North Falls and Five Estuaries offshore wind farms

Joint Substations Design Guide

Version 00: August 2025

FIVE ESTUARIES OFFSHORE WIND FARM

NORTH FALLS Offshore Wind Farm

Document Title: North Falls & Five Estuaries Joint Substations Design Guide

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Prepared For: North Falls & Five Estuaries

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1. Context, Requirements and Design Standards

1 Introduction

1.1 The Joint Substations Design Guide

1.1.1 This Joint Substations Design Guide (JDG) is being prepared to support the development of detailed proposals for two co-located onshore substations (OnSS). These OnSS are for the North Falls and Five Estuaries offshore wind farm projects. These are to be constructed on a site bounded by Ardleigh Road, Grange Lane and Barn Lane in Little Bromley, Essex.

1.1.2 The two projects are currently going through the Development Consent Order (DCO) examination process, which is due to conclude in early 2026. At DCO stage the submitted proposals showed an outline level of detail only, due to the uncertainty regarding technology and construction methodology at this early stage. This is standard procedure for Nationally Significant Infrastructure Projects (NSIPs).

1.1.3 Prior to DCO submission, both North Falls and Five Estuaries offshore wind farms prepared 'design approach documents', to evidence the 'Good Design' followed, in accordance with the overarching National Planning Policy for Energy. North Falls Onshore Wind Farm (NFOWF) submitted a 'Design Vision' and Five Estuaries Onshore Wind Farm, (VEOWF) submitted a 'Design Principles Document'.

1.1.4 Detailed designs for the OnSSs will be developed after the respective DCOs are awarded. Designs will be subject to formal approval by the dischaing authority. For the purposes of this project, the discharging authority is Essex County Council (ECC)s.

1.1.5 The purpose of the JDG is therefore;

- Inform the tender process, providing a clear indication of employer's requirements and design expectations to those tendering;
- Provide further information on how the detailed design will develop post-DCO, to staff acting on behalf of the discharging authority;
- Allow stakeholders and interested parties to contribute meaningfully to the design process, identifying where optionality exists for aspects of the design;
- Reconcile any differences between the VEOWF and NFOWF schemes and respond to any design issues raised during the examination process; and
- Ensure that 'Good Design' is maintained throughout the project lifespan, in accordance with National Planning Policy and Best Practice guidance for Nationally Significant Infrastructure Projects (NSIP).

1.1.6 An indicative time line is provided in Plate 01, which shows how the production of the JDG will fit within the DCO Examination, consenting and detailed design processes.

1.1.7 The process commenced in April 2025 with the appointment of consultants to develop the guide, alongside the North Falls and Five Estuaries offshore wind farm and their technical teams.

1.1.8 The JDG will be an iterative document, subject to external review by key stakeholders, interested parties and an independent design review panel.

1.1.9 The content will evolve as stakeholder feedback is obtained and the shortlist of acceptable options is refined.

1.1.10 The final version of the document is anticipated for release in December 2025. A detailed time line is shown in Plate 05.

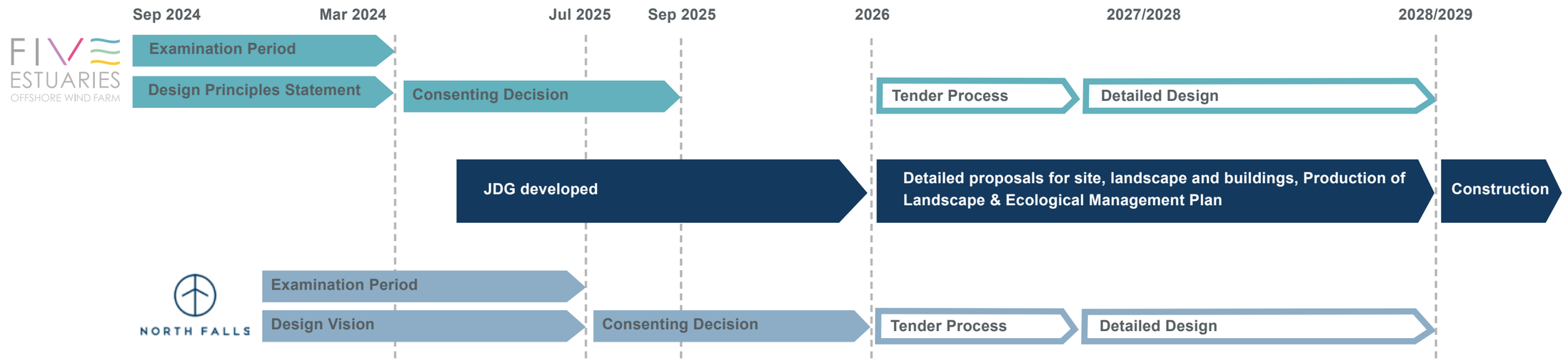

Plate 01 - Time line for North Falls and Five Estuaries offshore wind farms, identifying the relationship of the JDG within the process

1.2 Brief overview of the project(s)

1.2.1 The UK Government has committed to installing 50GW of offshore wind capacity by 2030, and reaching net zero carbon emissions by 2050. To help achieve the urgent need for renewable energy, in August 2019, the Crown Estate awarded an Agreement for Lease (AfL) to seven projects, including Greater Gabbard Extension and Galloper Extension (now North Falls and Five Estuaries).Plate 02 shows the location of these proposed extensions.

1.2.2 North Falls and Five Estuaries offshore wind farms will be connected to landfall on the Essex coast via undersea cable routes, then via underground cable routes to the site identified for the co-located OnSSs, to the west of Little Bromley, near Ardleigh.

1.2.3 The function of the two OnSSs is to convert power generated from the offshore wind farms to a form suitable to feed into the national transmission system at the new NGET East Anglia Connection Node substation, proposed on land to the west of Grange Road, Ardleigh.

1.3 Key components of the projects(s)

1.3.1 The relevant components of the project comprise the two co-located OnSSs and the wider site.

1.3.2 In NFOWF and VEOWF's respective DCO submissions, NFOWF utilised an Air Insulated Switchgear (AIS) and VEOWF retained optionality for either AIS or Gas Insulated Switchgear (GIS). VEOWF is now likely to progress with AIS at the site.

1.3.3 The AIS compounds will include several buildings, electrical equipment, access routes and other hard surfaces, enclosed by a secure, fenced boundary with lighting and CCTV provided.

1.3.4 The wider site includes the lands between the OnSSs and the wider site boundary. Project proposals include a range of measures to mitigate identified environmental impacts and other to provide site enhancements.

1.3.5 The outline landscape proposals for the sites, as submitted at DCO application, are shown in Plates 03 and 04 overleaf.

1.3.6 More detail on key components is provided in Part 3

1.4 Project site

1.4.1 The site occupies a rural context, approximately four miles east of Colchester. Existing land uses include farming (arable) and horticulture (glasshouses).

1.4.2 The project site is bounded by Ardleigh Road, Grange Road and Barn Lane in Little Bromley. The agreed site boundary for the JDG is discussed in more detail within Part 2.

1.4.3 The landscape is generally flat and open, with far reaching views due to the removal of field boundaries and limited extent of significant woody vegetation. Further information on the site is provided in Part 2

1.4.4 National Grid Energy Transmission (NGET) have selected a site immediately to the west of Grange Road for a new 400kv substation; the East Anglia Connection Node (EACN). Proposals will be submitted for DCO in August 2025.

1.4.5 The EACN will also offer a connection into the electricity supply grid for the proposed Tarchon UK-Germany power link. The site for the Tarchon substation is yet to be confirmed. The Tarchon project is not related to either Five Estuaries or North Falls.

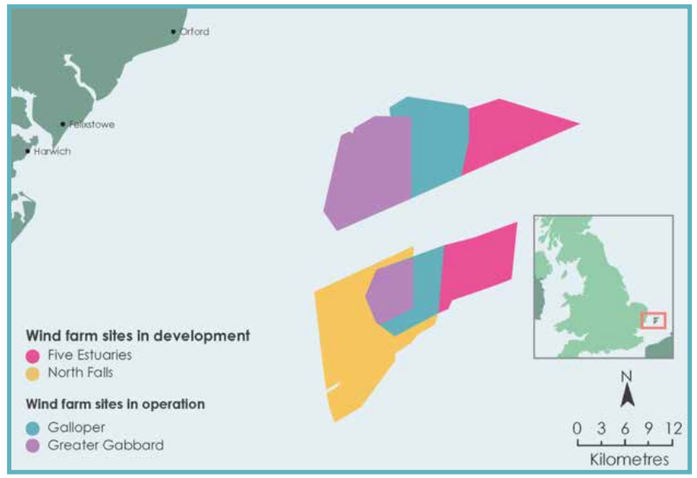

Plate 02 - Location of the offshore wind farms

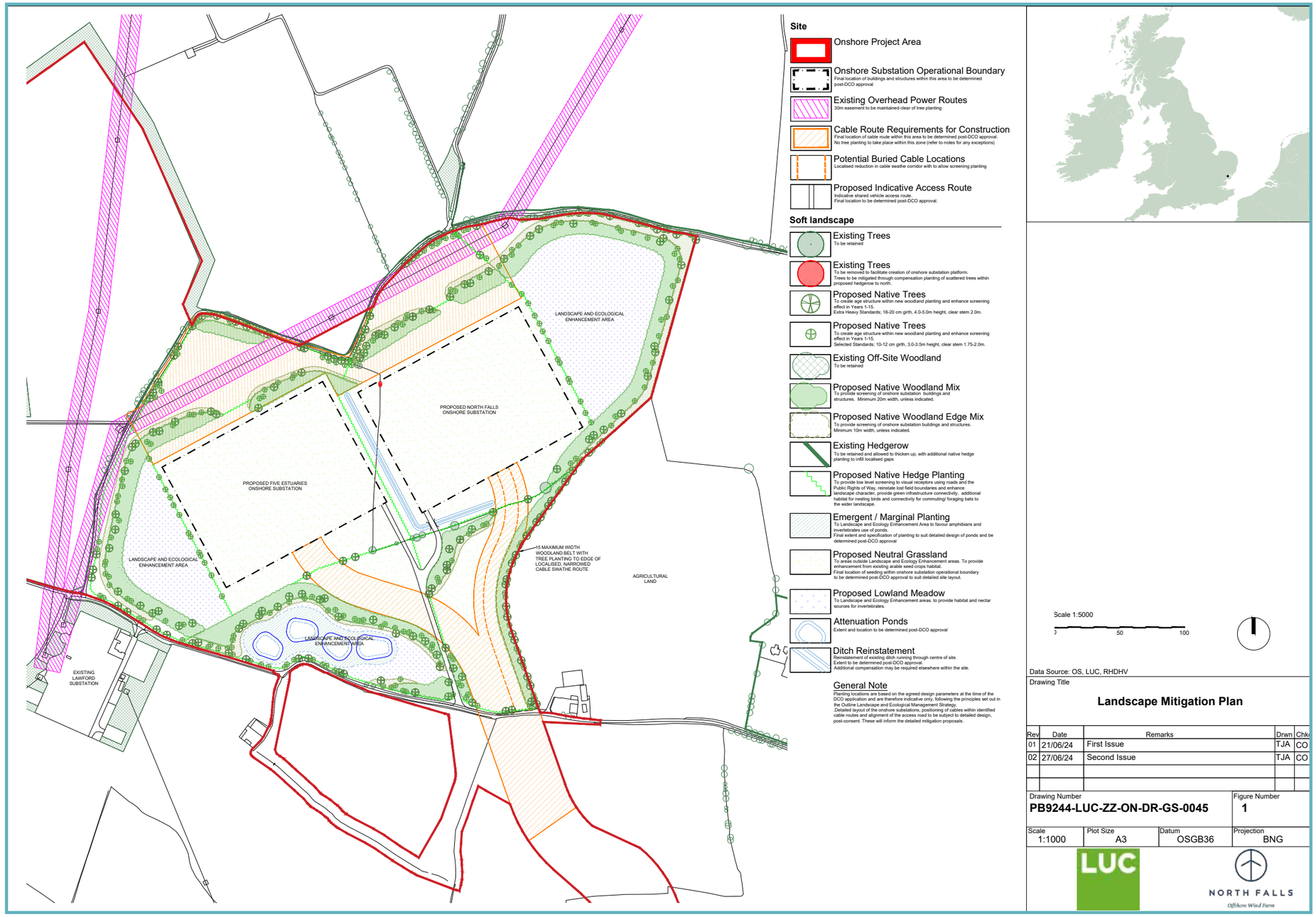

Plate 03 - NFOWF OnSS Landscape Mitigation Plan, as submitted at DCO application.

Plate 04 - VEOWF OnSS Landscape and Ecological Mitigation Plan, as submitted at DCO application.

1.5 Project team

1.5.1 Two project teams will be responsible for developing the JDG. These comprise VEOWF and NFOWF onshore consents staff, supported by engineering, land transactions and communications teams, with consultant support.

1.5.2 An internal Design Champion will review the JDG as it progresses, supported by a design review team. The role of the internal Design Champion is identified in the National Infrastructure Strategy(2020);

- *'All projects are required to have a board level design champion in place...at either the project, programme or organisational level, supported where appropriate by design panels'.*

1.5.3 Nationally Significant Infrastructure Projects: Advice on Good Design (2024) identifies that a good design process should include;

- *'Design leadership supported by an engaged design champion to ensure design governance is secured and the design principles drive a structured design process and hierarchy of design control'.*

1.6 Indicative time line

1.6.1 An indicative time line is shown in Plate 05, which is based on the draft Engagement Strategy and outline programme. This may be subject to change.

1.6.2 The development of the JDG will span from late April, when initial introductory meetings took place with key stakeholders and the consultant teams were appointed, until the end of 2025, when the final version will be released. This aligns with the indicative timescales included within NFOWF 'Design Vision' and VEOWF 'Onshore Substation Design Principles Document'.

1.6.3 The JDG will be subject to a comprehensive stakeholder review process. This approach is set out within 'North Falls and Five Estuaries offshore wind farms' approach to Onshore Substations Design Guide engagement'. This has been subject to review by ECC and Tendring District Council (TDC).

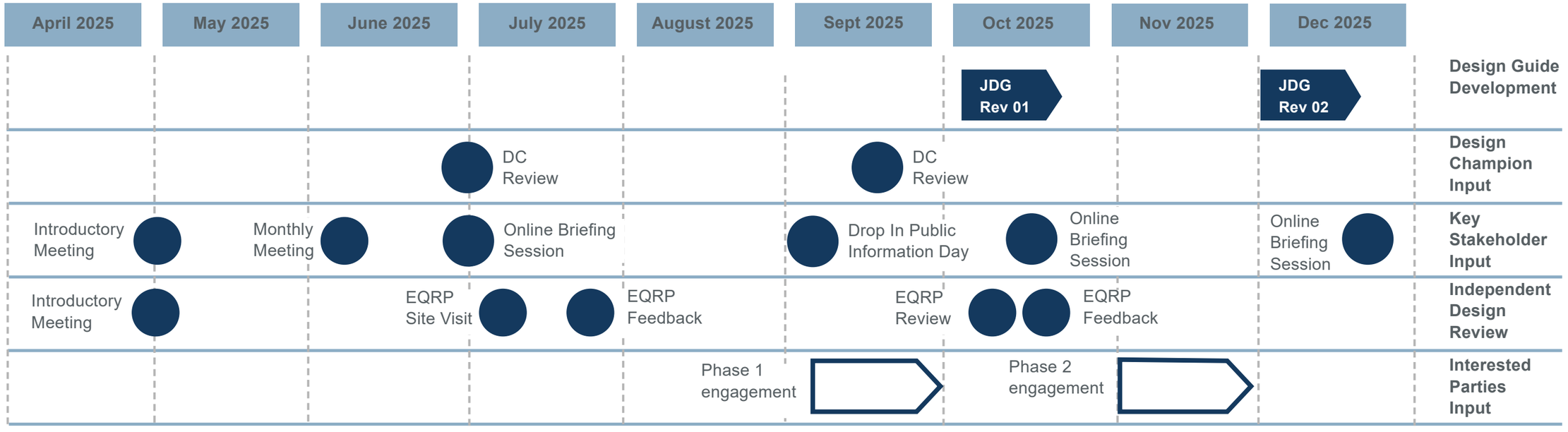

Plate 05 - Indicative time line for the JDG

1.6.4 The JDG will also be subject to review by the Essex Quality Review Panel (EQRP). A tracker recording feedback received and actions taken is included within Part 5: Consultation.

1.6.5 The consenting decision for VEOWF is due during the JDG development period, although the examination for NFOWF will still be ongoing. However, completing the document during this period will allow it to form a material part of the VEOWF tender process.

1.7 Design Guide Scope

1.7.1 The geographical extent of the JDG will only cover the co-location OnSS area, as defined in Part 2.

1.7.2 The JDG includes details of above-ground built development within the site boundary. This encompasses the OnSS compound buildings, structures and landscape and ecological works within the wider site areas.

1.8 Document Structure

1.8.1 Part 1 of the JDG sets the scene for the design guidance encompassed within the appendices. It sets the context for the project, and sets out clear regulatory, technical and performance requirements for the future detailed design.

