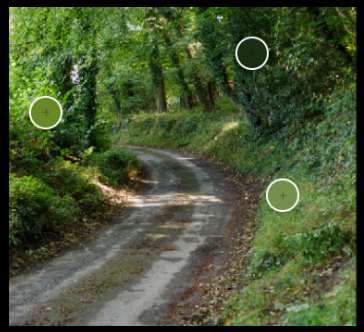
Woodland and vegetation

3065-G40Y | 8505-G | 3040-G40Y | 4550-G30Y | 8010-G10Y

4550-Y | 3060-G80Y | 7020-G | 6530-G50Y | 7020-G90Y

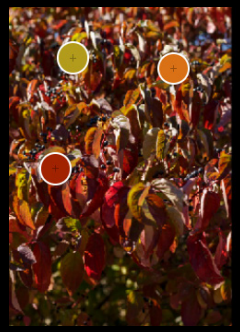
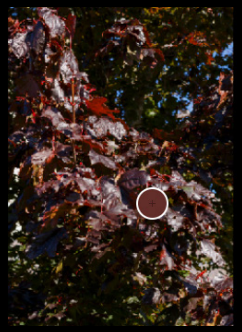
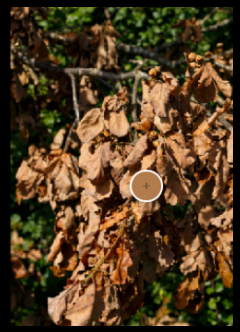
8005-R20B | 5005-Y50R | 6030-Y60R | 3060-Y20R | 4550-Y30R

2060-G80Y | 2070-Y40R | 3560-Y70R | 6030-Y90R | 4030-Y30R







Woodland and vegetation

5005-Y50R | 7502-Y | 8010-Y50R | 5020-Y50R | 6005-Y50R

8010-G10Y | 7020-G10Y | 3560-G30Y | 3060-G40Y | 3560-G40Y

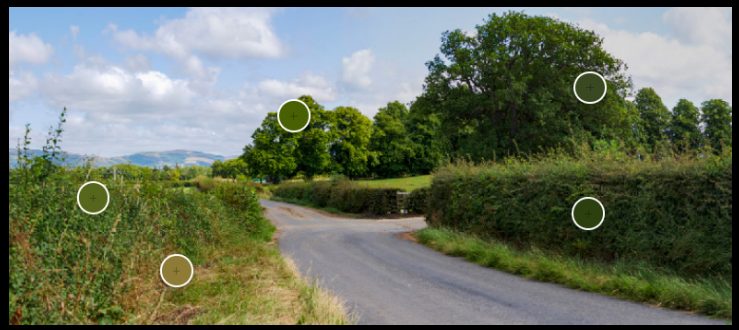
2570-Y90R | 3065-G50Y | 3560-G50Y | 4550-Y70R | 5540-G40Y

4030-Y20R | 4550-G30Y | 3060-G30Y | 2070-R | 8505-R80B

Woodland and vegetation

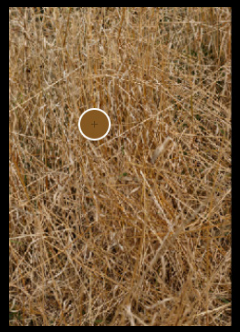
4050-G60Y | 5020-Y30R | 8505-G50Y | 6530-G50Y | 4020-Y20R