1.8.2 The three subsequent Parts provide focussed design advice:

- Part 2: Layout, Design and Materials Guidance
- Part 3: Environmental Colour Assessment
- Part 4: Landscape and Ecology Guidance

1.8.3 These identify where technical and performance requirements influence the design and where optionality exists for wider input.

1.8.4 Part 5 provides an overview of the consultation process. It identifies the feedback received at each stage and the changes made as a result.

1.9 Use of the Joint Substations Design Guide

1.9.1 The ultimate function of the JDG is to provide clear and specific guidance to those developing the detailed design of the OnSSs.

1.9.2 Other important functions of the document are described below.

Draft Stage

1.9.3 At draft stage, the JDG will be used to identify any aspects of the OnSS design that will be subject to optionality. The review process will allow the selection of options to be refined, following the input of internal and external parties.

1.9.4 The final version shall therefore include the range of preferred design options. These shall meet the technical and regulatory standards required and be considered appropriate and acceptable by the discharging authority.

Tender Stage

1.9.5 The JDG will be included within the tender documentation as part of the Employer's Requirements.

1.9.6 Tender pricing should therefore allow for the range of options identified within the guidance, which reflect the client's expectations in terms of design quality.

1.9.7 After contract award, the successful tenderer will be expected to deliver proposals in accordance with the guidance.

Detailed Design Stage

1.9.8 Following appointment, a range of further surveys and assessments will be required to inform the detailed design.

1.9.9 Outline strategies developed prior to DCO submission will also be updated, as identified in Plate 06.

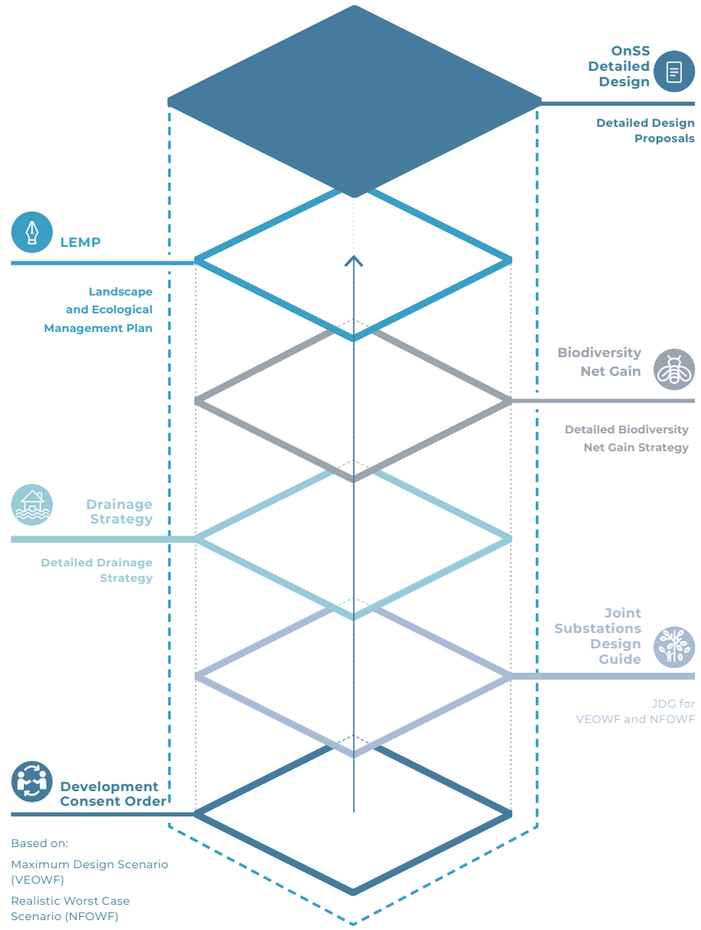

Plate 06 - OnSSs detailed design considerations

Site Layout

1.9.10 The appointed design contractor shall make reference to Part 2: Layout, Design & Materials, when developing the site layout. This identifies the key elements for inclusion and any specific constraints influencing the layout of the site.

1.9.11 Further surveys will be required to inform the site layout. For example, a Tree Survey to BS:5837 will be needed to identify all existing features and their value for retention to determine the placement of site components and new planting, infiltration testing required to identify the extent of Sustainable Urban Drainage Systems (SuDS) features, etc.

1.9.12 The site layout shall be developed as part of an iterative process, informed by any relevant strategies:

- Site Security Strategy
- Detailed drainage strategy
- Biodiversity Net Gain Strategy
- Landscape and Ecological Management Plan

1.9.13 The site layout is primarily determined by the electrical equipment specified and its functionality, therefore any optionality is limited to the following:

- OnSS Compound location
- Location of agricultural access and private easements

Buildings

1.9.14 The appointed design contractorshall make reference to Part 3: Environmental Colour Assessment and Part 2: Layout, Design & Materials, when developing proposals for the site buildings.

1.9.15 Part 2 also identifies the anticipated range of building types and the optionality that exists for each one. This includes:

- Building Roof Type
- Building Materials
- Building Colour

1.9.16 Part 3 identifies a range of options for the treatment of building façades, exploring the use of colour and cladding patterns. These options shall be considered against the range of options identified in Part 2, then used to develop proposals that represent a coherent range across all building types.

Site Components

1.9.17 The appointed design contractor shall make reference to Part 2: Layout, Design & Materials when designing and specifying any above-ground site components.

1.9.18 The limited optionality for electrical infrastructure is acknowledged, however designers are expected to explore ways of minimising the visual impact, where possible.

1.9.19 Identified optionality for site components includes:

- Fence type
- Fence colour
- Hard surface materials
- Cycle parking type and location (if required)

Site Landscape

1.9.20 The appointed design contractor shall make reference to Part 4: Landscape and Ecology Guidance and Part 2: Layout, Design & Materials, when developing proposals for the site landscape beyond the compounds.

1.9.21 Part 4 identifies the anticipated range of planting types and ecological measures, based on the approach described within the Outline Landscape and Ecology Management Strategies submitted at DCO. It shows how differences between the VEOWF and NFOWF are addressed and identifies any optionality that exists for key components. This includes:

- Habitat mosaics
- Shelterbelts
- Hedgerows
- Woodland
- Orchards
- Scrubland
- Grassland
- Wetlands
- Microhabitats.

1.9.22 A Design Guide Landscape and Ecology Plan illustrates how these components are applied to the DCO-stage layout.

1.10 Project Context

1.10.1 This section provides an overview of the project context, identifying where this has the ability to influence design decisions and optionality.

1.11 Good Design Context - Best Practice

1.11.1 Best practice for Good Design in Nationally Significant Infrastructure Projects (NSIPs) is described within two key references:

- Nationally Significant Infrastructure Projects: Advice on Good Design (Planning Inspectorate, 2024) was not published until after both VEOWF and NFOWF DCO submissions, but is highly relevant to the preparation of the JDG and subsequent detailed design. It states:
  - *'Good design is crucial for achieving excellent functionality, sustainability, positive place-making and resilience in NSIPs'.*
  - *'Achieving high quality, good design outcomes requires an effective, intentional, transparent, deliverable process to be planned, followed and secured. Success in good design comes from a combination of securing both good process and good outcomes*'.
- The four key principles set out within National Infrastructure Commissions Design Principles for National Infrastructure (2020) have shaped the design vision and principles work completed by VEOWF and NFPWF to date. They remain valid themes for the preparation of the JDG and subsequent detailed design. These are:
  - *Climate: Mitigate greenhouse gas emissions and adapt to climate change;*
  - *People: Reflect what society wants and share benefits widely;*
  - *Places: Provide a sense of identity and improve our environment; and*
  - *Value: Achieve multiple benefits and solve problems well.*

1.12 Good Design Context - Policy

1.12.1 The emphasis on Good Design for NSIPs is further reinforced through policy:

- The National Infrastructure Strategy (NIS, 2020) describes how Good Design can be embedded through the use of design principles, parameters, and codes to guide the development of projects ensuring they are well-designed, aesthetically pleasing, and fit for purpose.
- The National Planning Policy Framework (2025) acknowledges that Good design can be achieved through clear design expectations, testing approaches and effective engagement.
- The Overarching National Policy Statement for Energy, EN-1 (2024) identifies that;
  - *'Applying good design to energy projects should produce sustainable infrastructure sensitive to place, including impacts on heritage, efficient in the use of natural resources, including land-use, and energy used in their construction and operation, matched by an appearance that demonstrates good aesthetic as far as possible'.*

Plate 07 - NIC four key design principles. Image source: National Infrastructure Commission

1.13 Technical Limitations for Design

1.13.1 National policy also recognises the technical and regulatory context governing the design of NSIPs and the limitations this can place on design optionality:

- The Overarching National Policy Statement for Energy, EN-1 (2024) states:
  - *The visual appearance of a building, structure, or piece of infrastructure, and how it relates to the landscape it sits within, is sometimes considered to be the most important factor in good design. But high quality and inclusive design goes far beyond aesthetic considerations. The functionality of an object... including fitness for purpose and sustainability, is equally important'.*
  - *'It is acknowledged...that the nature of energy infrastructure development will often limit the extent to which it can contribute to the enhancement of the quality of the area'.*
  - *'Whilst the applicant may not have any or very limited choice in the physical appearance of some energy infrastructure, there may be opportunities for the applicant to demonstrate good design in terms of siting relative to existing landscape character, land form and vegetation'.*
- NPS for Electricity Networks Infrastructure, EN-5 (2024) also acknowledges:
  - *'electricity networks infrastructure must in the first instance be safe and secure, and that the functional design constraints of safety and security may limit an applicant's ability to influence the aesthetic appearance of that infrastructure'.*

1.14 Site Context

1.14.1 The co-located OnSS site is located to the north-east of the existing UK Power Networks (UKPN) substation (Lawfoed Substation), on Ardleigh Road. The site is located approximately 2km to the south-west of the settlement of Little Bromley, in Tendring.

1.14.2 The site is approximately 35m Above Ordnance Datum (AOD), with a generally flat land form across the site. The land cover is characterised by arable farmland with large-scale field patterns.

1.14.3 Field boundaries across the onshore substation works area are generally open in character, with some hedgerow boundaries with occasional hedgerow trees. The ecological survey has identified sections of existing species poor hedgerow on the northern boundary of the substation site. This offers scope for enhancement with new infill hedge planting providing greater habitat and Green Infrastructure (GI) connectivity.

1.14.4 Historic mapping indicates a line of trees located within the middle of the site, which formed part of a field boundary system that subdivided the larger agricultural fields. The hedgerow itself has become lost over time.

1.14.5 There is a higher degree of tree cover along the boundary with Barn Lane and Grange Road, to the north and west, and around the existing substation on Ardleigh Road, to the south-west of the onshore substation working area. These filter views across the site from the northeast.

1.14.6 Shelter belts, around 20m in width, are a common feature in the wider landscape, where they form boundaries to horticultural uses and farms. Elsewhere, small copses of trees are clustered in the corners of fields and at the junctions of field boundaries, near to isolated residential properties.

1.14.7 A drainage ditch runs through the centre of the site, with others located close to the boundary of the wider onshore substation working area.

1.14.8 The UKPN substation opposite the site is surrounded by a woodland belt varying in depth between 12-40 metres. Two 132kv overhead electricity transmission lines run northwards from the substation, one of which crosses the western boundary of the site.

1.14.9 There are existing Public Rights of Way (PRoW) to the north of the site (FP170-25, FP170-21, FP170-22), east of the site (FP170-23, FP170-57, FP170-19, FP172-12, FP172-14) and south of the site (FP172-15). Barn Lane, a local byway (170-57) runs along the north-eastern boundary of the site.

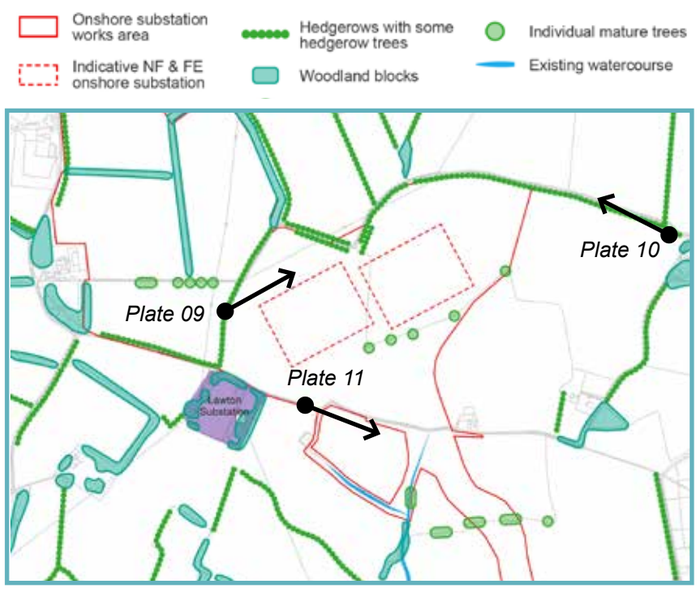

Plate 08 - Existing vegetation and watercourses at the site. Source: NWOWF

Plate 09 - Grange Road, facing north east. Source: LUC.

Plate 10 - Barn Lane, facing west. Source: LUC

1.15 Landscape Character

1.15.1 The site is located within the broad scale National Character Area (NCA) 111 Thames Basin and the local scale Landscape Character Area (LCA) 7A Bromley Heaths, as defined within the Tendring Landscape Character Assessment.

1.15.2 The landscape condition is described as being 'in decline'. Long term management aims to 'Conserve and Enhance' the landscape character include:

- *Conserve shelter belts of native species;*
- *Enhance woodland cover and the wooded character;*
- *Maintain historic lanes with ancient Oaks and unimproved roadside verges;*
- *Manage, enhance and expand hedgerows and grass strips as field boundaries to agricultural areas (to help bind soil, reduce erosion, provide habitats and wildlife* corridors); and
- *Improving biodiversity by creating semi-natural habitats such as wildflower meadows and grasslands.*

1.16 Visual Amenity

1.16.1 The surrounding landscape is generally flat with some long-range views.

1.16.2 Lawford substation is located south of the OnSS site. Pylons are visible in the landscape, however electrical equipment within the compound is largely screened from local receptors by mature clusters of trees.

1.16.3 Ardleigh Road passes through the onshore substation works area, running northwest to southeast. An existing PRoW runs to the south connecting Ardleigh Road to Lilley's Lane.

1.16.4 A small number of properties and farmsteads lie to east and south-east of site. These include Normans Farm, Jenning's Farm and Mulberry Court. Views from properties on the western edge of Little Bromley are typically filtered by intervening vegetation.

1.17 Heritage Setting

1.17.1 An assessment of the impacts of the OnSSs on the heritage settings of listed buildings was submitted by both parties.

1.17.2 Heritage assets within the co-located OnSS site include:

- Church of St Mary (NHLE 1337175 – Grade II* Listed Building); and
- Jenning's Farmhouse (NHLE 1111459 – Grade II Listed Building).

1.17.3 Minor adverse impacts are identified for both assets due to the change in their setting. These are not considered Significant in Environmental Impact Assessment (EIA) terms.

Plate 11 - Ardleigh Road, facing east. Source: LUC

Plate 12 - Jenning's Farmhouse. Source: NFOWF.

Plate 13 - Vegetation to rear of Jenning's Farmhouse. Source: NFOWF

1.18 Public Rights of Way

1.18.1 Plate 14 identifies the network of Public Rights of Way (PRow) in the vicinity of the substation. There are no PRoW through the site itself.

1.18.2 An existing byway, Barn Lane, runs along the northern boundary of the site, connecting Bromley Road and Grange Road. Two public footpaths connect to Barn Lane from the north.

1.18.3 Four further footpaths connect to Ardleigh Road and Little Bromley Road to the south of the site.

1.19 Ecology

1.19.1 The onshore project area is dominated by arable fields interspersed with field margin drains, rivers and areas of scattered and dense scrub. Field boundaries are typically species-poor hedgerows.

1.19.2 Other small areas of habitat present include semi-improved grassland, marshy grassland, woodland (broadleaved and mixed semi-natural and plantation) and woodland/scrub successional habitats.

1.19.3 Fauna such as common pipistrelle, hazel dormice and common nesting birds are associated with hedgerows. Trees and woodland are also valuable to badgers, bats and hazel dormice for nesting and foraging resources. Terrestrial habitats such as grassland support notable species including reptiles.

1.20 Drainage

1.20.1 The co-located OnSS is situated to the northern end of the Tenpenny Brook Water Framework Directive (WFD) Surface Water Operational Catchment. Mapping indicates that there are two Ordinary Watercourses comprising ditches along field boundaries to the south of Ardleigh Road

1.20.2 The site is situated wholly within Flood Zone 1. None of the onshore substation works area is situated within a historical flood extent.

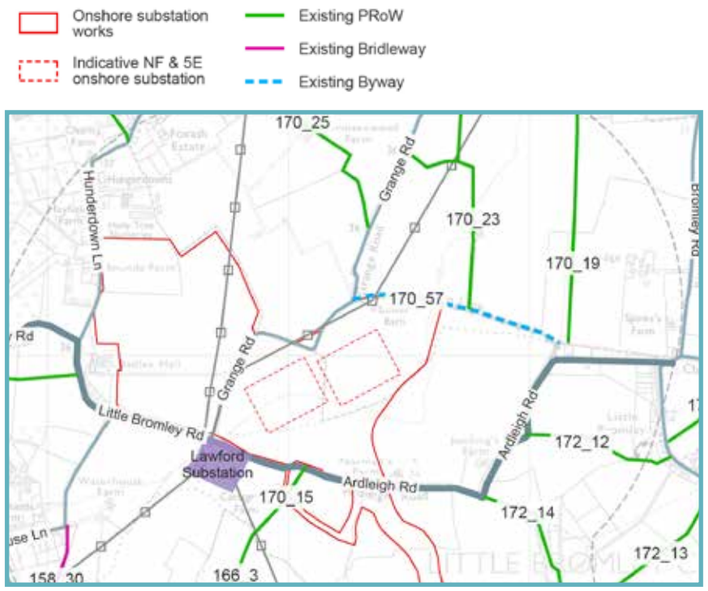

Plate 14 - Existing Public Rights of Way at the site. Source: NWOWF

Plate 15 - Barn Lane. Source: LUC

Plate 16 - Drainage ditch to south of Ardleigh Road . Source: LUC.

1.21 Performance Requirements

1.21.1 This section summarises the additional performance requirements for the co-located OnSSs and their wider site proposals, which are described in details within the DCO documentation.

1.21.2 Further reference should be made to the specific documents for full details of compliance requirements.

1.22 Functionality and Operability

1.22.1 Fundamentally, the proposals must achieve the functional and operational requirements of an OnSS.

1.23 Compliance

1.23.1 Proposals must comply with relevant statutory and technical requirements.

1.23.2 Wherever possible, proposals shall align with Best Practice standards and the criteria for Good Design.

1.24 Consent

1.24.1 Proposals must reflect the consented NFOWF and VEOWF schemes.

1.24.2 Proposals shall take cognisance of the requirements of consenting bodies responsible for the subsequent approvals and discharge process. The JDG engagement process described within Part 5 aims to support and minimise any project risks associated with the consenting process.

1.25 Mitigation

1.25.1 Proposals shall incorporate the mitigation measures identified within the respective Environmental Statements submitted at DCO stage by VEOWF and NFOWF, in order to minimise potential environmental effects.

1.25.2 Mitigation measures of relevance to the co-located OnSS site include:

Landscape & Visual

1.25.3 Planting and habitat creation to the wider site area shall replace and/or compensate for the loss or change in existing landscape elements:

- Loss of arable farmland, field boundaries; and
- Loss of landscape features associated with these, such as trees and hedgerows.

1.25.4 The design of the co-located substations and associated compounds shall seek to minimise visual impacts experienced by local receptors (residents, users of PRoW and users of the local road network).

1.25.5 Beyond the OnSS compounds, visual mitigation measures will include the planting of woodland belts, hedgerows and other forms of vegetation to filter and screen the development.

Heritage

1.25.6 The measures set out above also form part of the embedded mitigation to minimise effects on the setting of local heritage assets, St Mary's Church and Jenning's Farm .

Ecology

1.25.7 Habitat reinstatement measures include; grassland habitats, trees and woodland and arable field margins.

1.25.8 Habitat creation measures include; increasing habitat connectivity, new woodland creation and maintenance, drainage features, watercourses and ponds designed to meet wildlife needs as well as water management requirements, hibernacula for reptiles, amphibia and small mammals, wildflower meadow creation, installation of bird and bat boxes.

Drainage & Water

1.25.9 Embedded mitigation measures include:

- Reinstatement of agricultural land drainage, including the relocation of the ditch crossing the two OnSS compounds.
- Implementation of the SuDS elements (swales, attenuation ponds) identified within the Outline Operational Drainage Plan.

Noise

- The design of the OnSS compounds shall include measures to control operational noise levels at source, such as acoustic screens or structures.

1.26 Enhancement measures

1.26.1 Proposals for the co-located OnSSs and wider site shall include suitable enhancement measures. These will contribute to the overall sense of place, reinforce local distinctiveness and biodiversity.

1.26.2 Enhancement measures will include the statutory requirement for 10% Biodiversity Net Gain improvements.

1.26.3 Other enhancement measures contributed through the landscape and ecological interventions will include:

- Enhancements to local Green and Blue Infrastructure
- Enhancements to landscape character in line with the landscape management recommendations set out within the OLEMP and OLEMS

1.27 Robustness

1.27.1 Proposals shall be sufficiently robust to withstand site conditions during the operational lifetime of the project.

1.27.2 Design details and materials specification shall consider the need to minimise unnecessary maintenance requirements and uphold design standards during this period.

1.28 Sustainability

1.28.1 Proposals for the co-located OnSSs and wider site shall, where possible, demonstrate sustainable design and construction principles that align with NFOWF and VEOWF's sustainability commitments.

Carbon Reduction

1.28.2 The Project will seek to minimise, where practicable, Greenhouse Gas (GHG) emissions during each phase through the use of best available techniques and efficient design/management.

1.28.3 The GHG mitigation hierarchy shall be followed:

- Do not build (eliminate)
- Build less (reduce)
- Build clever (substitute)
- Construct efficiently (compensate)

1.28.4 A GHG assessment should be used to drive down GHG emissions at every stage of the proposed development and ensure that emissions are minimised as far as possible for the type of technology, taking into account the overall objectives of ensuring our supply of energy always remains secure, reliable and affordable.

1.28.5 Designers shall look for opportunities within the proposed development to embed nature-based or technological solutions to mitigate or offset the emissions of construction and decommissioning.

Climate Resilience

1.28.6 A Climate Change Resilience Assessment was undertaken at DCO stage. This presented the projected impacts of climate change across a range of scenarios and considers the direct impacts of climate change on the Project

1.28.7 The impact of various climate change scenarios shall be considered when developing the detailed design. This will include;

- Response to increased flooding: reduction in impermeable surfaces, using Sustainable Urban Drainage Systems (SuDs) wherever possible.
- Response to increased temperatures: considering the Urban Heat Island (UHI) effect when specifying hard surfaces, selecting plant species tolerant of predicted future temperatures

1.29 Design Standards

1.29.1 The following national and local design standards shall inform the future detailed design stages. This is not a exhaustive list of all relevant standards.

1.29.2 General Site Planning

- Environmental Impact Assessment Regulations;
- Habitats Regulations;
- The Electricity Act 1989;
- The Planning Act 2008;
- Overarching NPS for Energy (EN-1);
- NPS for Renewable Energy Infrastructure (EN-3);
- NPS Electricity Networks Infrastructure (EN-5);
- Planning Inspectorate Advice Note Nine: Rochdale Envelope;
- Overarching NPS for Energy (EN-1) (2011);
- EIA Guide to Shaping Quality Development (IEMA) (2015);
- The Horlock Rules.
- National Grid Technical Specification 'Substations'
- NGTS 3.10 General Technical Specification for Civil Engineering Works and Electricity Substations

1.30 Design and Local Character

- NIC Design Principles (NIC, 2020)
- National Character Area Profile 111- Northern Thames Basin
- Tendring Landscape Character Assessment - 7A Heathland Plateaux - Bromley Heaths
- Essex Design Guide (EDG, 2018)
- Essex Green Infrastructure Strategy (EGIS,2020)
- Essex Green Infrastructure Standards (EGIS, 2022)

1.31 Drainage and Water

- Generic Electricity Substation Design Manual for Civil, Structural and Building Engineering:
  - Section 01 Oil Containment (TS 2.10.01);
  - Section 09 Site Drainage (TS 2.10.09);
  - Section 13 Flood Defences for Electricity Substations (TS 2.10.13);
- Flood and Water Management Act 2010
- The Building Regulations 2010 Drainage and waste disposal, document H
- National Planning Policy Framework (NPPF) 2021
- National Planning Practice Guidance 2021
- The SuDS Manual (C753)
- Essex County Council Local Flood Risk Management Strategy
- The SuDSs Design Guide for Essex

1.32 Trees and Planting

- A Sense of Place; Design Guidelines for development near high voltage overhead lines.
- National Grid's Notes for Guidance - Tree Planting Restrictions On Pipelines.
- NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in
- Proximity to Trees
- Essex Tree Palette (ETP,2018)
- Forest Research Ecological Site Classification (ESC4). A tool to assess the suitability of a range of tree species and NVC woodland communities based on precise geographical location. It incorporates future climate change projections. Found at: http://www.forestdss.org.uk/geoforestdss/
- National Vegetation Classification - Field Guide to Woodland. JNCC.

1.33 Buildings

- Building Regulations: various Approved Documents
- Essex Design Guide (EDG, 2018)

1.34 Hard Surfaces

- National Highways guidance on Abnormal Indivisible Loads (AiL)
- Approved Document M: Access to and use of Buildings
- BS8300: Design of an accessible and inclusive built environment.

1.35 Boundaries

- NG TS 2.10.02 Technical Specifications - Perimeter Security Fencing for Substations and Other Operational Compounds.

1.36 Lighting

- Dedham Vale National Landscape Lighting Design Guide (2023)

1.37 Sustainability

- Green Guide to Specification (BRE)

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2: Layout, Design & Materials Guidance

2 Layout, Design & Materials Guidance

2.1 Introduction

2.1.1 Part 2 provides design guidance in relation to the layout, design and materials.

Layout

2.1.2 The Layout section offers design guidance on the overall layout of the site, including the positioning of key components within it. It also identifies the main constraints or parameters that will influence the setting out of the site at detailed design stage. Any optionality in layout is also identified.

Design and Materials

2.1.3 The Design and Materials section offers design guidance on the outline specification of individual site components. This is focused on details of the built form and hard landscape, with details of the soft landscape captured within Part 4.

2.2 Site Layout Guidance

Layouts at Development Consent Order Stage

2.2.1 Indicative site layouts were included within the Outline Landscape and Ecological Management Plan (OLEMP) submitted by VEOWF (Plate 17) and the Outline Landscape and Ecological Management Strategy (OLEMS) submitted by NFOWF (Plate 18).

2.2.2 Prior to DCO submission, guiding principles for these layouts were established and concept layouts were subject to extensive technical scrutiny and assessment.

2.2.3 The indicative layout for the co-located OnSSs was selected for two significant reasons;

- It provides maximum opportunity to co-ordinate the infrastructure, therefore minimising visual impacts though alignment and reducing the overall net impact.
- Whilst the temporary construction compounds are not within the OnSS site, the layout offers the opportunity for a more optimum temporary construction compound (TCC) arrangement.

2.2.4 For this reason, significant changes to the layout will not form part of the detailed design scope.

Detailed Site Layout

2.2.5 The site layout will be determined by the following factors:

- The extent of the overall site boundary for the co-located substation;
- The size and shape of the Onshore Substation Compounds for North Falls and Five Estuaries;
- Technical requirements concerning electrical transmission and safety;
- Construction phasing;
- Other functional requirements (access, security, drainage etc.);
- Site constraints, such as ground conditions, flood zones, protected habitats etc.
- Wayleaves or easements that must be maintained. These may constrain the land available for development or place other restrictions i.e. the extent of planting;
- Mitigation requirements; and
- Enhancement requirements e.g. Biodiversity \net Gain (BNG).

Plate 17 - Five Estuaries indicative layout as shown in the Outline Landscape and Ecological Management Plan : OnSS. (ES Volume 9, Report 9.22: Outline Landscape And Ecological Management Plan – Rev E)

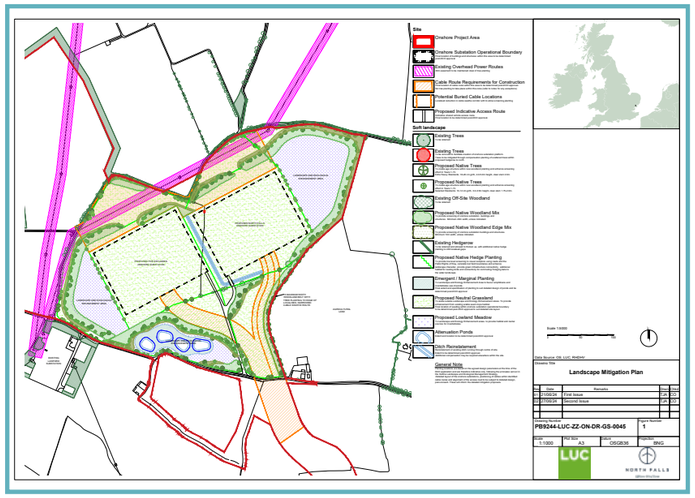


Plate 18 - North Falls indicative layout as shown in the Outline Landscape and Ecological Management Plan : OnSS. (ES Volume 7, Document 7.14: Outline Landscape And Ecological Management Strategy – Rev 4)

2.3 Site Boundary

Site boundaries for the Development Consent Order

2.3.1 The red line site boundaries submitted for the Development Consent Order (DCO) were different for NFOWF and VEOWF.

2.3.2 The VEOWF red line boundary included agricultural lands to the north and east of Normans Farm, extending eastwards up to the rear of Jenning's Farm.

2.3.3 The NFOWF red line boundary was drawn more closely to the onshore substation compounds, following the line of an existing field boundary leading from Barn Lane, then finishing to the west of Normans Farm.

Site boundary for the Joint Substations Design Guide

2.3.4 North Falls and Five Estuaries have now agreed a common boundary for the site to define the extent of the JDG. This will adopt the wider VEOWF boundary, as shown in Plate 19.

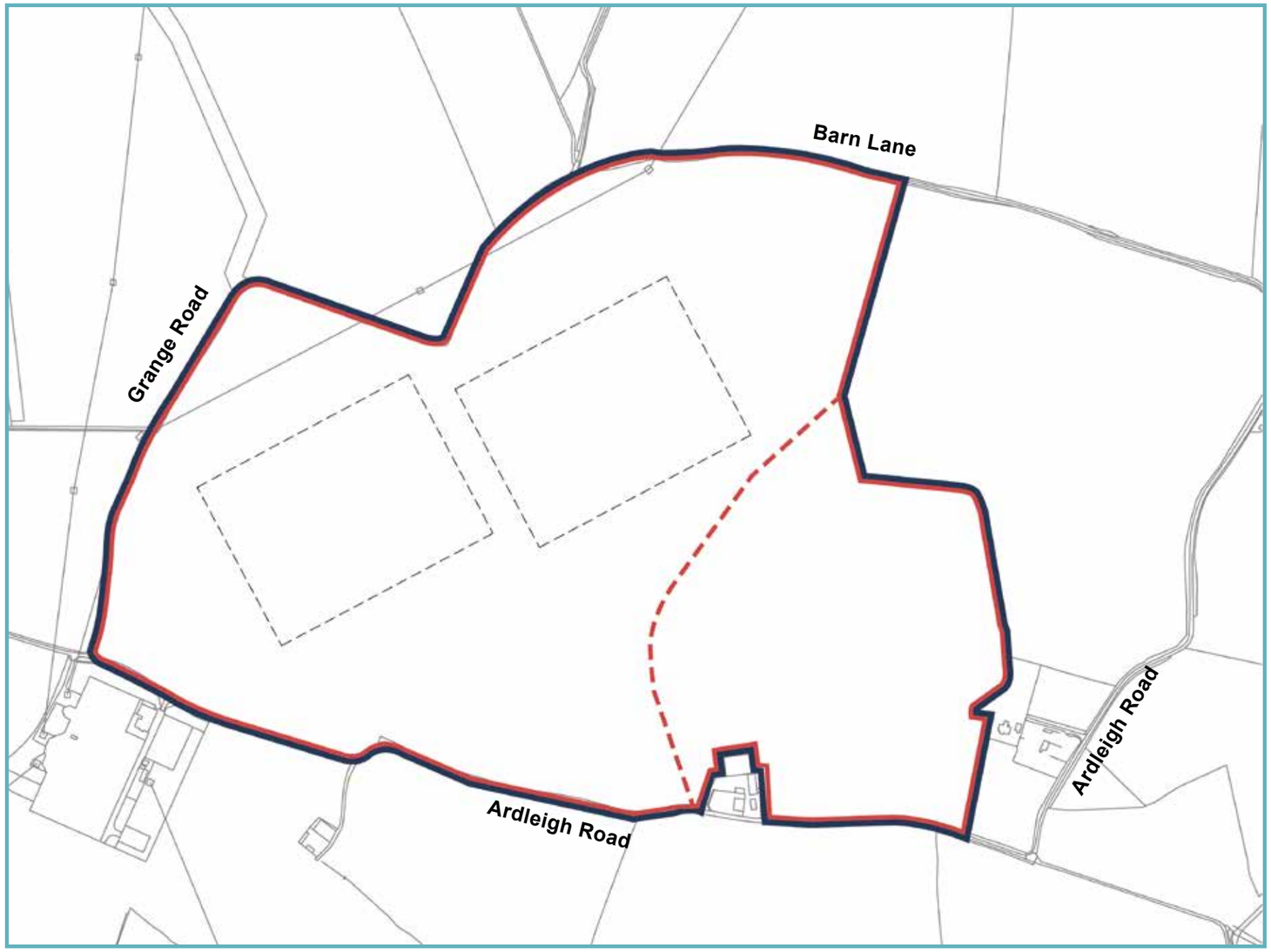


Plate 19 - Joint Site Boundary

2.4 Boundaries

Site Perimeter Boundary

2.4.1 The perimeter of the OnSS site will be permanently fenced for the following reasons;

- in order to define the extents of the operational area;
- to provide protection to establishing boundary vegetation;
- to prevent access into sensitive habitat areas by people and dogs.