4550-G40Y | 4040-G80Y | 5540-G40Y | 6030-G30Y | 7020-G30Y



3560-G40Y | 5540-G60Y | 2070-G90Y | 5030-Y30R | 3020-Y30R

5040-Y20R | 3560-G50Y | 5010-G10Y | 6020-Y10R | 8010-Y10R



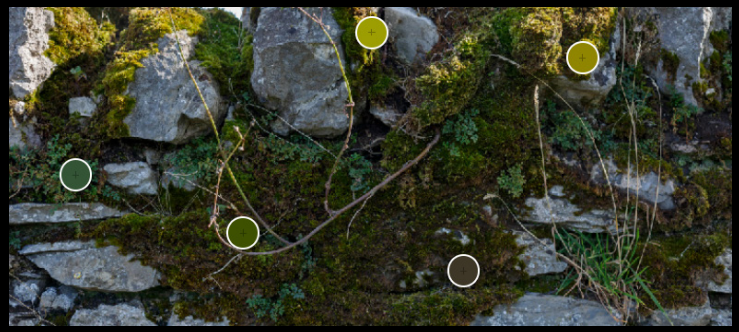
Woodland and vegetation

3060-G50Y | 3560-G40Y | 3040-G40Y | 6030-Y | 3020-G60Y

6020-Y10R | 4040-G70Y | 7020-Y | 7010-G30Y | 7020-G70Y

6030-R | 7020-G90Y | 5040-G80Y | 1505-Y50R | 2070-Y20R

6030-G30Y | 5540-G40Y | 8010-G90Y | 2070-G60Y | 3060-G60Y

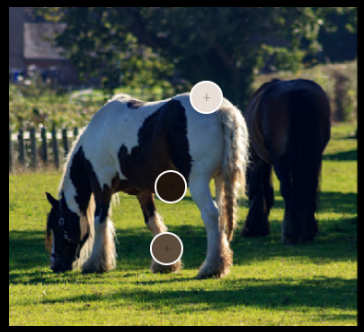


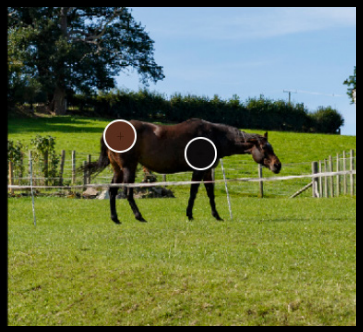
Livestock

0804-Y70R | 8505-Y | 7010-Y30R | 8505-Y80R | 7020-Y70R

8010-Y30R | 6020-Y30R | 4020-Y20R | 2030-Y10R | 5030-Y10R

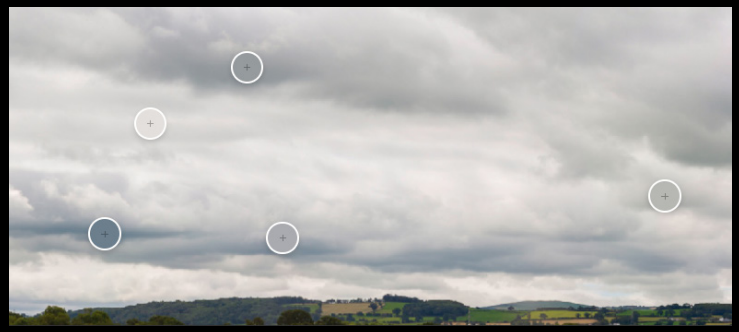
4550-Y40R | 1505-Y40R | 9000-N | 8010-Y50R | 8505-Y20R





Skyscape/cloudscape

5010-R90B | 1002-R | 3005-R50B | 3502-B | 2500-N



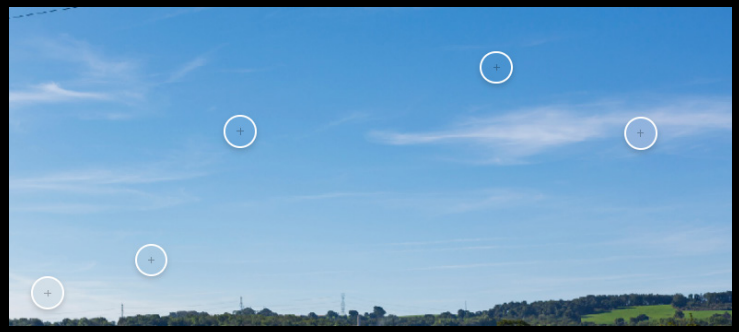
4020-R80B | 3010-R80B | 2010-R70B | 3005-R80B | 1502-R