2.4.2 The site perimeter will follow the overall red line boundary at Ardleigh Road, Grange Road and Barn Lane. To the southeast of the OnSS compounds, the boundary will be inset from the overall red line boundary, to allow the return of agricultural land to landowners following construction.

Secure Boundary

2.4.3 A secure boundary will be required to the perimeter of the two OnSS compounds. Details of all boundary treatments are provided within sections 2.19-2.21.

2.5 Site Access

2.5.1 Several highways access points will require incorporation within the layout, as shown in Plate 20.

Main access to the co-located onshore substations

2.5.2 The main highways access (A) to the co-located onshore substation will be taken from Ardleigh Road, as identified within both DCO applications. This access will be gated. The location of the site access from Ardleigh Road has been identified based on consultation with ECC and the findings of a Stage 1 Road Safety Audit.

2.5.3 The route from the highways access to the onshore substation compounds will be shared by North Falls and Five Estuaries. The route will diverge to allow separate access to the individual compound gates (B).

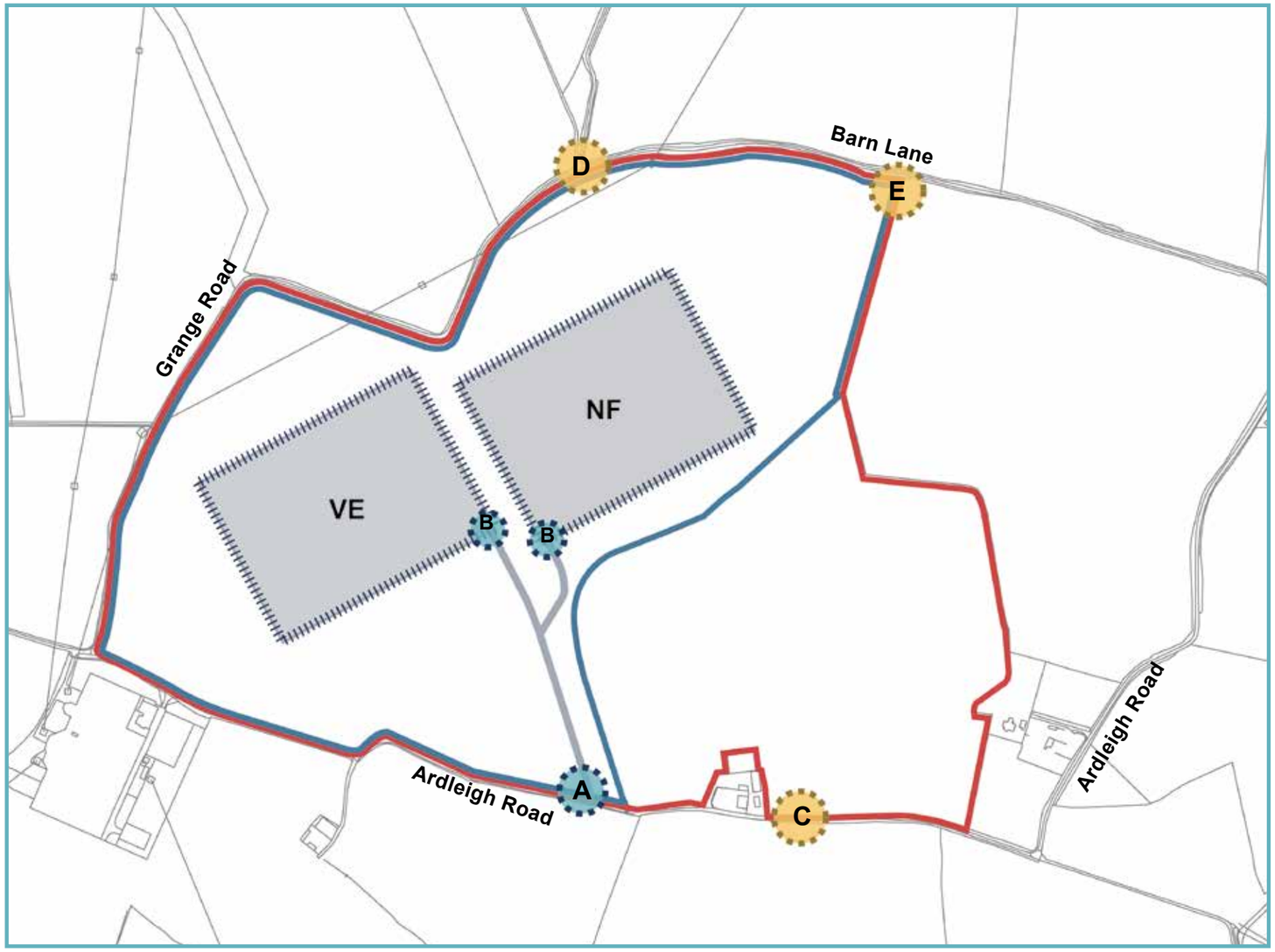


Plate 20 - Access and Security

Additional highways access points

2.5.4 Additional highways access points have been requested by adjacent landowners during the Examination process. These are required to provide access to agricultural land for farm machinery, as requested by relevant landowners.

2.5.5 To the south of the site, an access point (C) will be created to allow large farm machinery to access agricultural lands to the north of Ardleigh Road.

2.5.6 To the north of the site, an access point (D) will be created to allow large farm machinery to access agricultural lands to the south of Barn Lane, via the site. The proposed access route to the immediate south of the red line boundary will also be gated on entry to the agricultural land (E).

2.5.7 At detailed design stage, swept path analysis will be undertaken to establish the final location of routes, gate widths and visibility setbacks.

2.5.8 The creation of additional access points may impact on the extent of visual screening provided by boundary planting, the cohesiveness of green infrastructure, habitat connectivity and Biodiversity Net Gain (BNG). These implications shall be carefully considered as part of the detailed design process.

Design

2.5.9 Design guidance relating to the site access points and access routes is described within section 2.22.

2.6 Security

CCTV

2.6.1 An unmanned substation will require a CCTV system appropriately designed in accordance with risk assessment and linked to Supervisory Control and Data Acquisition (SCADA) system requirements for online monitoring/alarms & security.

2.6.2 This will include CCTV surveillance of the OnSS compound and the shared access route.

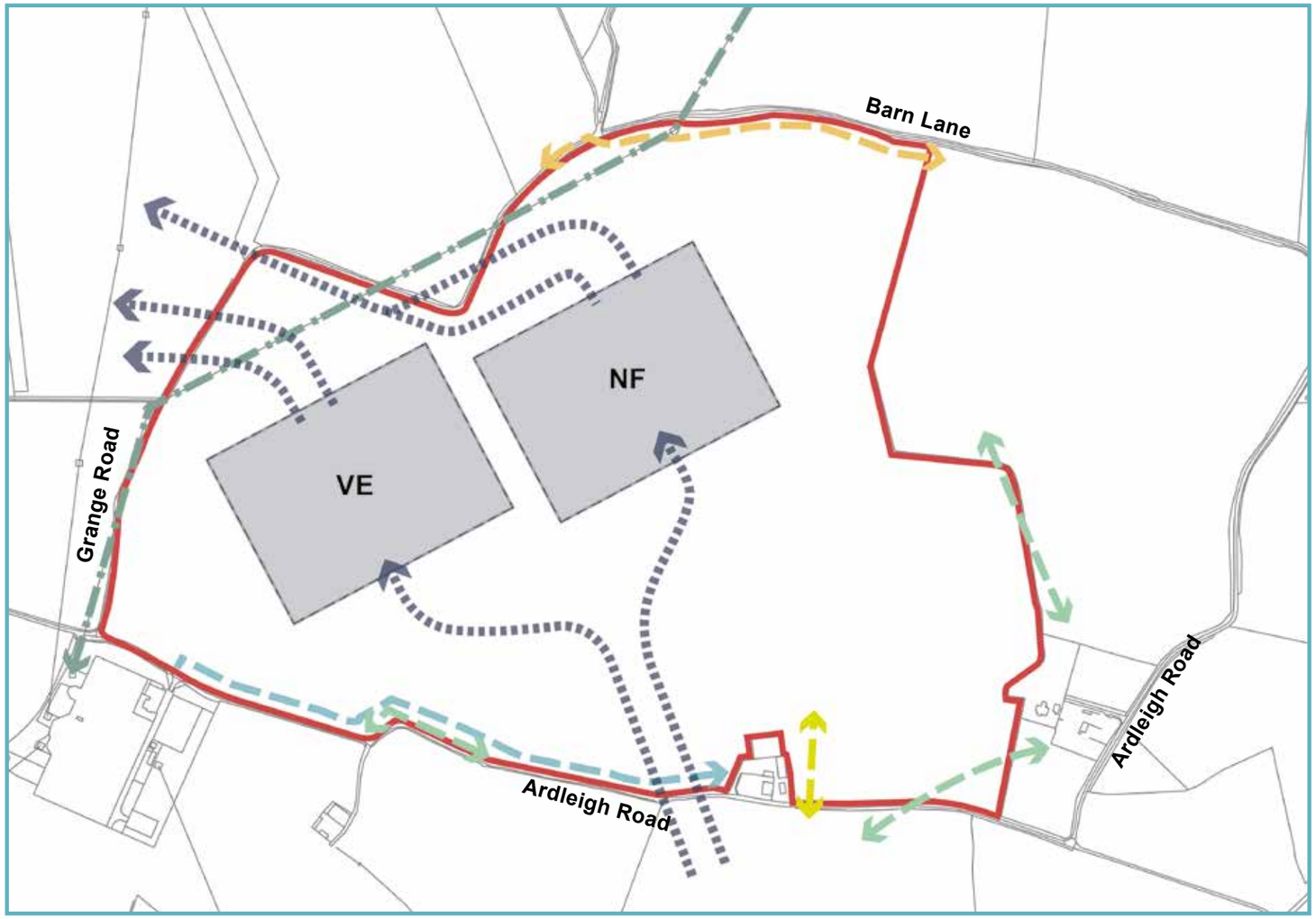


Plate 21 - Wayleaves and Easements

2.7 Wayleaves and Easements

2.7.1 Existing and future easements will impact the extent of the site available for construction of the OnSSs and may restrict certain activities within the site. Known wayleaves and easement are identified in Plate 21.

132kv Overhead Transmission Line

2.7.2 A 132kv overhead transmission line skirts the north west corner of the site. A tower is located within the site, close to the junction with Grange Road and Barn Lane.

2.7.3 No operational equipment will be installed beneath the overhead line.

2.7.4 Fence lines running parallel with, and equipment adjacent to the overhead lines will observe the minimum clearances to exposed overhead conductors as set out in the relevant substation design standards (approximately 5 metres).

2.7.5 Tree planting restrictions must be followed within the easement. This limits the planting of tall, forest-scale species (Beech, Horse Chestnut, Lime and Oak).

Onshore Export Cable Corridor

2.7.6 Incoming cables from landfall will enter the site to the west of Normans Farm.

2.7.7 Tree planting restrictions must be followed near all EHV underground cables. These limit planting of small-medium trees to 6m either side of the centre of the easement. Willow and Poplar should not be planted within 10m.

Outgoing Cable Corridor

2.7.8 Outgoing cables will exit the OnSSs to the north west on their route to the National Grid proposed East Anglia Connection Node (EACN) Substation. Options for the routeing of these cables are currently being explored. Plate 21 identifies the options. These are not subject to external influence.

2.7.9 Tree planting restrictions outlined above must be followed.

NGET infrastructure requirements

2.7.10 It is anticipated that the layout will need to accommodate minor infrastructure requirements associated with the proposed National Grid Electricity Transmission (NGET) Connection Node.

2.7.11 Further liaison will be undertaken with NGET to establish any requirements.

LV overhead distribution line

2.7.12 Existing low voltage overhead distribution line cross the south eastern edge of the site, connecting to Jenning's Farm and Mulberry Lodge. This will limit the extent of planting that can be introduced along the northern boundary to Ardleigh Road and the rear of the two properties.

Private water supply

2.7.13 An existing private water supply runs within the northern verge of Ardleigh Road.

2.7.14 The exact location of the supply shall be determined and the extent of planting and fencing adjusted to allow suitable access to maintain the supply.

2.7.15 Further discussion will be required with landowners

Farming access

2.7.16 As identified within the Security and Access section, adjacent landowners have requested the creation of two permanent access points to allow farm machinery to enter the agricultural land.

Optionality

- The location, width and means of access are subject to further review with landowners and key stakeholders as part of the design guide review process.

2.8 Substation Compounds

Technical requirements

2.8.1 At DCO submission, the indicative compound size shown for both schemes was based on the footprint of an Air Insulated Substation (AIS). This represented the Maximum Design Scenario or Realistic Worst Case Scenario.

2.8.2 Further discussions with NFOWF and VEOWF suggest that the AIS footprints could be subject to further rationalisation, dependent on electrical equipment selection and layout efficiencies. The choice of equipment is not subject to influence.

2.8.3 An AIS does not place electrical equipment in buildings, but instead relies on the surrounding air to provide the insulation between pieces of equipment. This means that there will be fewer buildings at a lower height, although electrical equipment and lightning masts will be exposed. An AIS will have a larger footprint for the onshore substation works area, due to the increased distances required for insulation. The maximum design scenario footprint is 280 x 210m.

Orientation

2.8.4 An orthogonal, side by side, arrangement is the preferred solution. This provides maximum opportunity to co-ordinate infrastructure, and an optimum temporary construction compound (TCC).

Optionality

- Should a reduction in the dimensions of the AIS footprint be possible, this may provide some additional flexibility in the location of the compound within the identified zone. Plates 22-25 illustrate some of the potential options. These will be subject to review with stakeholders as part of the design guide process.

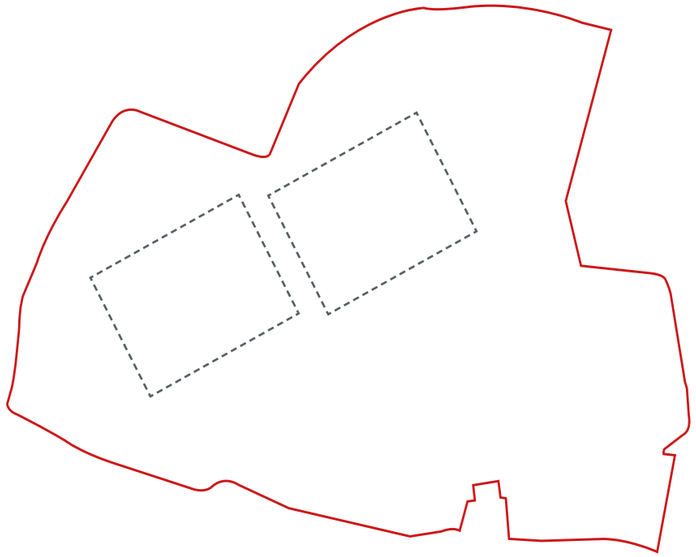


Plate 22 - Current compound arrangement

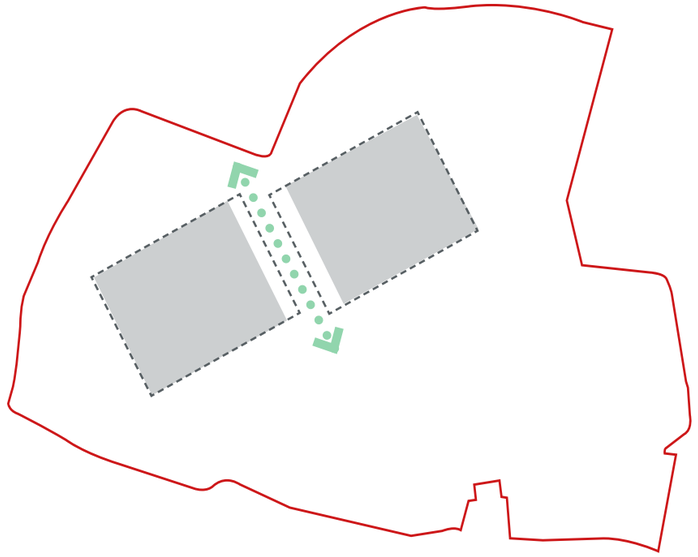


Plate 23 - Shortened length, allowing widened central planting

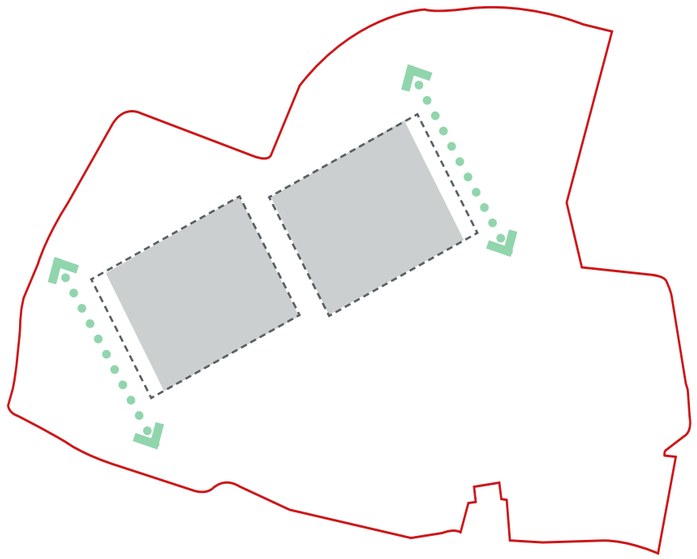


Plate 24 - Shortened length, allowing widened edge planting to south west and north east

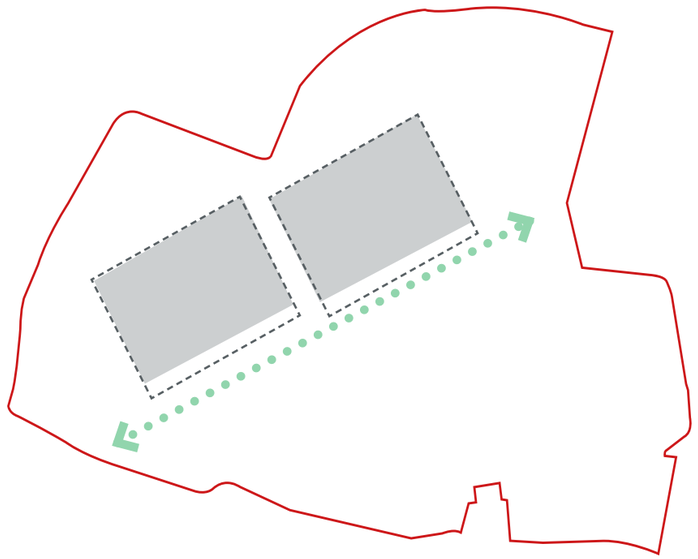


Plate 25 - Shortened width, allowing widened edge planting to south east

2.9 Lighting

2.9.1 Plate 26 identifies the lighting requirements at the site. These constitute two zones:

- OnSS compounds
- Shared access road

2.9.2 Where possible, the following principles should be adhered to:

- Use the minimum possible number of light fittings required to adhere to relevant standards.
- Light should be directed to where it is needed and not spill into neighbouring spaces.
- All light above the horizontal should be avoided.
- Lamps should be 3000K or less and ideally 2700K. These are sometimes described as ‘warm white’.

OnSS compounds

2.9.3 Permanent light fittings will be installed around and within the substation. Under normal operating conditions the substation will not be illuminated at night. Lighting will be used only when required for maintenance outages or emergency repairs at night.

2.9.4 Light fittings will typically be mounted on columns or buildings.

Shared access road

2.9.5 Lighting will also be required along the shared access track from Ardleigh Road to the substation. This would only be used when visits to the site are required within hours of darkness.

2.9.6 Low level lighting, such as bollards, should be used to achieve to minimise light spill.

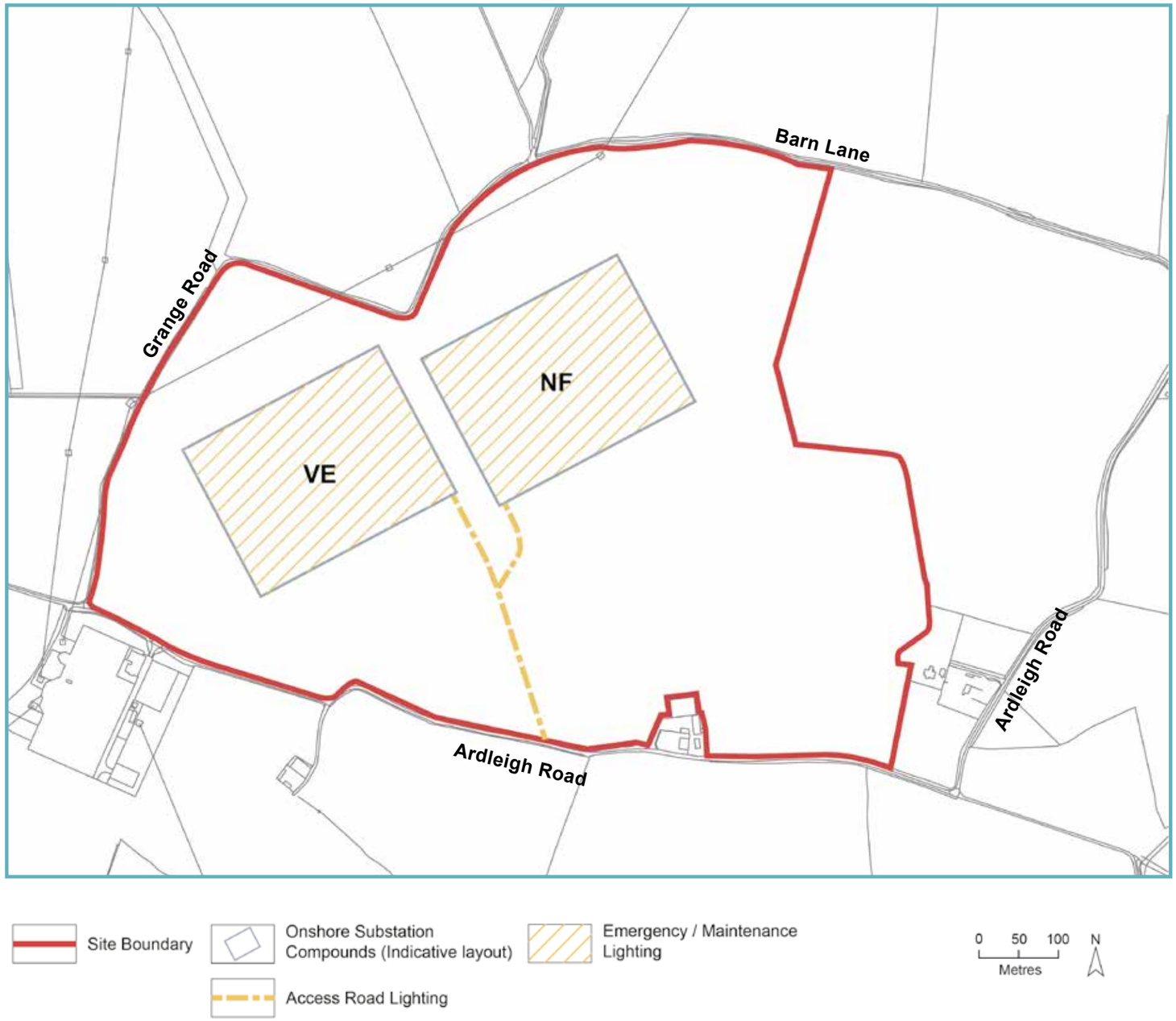


Plate 26 - Lighting

2.10 Water and Drainage

Drainage Strategy

2.10.1 A joint Outline Operational Drainage Strategy was developed prior to DCO application, ensuring the designs can co-locate and do not cause any adverse effects on each other and/or the local environment. A detailed Operational Drainage Strategy in accordance with this strategy will be produced following DCO award.

2.10.2 The appropriate use of sustainable drainage systems (SuDS) will better manage the risk from surface water flooding as well as improving water quality, amenity, and biodiversity objectives.

2.10.3 The following above-ground elements will be accommodated within the site layout. These are shown on Plate 27:

- Existing ditch
- Relocated ditch
- Filter drains
- Swales
- Permanent attenuation ponds
- Temporary attenuation ponds

Existing ditches

2.10.4 A network of existing ditches run within the site. These convey field runoff to a watercourse south of Ardleigh Road and will be retained. The detailed location of planting and boundaries will ensure that adequate access to the ditches is provided for inspection and maintenance.

Relocated ditch

2.10.5 The construction of the OnSS compounds will required the relocation of an existing ditch.

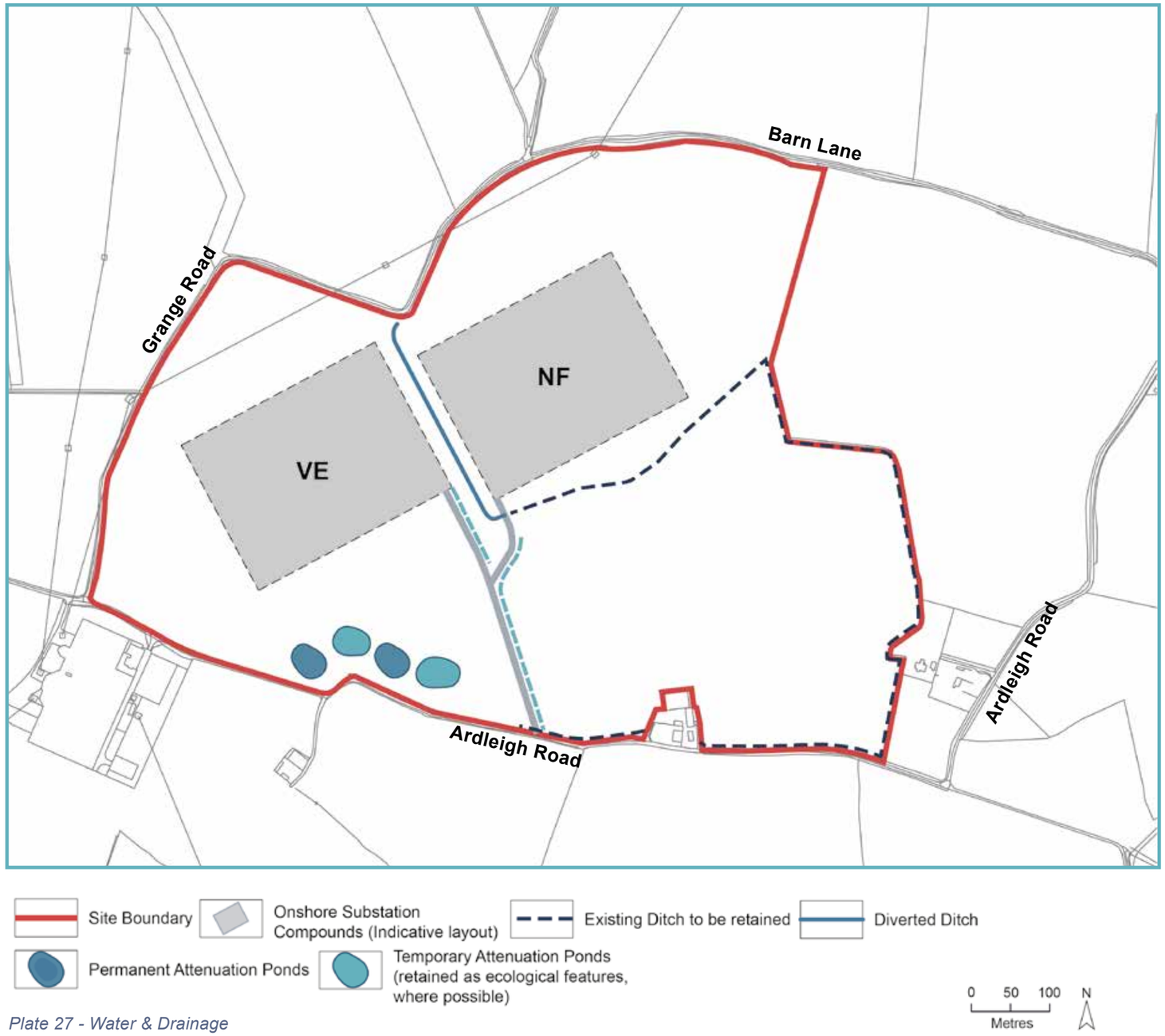


Plate 27 - Water & Drainage

Filter drains

2.10.6 Runoff from the internal access roads within the substation site will be captured by filter drains and conveyed to swales at the boundary.

Swales

2.10.7 Runoff from the access road will be channelled into swales, which will convey flow to the attenuation storage.

Attenuation Ponds

2.10.8 Both projects will require attenuation ponds. The number and size of the ponds is dependent on the results from infiltration testing. The Outline Operational Drainage Strategy indicated two permanent ponds and two temporary ponds.

2.10.9 The permanent ponds will be retained throughout the OnSSs operational lifespan; one serving VEOWF compound and one serving the NFOWF compound.

2.10.10 Once construction has been completed and the land returned to its former state, the attenuation volumes within the temporary ponds are likely to reduce. Where possible, these ponds will be retained in order to deliver long term ecological enhancements at the site.

Design

2.10.11 The ponds at the OnSS will be designed so as to be of high ecological value, with varying depths, scalloped margins and areas with a wide draw down zone. They will be potentially suitable for use by a wide range of species including invertebrates, amphibians, reptiles, mammals and birds.

2.10.12 Design guidance relating to drainage and water is described within section 2.28.

Plate 28 - Drainage swale. Source: LUC

Plate 29 - SuDS pond. Source: Edward Mcmaihin. https://creativecommons.org/licenses/by-sa/2.0/

Plate 30 - Ditch. Source: Roger Jones. https://creativecommons.org/licenses/by-sa/2.0/

2.11 Design & Materials Guidance

2.11.1 NFOWF and VEOWF both prepared 'design approach documents', to evidence 'Good Design' at DCO stage.

2.11.2 VEOWF prepared an 'Onshore Substation Design Principles Document', which set out the high-level principles that had informed development of the site layout to date.

2.11.3 NFOWF submitted a 'Design Vision'. This included a section on 'Onshore Substation Design Principles'. These identified the main components to the OnSS design and range of design solutions available, using a multi-criteria analysis to inform future decision making.

2.11.4 This section of the JDG represents the combined approach to the design and specification of key elements of the OnSS, which will be used as the basis for tendering and to inform the detailed design stage. It reflects the following areas of design progression:

- The VEOWF decision to utilise an Air Insulated Substation (AIS) as the base case scenario, thus reducing the scale and number of buildings within the OnSS compound;
- Further liaison with key stakeholders and landowners as part of the DCO application process, resulting in a number of design changes to both schemes; and
- Continued liaison between NFOWF and VEOWF as part of their close working agreement, leading to further design evolution and co-ordination across the site.

2.12 Guidance Content

2.12.1 Similar to the NFOWF Design Vision, the scope of the Design & Materials section encompasses the range of built components that will remain visible within OnSS compounds and wider site, on completion of construction. It does not include aspects of the soft landscape or ecology, which are covered in Part 4.

2.12.2 The function of each component is described, identifying any technical or performance requirements that must be met.

2.12.3 The range of design options considered suitable for each component is then outlined, with typical specifications identified for ease of comparison. For some components there may be no optionality, and if so this is clearly stated.

2.12.4 As the JDG undergoes the review and feedback process, further options may be included and others discounted.

2.13 Building Typologies

2.13.1 Both OnSSs are expected to be AIS substations. The building height is around 7m for an AIS substation.

2.13.2 An AIS will typically comprise three main types of buildings:

- STATCOM buildings, typically 55 x 15 x 7m high (refer to Plate 31);
- Control buildings, typically 50 x 20 x 5m high (refer to Plate 32; and
- Storage and Amenity buildings, typically 20 x 9 x 4m.

Plate 31 - Image of typical STATCOM building. Source: https://www.entsoe.eu/technopedia/techsheets/static-synchronous-compensator-

2.14 General building properties

2.14.1 Fundamentally, the buildings on the OnSS site do not function as traditional 'buildings', as their primary purpose is to house the sensitive electrical equipment, with little human interaction. Building functionality must also ensure the safety and security of the electrical processes.

2.14.2 OnSS buildings typically have blank elevations with no or limited fenestration and simple entry points in keeping with the limited access requirements. There may be a requirement for ventilation, lighting and surveillance equipment within their elevations or immediate periphery.

2.14.3 Roofs typically have a simple dual or mono pitch, allowing water to shed easily and limit any ingress, that could damage the electrical equipment within. Sloped roofs are also used to minimise maintenance given the ONSS is an unmanned facility. Roof heights are kept as low as possible to minimise visual intrusion, whilst meeting ventilation and insulation requirements for the electrical equipment.

2.14.4 Simple cladding systems, such as corrugated metal sheeting, are typically specified for the facade due to their robustness and ease of maintenance.

Plate 32 - Typical AIS control building (source - RWE)

2.14.5 Design Considerations

Local Precedents

2.14.6 A review of local architectural precedents has been undertaken to assess their relevance as design cues, as suggested within the Essex Design Guide.

2.14.7 It should be noted that the successful reinterpretation of local vernacular within contemporary design relies upon a subtle interplay of building forms, their spatial relationship to each other and the other built elements within their curtilage, such a boundary treatments and planting.

2.14.8 In this instance, the scale of the buildings and their immediate proximity to significant electrical infrastructure will dispel any perception of the OnSSs as traditional settlements or farmsteads.