6010-R70B | 4010-R70B | 5010-R90B | 5020-R80B | 2002-R50B

2040-R80B | 1010-R70B | 2020-R80B | 2010-R70B | 2020-R80B

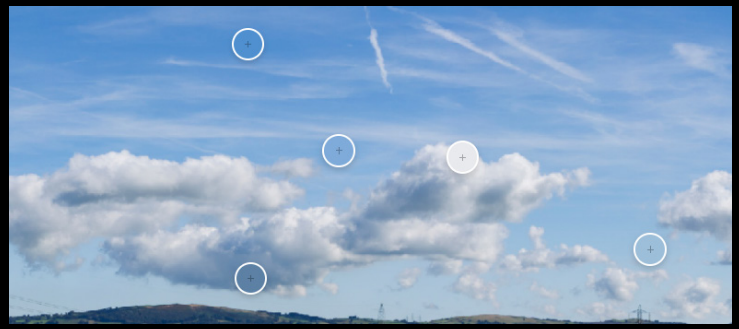
Skyscape/cloudscape

0907-R90B | 1020-R90B | 1040-R90B | 1550-R80B | 1040-R80B

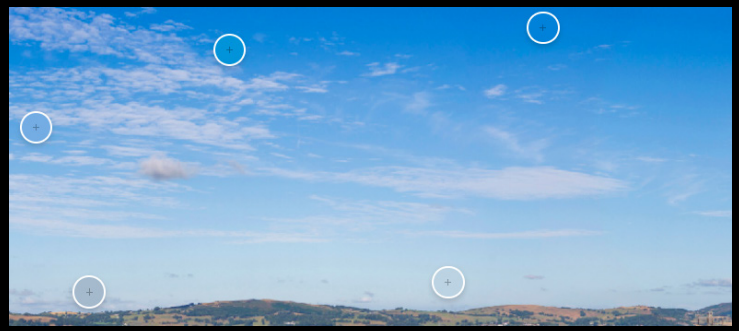


2020-R80B | 1555-R80B | 1030-R90B | 1040-R90B | 0530-R80B

1555-R80B | 3030-R80B | 1040-R80B | 0603-R80B | 1030-R80B



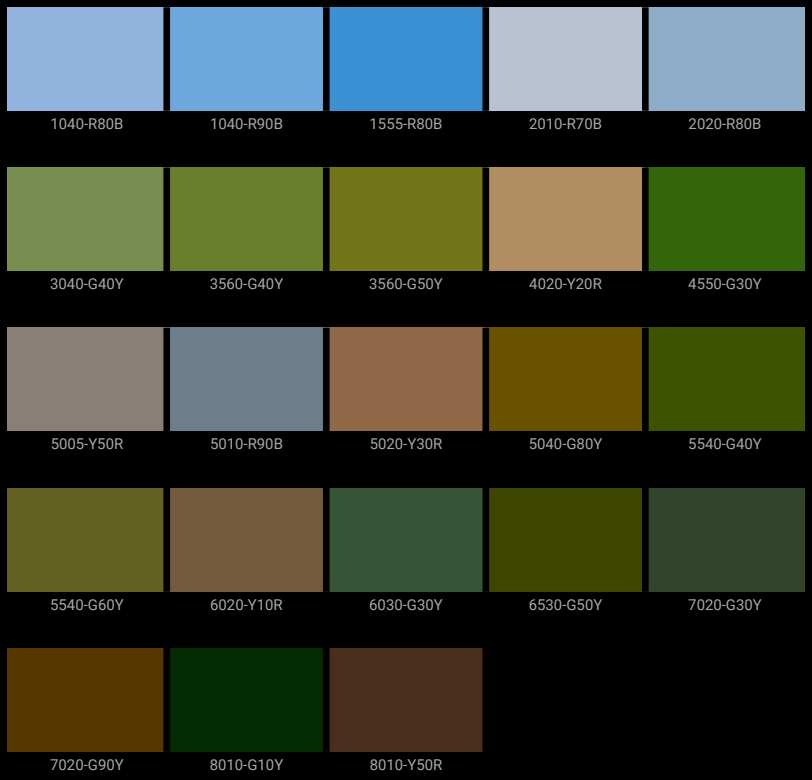
0540-R90B | 1515-R80B | 1015-R80B | 1050-R90B | 2050-R80B