2.14.9 Notwithstanding this, the surrounding buildings can provide a useful reference in terms of form, scale, materiality and colour.

Local Precedent - Glasshouses

2.14.10 Within the surrounding area, the main precedent for large industrial structures with a simple form and elevation are the horticultural glasshouses between Ardleigh and Lawford (Plate 33). These are typically a maximum of 6m high, comparable to the STATCOM buildings.

2.14.11 The materiality of the glasshouses is clearly not appropriate for the STATCOM buildings, however the facade treatments could consider the interplay of light and the weather on the reflective glasshouse elevations. This visual effect could be reinterpreted in a contemporary cladding system to create a harmonious transition to the horizon. Part 3: Environmental Colour Assessment considers this in more detail.

Local Precedent - Barns

2.14.12 Lower structures with simple forms and facade treatments include agricultural barns. The height of these buildings ranges; recently constructed barns at Holly Lodge Farm have a roof height of around 9m.

2.14.13 Within the local area, the positioning of agricultural barns is typically in close proximity to the farmhouse, but usually separated by an open yard. Barns may appear as individual structures or within small groups of two or three (Plates 34, 36-38).

2.14.14 Local barns are considered to be an appropriate precedent for the buildings within the site, such as the Control Building and Storage and Amenity Building due to their simple form, scattered positioning and small clusters. The materiality and colour of the barns can also be considered an appropriate visual reference.

2.14.15 Traditional Essex barns are constructed from horizontal weatherboarding, painted black (which may appear a dark brown).

2.14.16 More recent barns are a mix of brick (lower level) with vertical timber or corrugated steel (upper level),large, painted steel doors and corrugated steel roofs.

2.14.17 EQRP Design Review #1, included a discussion on the relevance of local precedents. The panel expressed a strong preference for the use of agricultural barns as design precedents, these being the most prevalent structures within the immediate setting and of a comparable scale to the OnSSs buildings.

Plate 33 - Industrial glasshouses, Hungerdown Lane. Source: LUC

Plate 34 - Derelict traditional barn in nearby fields. Source: LUC.

Plate 35 - Normans Farm (water tower at Horsley Cross in the background). Source: LUC

Plate 36 - Farm buildings at Little Bromley Hall. Source: LUC

Plate 37 - Recently constructed, 9m high grain store at Holly Lodge Farm (Tabor Farms), Bromley Road. Source: LUC.

Plate 38 - Recently constructed office buildings and agricultural barns at Grange Farm. Source: LUC.

Sustainability

2.14.18 A further design consideration is the contribution OnSS buildings can make to the overall sustainability of the developments. Approaches to minimising the carbon footprint of the building could include:

- Building layout organised to maximise solar shading; noting there is limited flexibility in the OnSS layout due to requirement for electrical integrity.
- Design of roof pitch to suit installation of photovoltaic (PV) panels (B, Plate 39); noting that steepening the roof pitch will increase the overall height of the building.
- Design of roof pitch to suit installation of green roof or rainwater harvesting (C, Plate 39); noting that this will minimise the overall height of the building and the roof finish will not be visible.
- Specification of materials to minimise the use of embodied carbon and/or maximise the potential for reuse or recycling of materials.

2.14.19 The practicalities of green roofs or solar panels have not been explored to date and further assessment is required to understand their feasibility.

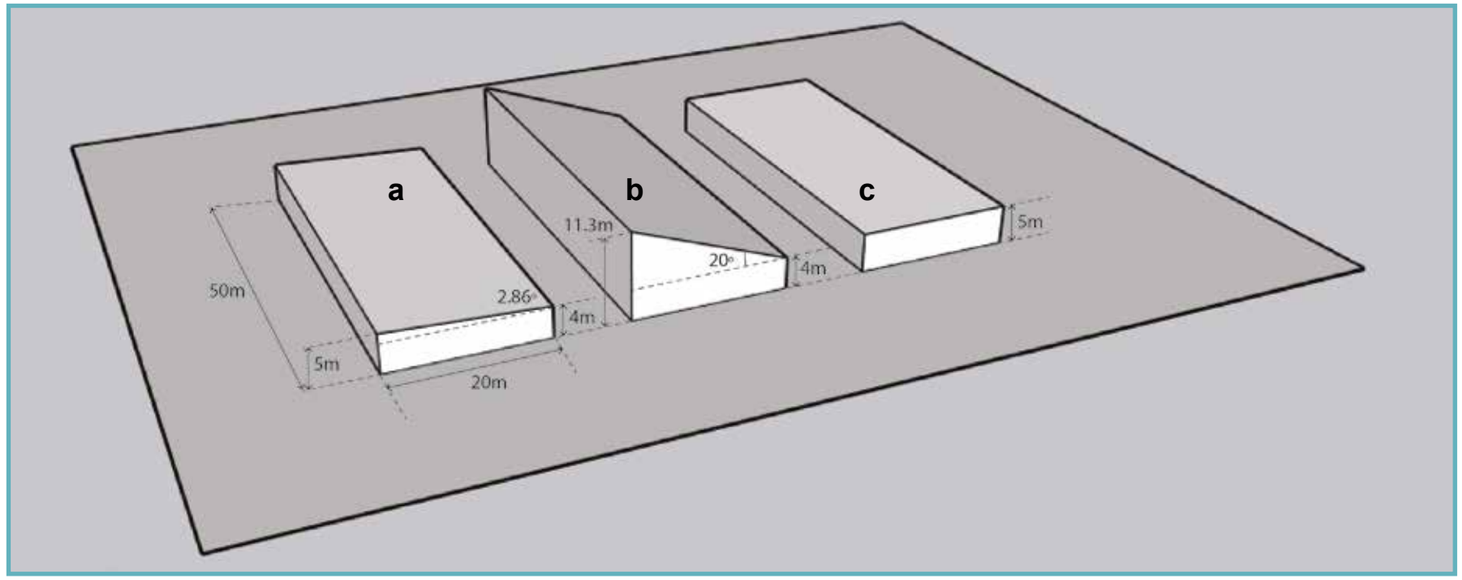


Plate 39 - Exploration of roof forms, using the Control Building as an example. A= typical monopitch roof angle, B= 20 degree angle, suitable for PV installation, C= flat roof, suitable for green roof installation.

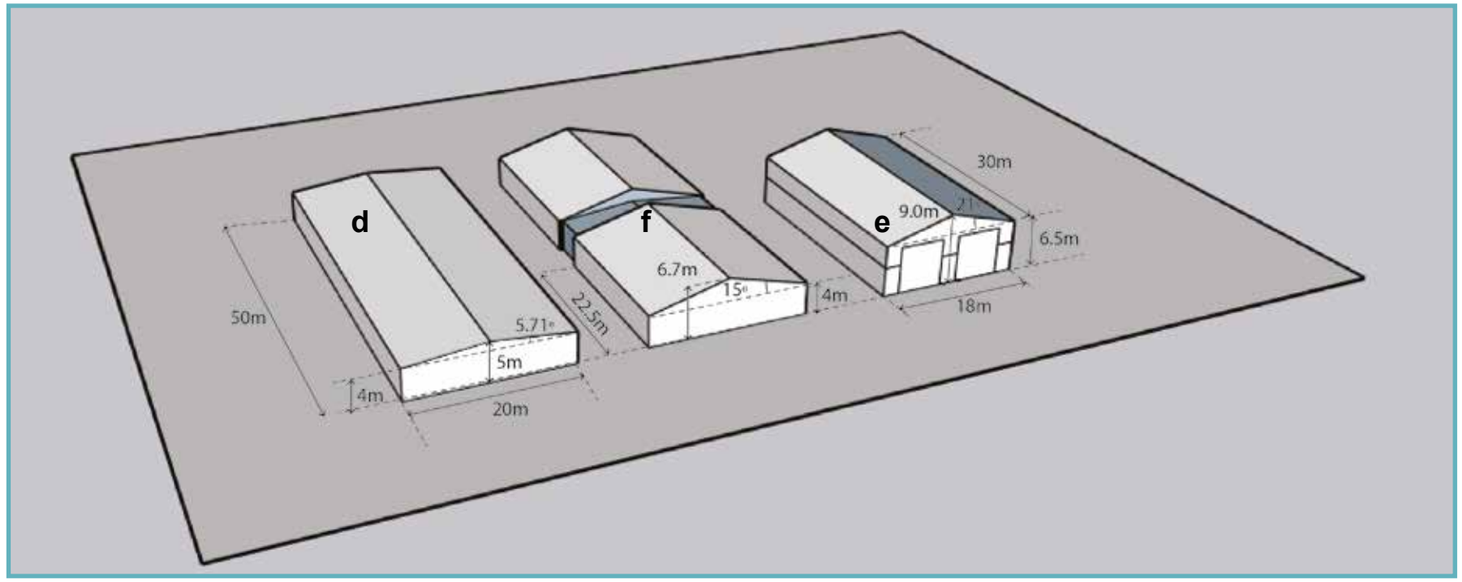


Plate 40 - Exploration of contemporary barn forms, using the Control Building as an example. D= typical dual pitch roof angle, E= contemporary barn at Holly Lodge Farm (dimensions taking from planning drawings), F= option reflecting the form, scale and roof pitch of contemporary barns.

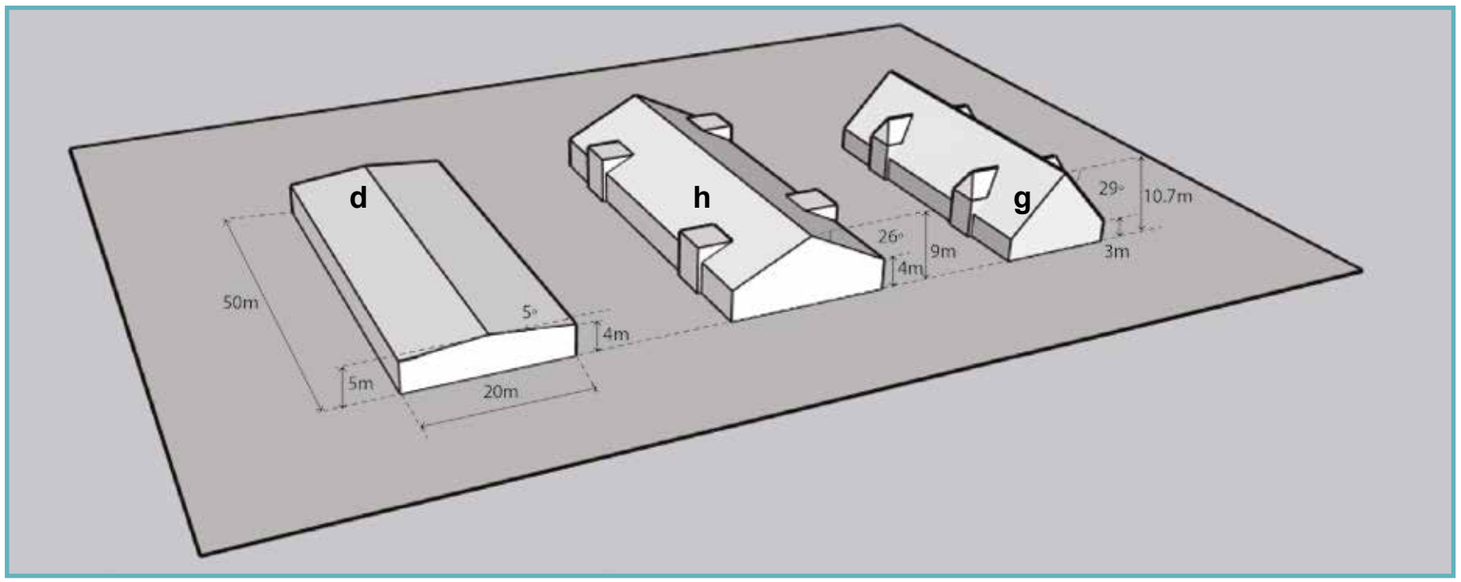


Plate 41 - Exploration of traditional barn forms, using the Control Building as an example. D= typical dual pitch roof angle, G= traditional barn (dimensions and form based on Grange Barn, Coggleshall), H= option reflecting the form, scale and roof pitch of traditional barns.

Exploration of local precedents in building form

2.14.20 Plates 40 and 41 illustrates potential variations in roof form. These are based on the typical dimensions for the Control Building, which is the largest building envisaged within the site.

- A shows a typical shallow (5 degrees) mono-pitch utilised for substation buildings.
- D shows a typical shallow (5 degrees) dual-pitch utilised for substation buildings.
- B shows a steeper pitch, which would be suitable for installation of photovoltaic panels (15-30 degrees optimum). As shown, increasing the pitch to 20 degrees would increase the building roof height by more than 6 metres. Operational and maintenance access would also be required.
- C shows a flat roof, which could be suitable for installation of a green roof. There may also be a requirement for a parapet or guardrail due to the ongoing maintenance commitments.

2.14.21 Plate 41 illustrates potential variations in building form, with reference to modern agricultural structures found within the surrounding landscape.

- E shows a typical barn, based on planning information submitted recently at Holly Lodge Farm. This is 18m wide x 30m long x 9m high.
- F shows how the form of the building could be adapted to reference this precedent. This includes increasing the roof pitch and height to c.7m, creating a visual separation (i.e. slight inset of building line or change in colour) to break up long elevations.
- A change in material, colour or the direction of cladding could also be used to reinforce the strong horizontal lines of the barn.
- This approach would maintain a simple aesthetic that could be enhanced through a complimentary colour scheme.
- A 15 degree roof pitch could be suitable for PV panels, although these would be visible.

2.14.22 Plate 42 illustrates potential variations in building form, with reference to traditional agricultural structures found within the surrounding landscape.

- G shows a typical barn, based on the dimensions of the 13th Century Grange Barn in Coggleshall, Essex. This is one of Europe's largest remaining timber-framed buildings and is owned by the National Trust.
- H shows how the form of the building could be adapted to reference this precedent. This includes increasing the roof pitch and introducing structures representative of gabled porches to break up long elevations.
- This approach would introduce more complexity to the built form and increase the overall height of the Control Building to c.9m.
- A 15 degree roof pitch could be suitable for PV panels, although these would be visible.

2.15 Design Optionality - STATCOM buildings

Performance Requirements

2.15.1 The key requirement for these buildings is to provide a stable environment for the electrical components within. They are not intended to be accessed by site personnel, apart from maintenance or emergency circumstances.

Position within compound

2.15.2 The position of components within the substation compounds will be determined in detailed design and will be focused on the most efficient layout and functionality of the various equipment.

Typical Specification

2.15.3 These functional buildings typically have a simple form with a dual pitch roof set at a constant height. There is no fenestration and limited access points. The typical cladding material is metal panelling. The colour of the cladding will typically vary dependent on setting.

2.15.4 Plate 31 shows an example of a STATCOM building.

Optionality

2.15.5 Due to the complex internal electrical processes, there is limited optionality in comparison to other building types.

Form

- Optionality to adjust aspects of building form, whilst maintaining a simple structural form overall.

Roof

- Optionality for dual or mono pitch roof. No optionality for PV panels or green roof. Wherever possible, the roof pitch should be minimised to constrain the building height.

Elevations

- Optionality to vary facade treatment, whilst maintaining a simple elevational treatment with minimal fenestration / access.

Materials

- Steel frame and cladding is the preferred facade material due to fire safety considerations.

Colour

- The Environmental Colour Assessment (Part 3) identifies a suitable range of colours for the cladding.

Sustainability

- No optionality for PV panels or green roof. Embodied carbon and materials life cycle to be considered during procurement process

2.16 Design Optionality - Control building

Performance Requirements

2.16.1 The key requirement for this building is to house the control equipment. It will be accessed on an occasional basis by operational and maintenance staff and will contain welfare facilities for them.

Position within compound

2.16.2 The control building is typically located close to the compound entrance and parking areas.

2.16.3 Typical Specification

2.16.4 Control buildings typically have a simple form, with minimal (if any) fenestration and a dual or mono pitch roof. The use of flat roofs (including green roofs) will be considered during design but will be dependent on operational and maintenance factors.

2.16.5 The typical cladding material is metal panelling. The colour of the cladding will typically vary dependent on setting.

2.16.6 Plate 32 shows an example of a control building.

Optionality

2.16.7 There is a greater degree of optionality for the control buildings.

Form

- Optionality to adjust aspects of building form, whilst maintaining a simple structural form overall.

Roof

- Optionality for roof dual or mono pitch.
- Wherever possible, the roof pitch should be minimised to constrain the building height.

Elevations

- Optionality to vary facade treatment, whilst maintaining a simple elevational treatment with minimal fenestration / access.

Materials

- Use of alternative cladding systems, for example horizontal cladding that could replicate traditional weatherboarding and render systems will be considered.
- The use of an alternative material (e.g. brick) for lower levels will also be considered.

Colour

- The Environmental Colour Assessment (Part 3) identifies a suitable range of colours for the cladding.

Sustainability

- Optionality for PV panels or green roof.
- Embodied carbon and materials life cycle to be considered during procurement process

2.17 Storage and amenity building

Performance Requirements

2.17.1 The key requirement for this building is to provide storage. It will be accessed on an occasional basis by operational and maintenance staff.

Position within compound

2.17.2 The storage and amenity building can be located anywhere on the site, but is typically located close to the control building, compound entrance and parking areas.

Typical Specification

2.17.3 The building is typically designed to reflect the materiality of other buildings on site.

Optionality

2.17.4 There is a greater degree of optionality for the storage and amenity building.

Form

- Optionality to adjust aspects of building form, whilst maintaining a simple structural form overall.

Roof

- Optionality for roof dual or mono pitch.
- Wherever possible, the roof pitch should be minimised to constrain the building height.

Elevations

- Optionality to vary facade treatment, whilst maintaining a simple elevational treatment with minimal fenestration / access.

Materials

- Use of alternative cladding systems, for example horizontal cladding that could replicate traditional weatherboarding and render systems will be considered.
- The use of an alternative material (e.g. brick) for lower levels will also be considered.

Colour

- The Environmental Colour Assessment (Part 3) identifies a suitable range of colours for the cladding.

Sustainability

- Optionality for PV panels or green roof.
- Embodied carbon and materials life cycle to be considered during procurement process

2.18 Compound structures

2.18.1 The AIS compounds will contain a range of electrical equipment, along with other structures required to support the operational requirements. These include:

- Circuit breakers and busbars
- Transformers
- Reactors
- Auxiliary transformers
- Harmonic Filters
- Transformer noise enclosures
- Reactor noise enclosures
- Lightning masts
- Septic tank
- Water deluge tank

Circuit breakers and busbars

2.18.2 The electrical busbars are used to connect the various pieces of electrical equipment within the substation together. Circuit breakers are placed at strategic points within the busbar system in order to allow sections of the wind farm electrical network to be switched out with minimum disruption to the wind farm operation. Electrical equipment will be a maximum of 13m in height.

Plate 42 - Transformer with noise enclosure (source - RWE)

Transformers

2.18.3 The transformers step up the offshore wind farm export cable voltage to the 400kV voltage of the National Electricity Transmission System. The indicative size of each of the units is 6m by 16m by 12.5 high (to the top of the bushings). Transformers are typically painted grey.

Reactors

2.18.4 Reactive compensation equipment is used to condition the wind farm power prior to export to the transmission system, to ensure it complies with the requirements set out by the transmission system operator. Typically, one set of reactive compensation equipment is required for each wind farm export circuit.

2.18.5 Reactive compensation equipment will typically consist of a STATCOM unit and separate reactors. The indicative size of the reactive compensation control unit is 4m by 7.5m by 7.1m high. The level of reactive power required from the reactors (and therefore their size) cannot be determined at this early stage.

Auxiliary Transformers

2.18.6 In addition to the main transformers the substation will also have a set of smaller auxiliary transformers to provide a low voltage supply to the substation control buildings and auxiliary systems.

Harmonic Filters

2.18.7 Harmonic filters ensure that the power exported to the grid complies with the quality of supply requirements set out by the transmission system operator. Typically, one set of harmonic filtering is required for each export circuit and a 400kV harmonic filter may be required for the circuit connecting to the transmission system. It has been assumed that each harmonic filter compound will be of dimensions approximately 22.5m by 20m with an expected height of the filters to be from 10 m to 12.5m.

Noise Enclosures

2.18.8 Noise enclosures will be required to provide suitable acoustic treatment to the transformer and reactors. The choice in type of enclosure will depend primarily on the level of acoustic reduction required. Enclosures may include bespoke structures or use of an acoustic screen. A typical noise enclosure is shown in Plate 42.

Lightning Masts

2.18.9 Slender lightning masts up to 18m high will be required to provide protection to electrical equipment.

Septic Tank

2.18.10 An underground septic tank will treat waste arising from the on site welfare facilities, in the absence of a connection to the public sewer. The size of the tank will be confirmed during detailed design.

Water Deluge Tank

2.18.11 A water deluge tank has been included within the compound for the purpose of storing water for use in the event of a substation fire. This would have indicative dimensions of 6.5m wide by 6.0m high.

Optionality

2.18.12 Due to the functional nature of these components there is no optionality to consider altering their position within the overall layout.

2.18.13 Layout of these substation components will be considered where technically and logistically possible at detailed design stage, to alleviate the impact and result in a design with lower overall impact.

Colour

- Optionality for alternative colour finishes to compound structures will be explored, where possible.

2.19 Boundary Typologies

2.19.1 The boundary requirements at the OnSSs site include:

- Secure boundary to the OnSS compounds
- Perimeter boundary to the wider site

2.20 Secure boundary to the OnSS compounds

Performance Requirements

2.20.1 The boundary specification must comply with NG TS 2.10.02 Technical Specifications - Perimeter Security Fencing for Substations. Three categories of fencing are described;

- 3 – Reduced. 'Standard' but without electric fence;
- 2 – Standard. A physical mesh or palisade barrier to 2.4 m height with electric pulse fence;
- 1 – Enhanced. 'Standard' with enhanced features.

Typical Specification

2.20.2 The fencing category will be determined by security requirements at the site. This is subject to review.

2.20.3 There is no standard colour. Fencing will sometimes be left with a galvanised (grey) finish.

Design Considerations

2.20.4 Palisade provides a more solid appearance to the fence panel, therefore is better at screening development behind. Views through the site will be filtered by the pales. The metal pales, can be targeted for vandalism, leaving them vulnerable to entry. Palisade is rated 'C' in the Green Guide to Specification.

2.20.5 Weld mesh has a more open appearance, therefore offers better visibility for surveillance and maintenance of views. Tightly woven mesh is typically much harder to climb. Weld mesh is rated 'A' in the Green Guide to Specification.

2.20.6 Mitigation planting will largely screen the secure boundary from visual receptors during summer months. Use of a considered colour palette will also help the fence to 'recede' within the landscape backdrop.

Optionality

Materials

- Optionality for either steel palisade fencing or steel weld mesh fencing (see examples in Plate 43 and Plate 44).

Plate 43 - Palisade fencing / Source: Oakdale

Plate 44 - Weld mesh fencing / Source: Zaun

Colour

- Optionality for fencing colour. There are three suggested approaches for this:
  - Adopt the agreed architectural palette, as outlined within the Environmental Colour Assessment. This would allow the fence to integrate against a built backdrop.
  - Adopt a landscape palette, utilising 'subtle' and 'recessive' tones, as identified within Part 3 Environmental Colour Assessment. This will assist with integration within a backdrop of summer or winter vegetation.

4550-Y40R | 6030-Y30R | 8010-Y30R

  - Adopt a neutral palette, utilising 'recessive tones', as identified within the Environmental Colour Assessment. These will allow the fence to integrate within both built and landscape settings.

6030-Y30R | 6530-G50Y | S7502-B

2.21 Perimeter boundary to the wider site

Performance Requirements

2.21.1 There is no technical specification governing the perimeter to the wider site.

2.21.2 A security review is being undertaken to assess the risks associated with the co-located OnSSs and NGET EACN. This may determine the eventual specification.

Design Considerations

2.21.3 The primary design consideration is to minimise visual effects for receptors and align with the local vernacular, where possible. A maximum height of 1.2m is proposed.

2.21.4 The boundary should be sufficiently permeable to allow the passage of wildlife.

2.21.5 Protection of planting during establishment is a further design consideration, such as grazing by deer. A secondary temporary fence may be required.

Optionality

Materials

- Optionality for fence type, based on those found within the immediate context;
  - Timber post and three rail fence; this is the most common fence type found locally;
  - Timber post and wire fence; this will prevent access from dogs to sensitive habitat areas within the site; or
  - Fence set to centre line of proposed hedge planting, where it will be eventually screened.

Plate 45 - Timber post and rail fence. Source: Jacksons

Plate 46 - Timber post and wire fence. Source: Suregreen.

Plate 47 - Fence set to centre of hedge. Source: LUC.

Plate 48 - A: Section through Ardleigh Road, facing west, close to the site entrance.

Plate 49 - B: Section through Ardleigh Road, facing west, close to the attenuation ponds.

Plate 50 - C: Section through Ardleigh Road, facing west, close to the attenuation ponds.

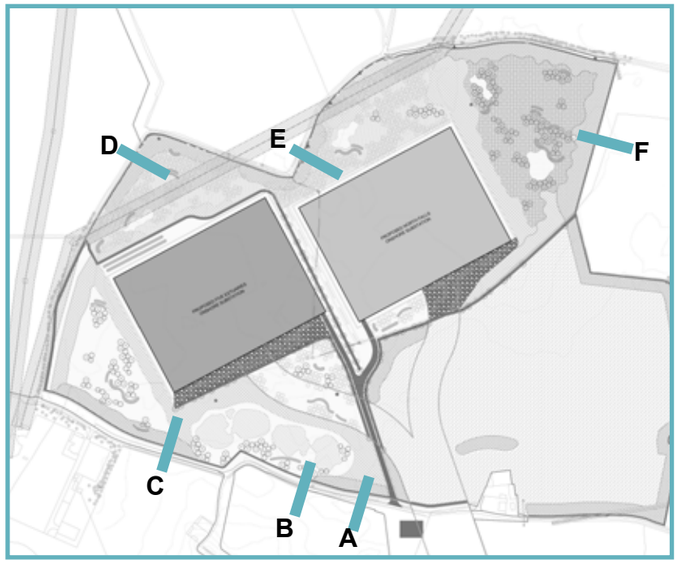


Plate 51 - Key plan showing cross section locations

Plate 53 - D: Section through Grange Road, facing north.

Plate 54 - E: Section through Grange Road, facing north.

Plate 55 - F: Section through boundary with agricultural land, facing north.

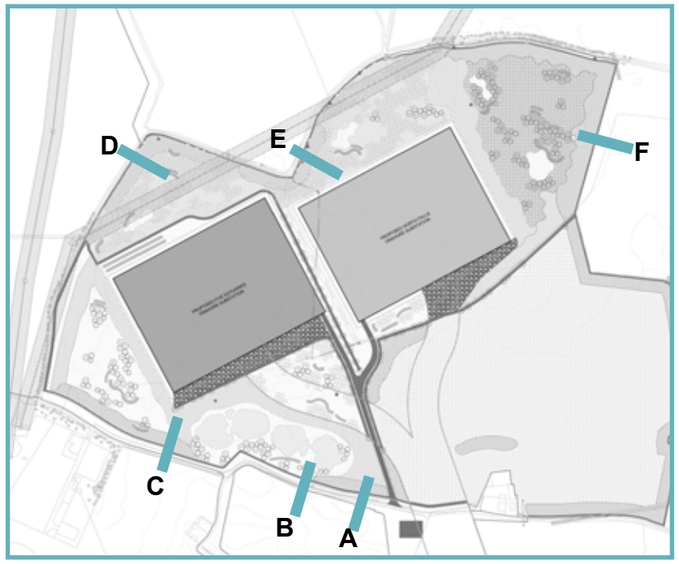


Plate 52 - Key plan showing cross section locations

2.22 Hard Surfaces

2.22.1 There will be a range of hard surfaces within the OnSS compound. This will include:

- Vehicle Access Road
- Car Parking
- Pedestrian Access
- Equipment Hardstanding
- Cable Trench Cover
- General Compound

2.22.2 Plate 56 identifies an indicative arrangement of these hard surfaces within an AIS substation compound.

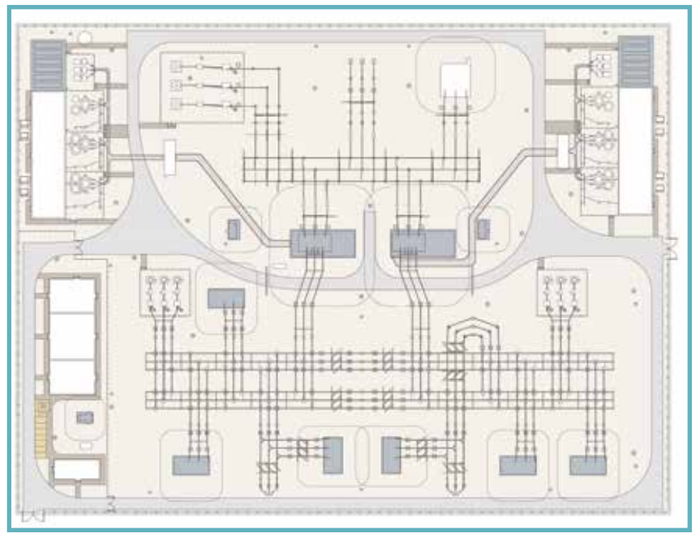


Plate 56 - Indicative location of hard surfaces within OnSS compound

General Guidance

2.22.3 Surfacing specifications shall meet all technical and operational requirements required for an OnSS.

2.22.4 The extent of impermeable surfacing should be minimised, where possible, in line with the NPPG Hierarchy of Drainage.

2.22.5 Consideration shall be made to the application of the waste hierarchy principles:

- Reduce: limit the extent of materials used overall
- Reuse: consider how materials can be reused
- Recycle: consider the use of recycled materials

2.22.6 Materials selection shall consider sustainable benchmarking, as set out in guidance such as 'The Green Guide to Specification'.

2.22.7 Materials selection shall consider the potential Urban Heat Island effect, whereby dark coloured surfaces warm up more quickly than light-coloured ones.

Plate 57 - Stone chippings

Plate 58 - Permeable parking

Plate 59 - Concrete pads to base of electrical equipment

Plate 60 - Pedestrian access routes to buildings

Vehicle Access Road

2.22.8 A circulatory vehicle access route is required within the compound to provide adequate vehicle access for installation of equipment, operational and maintenance requirements and fire fighting purposes.

2.22.9 A shared access road will provide vehicle access to the OnSS compounds from the entrance on Ardleigh Road.

2.22.10 The design and specification of the vehicle routes shall meet the National Highways guidance on Abnormal Indivisible Loads (AIL). These apply where a vehicle as any of the following:

- a weight of more than 44,000kg
- an axle load of more than 10,000kg for a single non-driving axle and 11,500kg for a single driving axle
- a width of more than 2.9 metres
- a rigid length of more than 18.65 metre

2.22.11 The Outline Drainage Strategy assumes an impermeable construction for all vehicular access roads. Options for permeable construction will be explored at detailed design stage, where compliant with the overarching loading requirements.

Car Parking

2.22.12 Car parking spaces will be provided in close proximity to the OnSS compound entrance and control building.

2.22.13 Accessible parking spaces will be provided at an agreed ratio. The design and layout will be in accordance with Approved Document M: Access to and use of Buildings, and BS8300: Design of an accessible and inclusive built environment.

2.22.14 Permeable surfacing will be used for all parking areas, where loading requirements allow.

Pedestrian Access

2.22.15 The layout of pedestrian access routes within the OnSS compound will employ a functional approach to access. Pedestrian routes will include:

- Access to buildings from car and cycle parking areas
- Access between buildings
- Perimeter access for building maintenance
- Access to electrical equipment, where requiring regular inspection

2.22.16 All pedestrian access routes will be designed in accordance with Approved Document M: Access to and use of Buildings, and BS8300: Design of an accessible and inclusive built environment. This will ensure that all pedestrian routes meet minimum width requirements and provide a firm and robust surface, free from trips and other hazards.

2.22.17 Circuitous routes will be avoided, where possible, to minimise travel distances for disabled users.

Equipment Hardstanding

2.22.18 Hardstanding to the electrical equipment must provide a robust and stable surface, capable of meeting heavy loading requirements. Typically concrete will be used in these circumstances.

Cable Trench Cover

2.22.19 Cable trench covers will be required to provide suitable access for inspection, maintenance and repair.

General Compound

- General compound areas between the structures on site will be specified as permeable surfaces.
- Stone chippings are typically used due to their high electrical resistance. Where possible, chippings will be recycled from other applications (such as railway ballast) and/or sourced locally.

2.23 Ancillary Structures

2.23.1 The extent of ancillary structures within the OnSS compound will be limited to those necessary for the functional operation of the site. These include:

- Cycle parking
- CCTV
- Lighting
- Signage

2.24 Cycle Parking

2.24.1 OnSSs are unmanned facilities and the requirement for cycle access is very unlikely due to the equipment required for operations and maintenance works.

2.24.2 Limited cycle parking will be located within the secure OnSS compound, therefore no additional security measures are required.

2.24.3 Where space allows, cycle parking may be located internally within buildings. Where located externally, it should be positioned in close proximity to buildings and car parking areas for ease of access.