Natural Landscape Summary

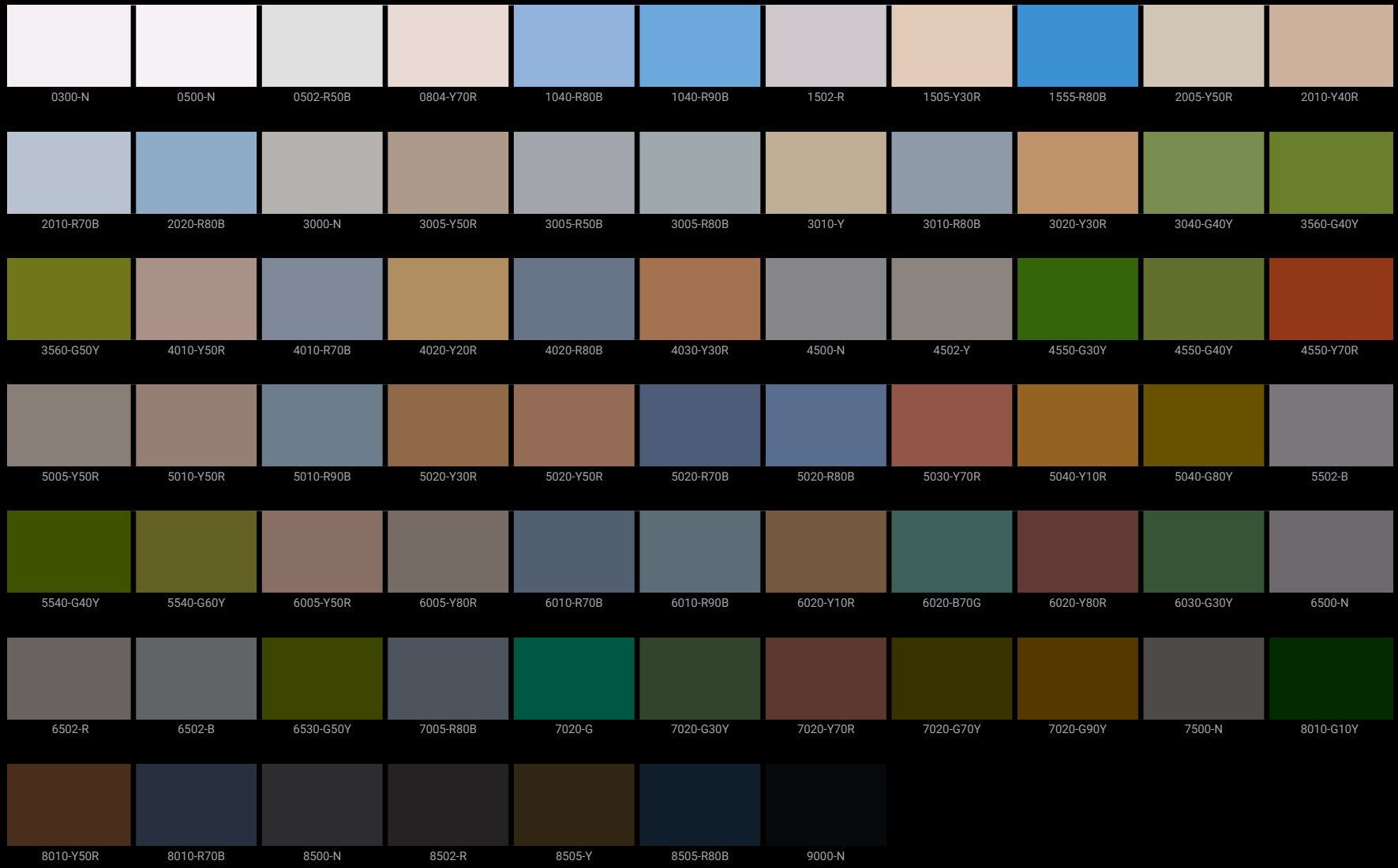
Colours appearing repeatedly in this landscape character type

Geology, soils and water
Woodland and vegetation
Livestock
Skyscape/cloudscape



Appendix **A** | Full Summary

Colours appearing repeatedly in the landscape character types



Online resources used for colour selection and conversions:

https://color.adobe.com
https://ncscolour.com
https://www.e-paint.co.uk
https://www.ncscolorguide.com/ncs

The information and swatch colour pallete depicted in this document is for guidance only. The displayed colour will depend on the users monitor, browser and/or printer. The finished colour, therefore, may not be as shown. A visual check using sample swatches obtained from an NCS local stockist is always recommended before any final colour selection.

November 2024