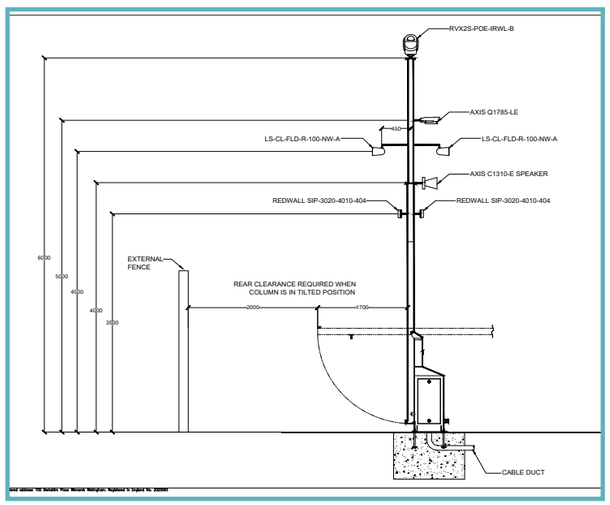


Plate 61 - Typical CCTV installation at an OnSS compound (source: National Grid)

2.24.4 If located externally, a small-scale shelter will meet the limited quantum requirements. This can be readily accommodated within the OnSS compound, where it would largely be screened by buildings, electrical equipment and the secure boundary.

2.25 CCTV

2.25.1 CCTV coverage will be required to the OnSS compound and shared access road to a recognised security standard. There is no optionality for this element.

2.25.2 Typical details of a 'redwall' system are shown in Plate 61. This specifies the positioning of CCTV columns away from the secure compound boundary, allowing suitable clearance for column tilting.

2.25.3 Clearance distances shall be established prior to the design of soft landscape and planting areas. Proposed planting shall be designed in such a way to avoid the overhanging of tree canopies within this zone.

2.26 Lighting

2.26.1 As outlined in section 2.9, lighting will be required to the secure OnSS compound, the shared access road and the entrance at Ardleigh Road.

2.26.2 Lighting to the secure compound will be governed by technical criteria, specifying the level of illumination required in the event of maintenance outages or emergency repairs. The lights will be directed downward, and shielded to reduce glare.

Plate 62 - Secure external cycle parking with green roof

Plate 63 - 'Dark Sky' approved bollard lighting

2.26.3 Lighting to the shared access road will provide the minimum amount of illumination required for night time access. The use of bollards, will restrict light spill to a low level. Where possible, 'Dark Sky' fittings should be used to minimise the impact of lighting on local fauna.

2.27 Signage

2.27.1 Signage will be required to the main entrance gate adjacent Ardleigh Road. This will typically be low-key but provide essential information, such as the risks associated with entering areas with high voltage electrical equipment.

2.27.2 Signage in accordance with the Electricity Supply Regulations will be located in conspicuous positions along the secure OnSS compound boundary.

2.28 Drainage

2.28.1 As outlined in section 2.10, the following features will be included within the site layout:

- Swales
- Attenuation Ponds

2.28.2 Whilst these elements play a functional role as part of the Operational Drainage Strategy, wherever possible they will be designed to contribute to the wider site aims, such as enhancing biodiversity and provision of green blue infrastructure. The indicative sections in Plates 64-66 show how they can be designed to maximise these opportunities. Further details are provided within Part 4: Landscape and Ecology.

Plate 64 - Typical cross section through drainage swale

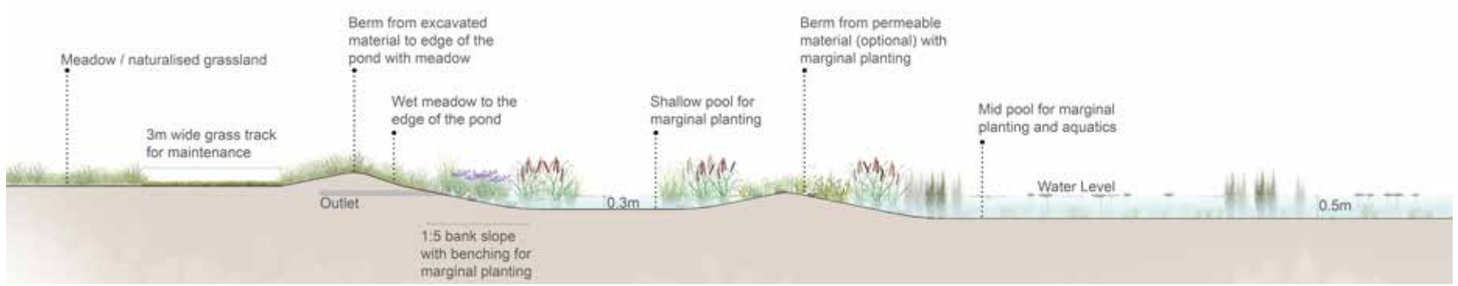


Plate 65 - Typical cross section through attenuation pond, designed for wildlife #1

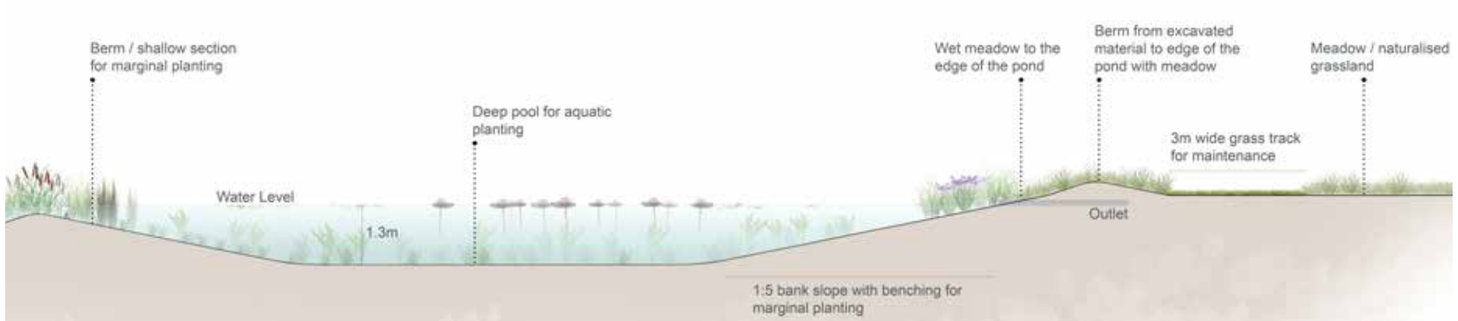


Plate 66 - Typical cross section through attenuation pond, designed for wildlife #2

3: Environmental Colour Assessment

3 Environmental Colour Assessment

3.1 Requirements of the DCO

3.1.1 This chapter focuses on providing design guidance in respect of the colour of the onshore substations, addressing the requirement under Schedule 2 (Part 1) 5(1)(e) of both the Five Estuaries Offshore Wind Farm draft DCO and the North Falls draft DCO requires that construction of the onshore substation must not commence until details of (emphasis added) 'the dimensions, external colour and materials used for the buildings' have been submitted to and approved by the discharging authority. It does not provide design details or a final confirmed colour for the substations, which will be subject to the detailed design process and be approved by the discharging authority post-consent. The design guide facilitates the continued review of the external colour with recommendations informed by the ongoing consultations with Essex County Council, the Essex Quality Review Panel (EQRP) and Interested Parties (IPs).

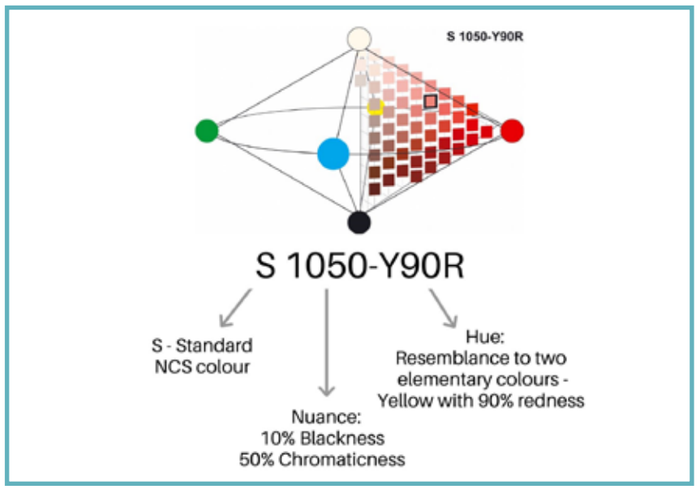


Plate 67 - NCS Colour Triangle

3.2 Environmental Colour Assessment Definition

3.2.1 An Environmental Colour Assessment (ECA) involves carrying out a detailed survey of baseline colours in order to inform the development of colour palettes to be applied on structures and associated hard and soft components in that environment. Guidance on ECA is presented in the Landscape Institute's Technical Information Note 04/2018 Environmental Colour Assessment (hereafter the 'LI ECA Note'), which sets out the objectives, principles and process that should be followed in the production of an ECA. The method set out in the LI ECA Note provides an objective approach to colour selection and highlights the notable landscape and visual improvements that an ECA can deliver.

3.3 Environmental Colour Assessment Aim

3.3.1 An ECA has been undertaken in accordance with the LI ECA Note, including desk study and site specific photography in the locality to record perceived colours using the Natural Colour System (NCS). The ECA records the baseline of the locality around the Five Estuaries and North Falls onshore substations and develops colour palettes for the detailed design of the structures and associated components of these developments. This approach ensures that colour palettes are developed in response to the unique colour context of the sites and surrounding area. This ECA is intended to provide a basis for consultation with Essex County Council (ECC), the Essex Quality Review Panel (EQRP) and other interested parties, presenting options for colour concepts and palettes for further discussion and feedback

3.4 Environmental Colour Assessment Process

3.4.1 The LI ECA Note sets out the following steps for undertaking an ECA, which are followed in this ECA.

- Background - setting out the overarching aims, objectives, scope and intention of the ECA in alignment with the broader aims of the project;
- Desktop Study - developing an understanding of 'the landscape's natural, cultural and visual baseline' drawing on previous site work and assessment and developing an understanding of guidance and theory on colour;
- Site Survey – undertaking site visits to identify and record the baseline colours and dominant tonalities within the local landscapes and settlements of study area;
- Colour Palettes – establishing the various colour ranges and main tonalities using the NCS and organising into palettes representative of the local context.
- Developed Palettes – developing concepts regarding colour selection and patterns with consideration of the design objectives, the relationship between colours, pattern and the local landscape context.

3.5 Natural Colour System

3.5.1 The Natural Colour System (NCS) is a global colour system used by designers and manufacturers to standardise the definition of colour. It is a system that has been developed by the Swedish Colour Foundation since 1964 and is different from other colour systems, such as CMYK and RGB, as it is based on human perception and the visual appearance of colours, rather than the physical mixing of colours. The Landscape Institute ECA Note states, 'Most ECA practitioners work with the Natural Colour System throughout the ECA process, as it is globally recognised and applied across many different industries and sectors.'

3.5.2 The NCS Colour Circle sets out the four chromatic elementary colours of yellow, red, blue and green at the north, east, south and west points, respectively. The circumference between two of the chromatic elementary colours is occupied by the nine different hues which are made by mixing specific amounts of the two chromatic elementary colours. For example, between yellow and red there are nine hues that range from a predominance of yellow over red to red over yellow. The nomenclature for each hue denotes the percentage of each chromatic elementary colour used to create the hue (or example Y10R denotes 90% yellow and 10% red).

3.5.3 The NCS Colour Triangle then uses each of the four chromatic elementary colours and 36 hues as the apexes from which nuances of each colour or hue are developed, as shown in the diagram below. This is done by adding specific amounts of black and / or white. The nomenclature for each nuance denotes the percentage of black, colour or hue, and white, for example 1040 denotes 10% blackness, 40% colour or hue, and 50% whiteness (although only the percentage of blackness and colour or hue are specified).

3.5.4 The NCS Colour Space is formed by the amalgamation of all the NCS Colour Triangles set out around the colour wheel with the black apex extending in one 3D direction and the white apex extending in the opposite 3D direction, as shown in the diagram below. The colour space presents a total of 2,052 colours, although can be used to describe all 10 million colours detectable by humans. NCS is the system favoured by colour experts undertaking ECAs as it presents globally recognised system with a broad range of colours that relate well to the colours found in both the natural and built environment.

3.5.5 An important part of undertaking the site work involved matching colours, hues and nuances observed in the local context with the colours, hues and nuances on the NCS swatches. The NCS was also used to develop the colour palette through the testing of different colours, hues and nuances and the relationship between them, compared to other colour systems available, such as RAL. NCS has proved to be practical and beneficial in simplifying the communication, specification, and notation of the appearance of colours, hues and nuances relevant to this ECA.

3.6 Colour Principles

3.6.1 There are a broad range of theories on the perception and use of colour in the built and natural environment, from which the LI ECA Note has drawn out the key principles that have been researched by the relevant colour experts. These principles are set out below, with reference to their origins and an outline of their relevance to this specific ECA.

Natural Lighting

3.6.2 The LI ECA Note highlights the importance of light, 'since this has a profound effect on our perception of colour and how it 'behaves'. Colour and light should always be considered together, as they are essentially inseparable elements.'

3.6.3 In the northern hemisphere, north facing façades receive less natural light and as a result the inherent colours of the facade will be perceived darker. Conversely, south facing façades will be perceived as lighter because of the increased light level. It is recognised that colours on the north facing façade cause a greater chromatic increase in bluish, greenish, and pinkish colours. It can be stated that the north facing direction causes most reddish-blue objects to shift towards increased reddish content, yellowish objects decrease in chromaticness and shift towards green and red attributes, while greenish objects tend to shift more towards green. Conversely, south facing objects will increase in chromaticness because of the direct sunlight. Yellowish, greenish, and pinkish hues move towards yellow hues, blue shifts towards green and red towards blue (Lancaster, M (1996)). Visibility of the onshore substations will generally be limited to the local area and the most common view will be from Ardleigh Road to the south and south-east, looking towards the southern façade.

Inherent and perceived colour

3.6.4 The LI ECA Note states, ‘When seen from a distance, the perceived colour of built form or surfaces tends to look less dark and more chromatic or brighter than the inherent colours of the construction material. A colour sample which may look slightly dull in the studio as a swatch will look more colourful and lighter on a façade or surface. The existing colour palettes may need to be adjusted in the developed palettes to take account of this phenomenon, reducing chromaticness, and increasing the amount of black.’

3.6.5 It is important to make the distinction between inherent colour, which is ‘the constant chromatic quality of the facade’ and perceived colour, which is ‘the colour seen in a specific situation by a specific observer’ (Fridell Anter, K (1996)). In the case of perceived colour, this will, therefore, vary depending on factors such as changing lighting through the seasons and the day, as well as distance. As Fridell Anter states ‘the problem is that the perceived colour of a building will differ from the inherent colour - and we do not always know how’ (Fridell Anter, K (1996)).

3.6.6 There are, however, some general conclusions that can be drawn from the extensive observational research carried out by Fridell Anter. Firstly, perceived colours will typically comprise less blackness and more chromaticness and whiteness, giving a slightly brighter and lighter appearance than the inherent colour. This is referred to as a ‘nuance shift’. Secondly, a ‘hue shift’ typically occurs which means the perceived colour appears more bluish and/or less yellowish compared to the inherent colour. Explanations for nuance and hue shifts relate to the difference of seeing large blocks of colour in the natural light and against a landscape background, rather than small samples seen in artificial light and against a white page. It is recognised that natural landscapes tend towards yellowness and this can lead to colours being placed in the landscape tending towards an increased perception of blueness.

Target and Background

3.6.7 Structures are often seen as ‘visual targets’ especially when seen against the background of a largely undeveloped landscape context. Colourscape (Lancaster, M (1996)) states, if the building is ‘more reflective or more colourful than the background it is likely to catch the eye’. Of the four ‘visual objectives’ cited in Colourscape; namely suppression, integration, distraction and creative expression; integration is likely to be the most appropriate for this project, owing to the size of the buildings and their scale relative to the landscape context, as well as the visual sensitivity of the landscape context in which baseline development is typically sparse and small in scale. Colours that are bright and contrasting are likely to increase the prominence of the buildings and emphasise their large scale relative to the receiving landscape, making the buildings a ‘target’ that may diminish the importance of the ‘background’ landscape. In respect of the issue of scale, Michael Lancaster (1996) states ‘It is almost always a mistake to use highly saturated bright colours over large areas.

Colour and distance

3.6.8 There is a common understanding amongst colour theorists that with distance, colours lose their distinction and gradually merge (Lancaster, M (1996)). Distance also introduces a change in perceived colour with a gradual reduction in chromaticness and increase in blackness and whiteness leading to a dulled grey effect, although some colours, such as white and yellow maintain their chromaticness over longer distances.

3.6.9 It is observed that urban buildings are typically seen at close range and rural buildings are typically seen at middle or distant range, with this observation reflected by the fact that the onshore substations will typically be observed from a range between 0.6 and 1.2km. A Swedish example referred to in the LI ECA Note revealed how green close up became darker blue green at 2km and lilac grey at 20km. While there are many other variables to consider, such as the effects of light and surfaces, this research suggests that while the perceived colours will be seen lighter and brighter than the inherent colours at 50m, from a range of 2km there will be a hue shift towards blue and a nuance shift towards black. The colour selection for the onshore substations, which will mostly be observed from around the 1km range, should, therefore, look to counter the blueness by moving more towards yellow and counter the darkness by moving more towards whiteness.

3.7 Project Scope

AIS and GIS

3.7.1 Five Estuaries intend to progress with Air Insulated Switchgear (AIS) at the site and North Falls have selected AIS as the preferred technology for their onshore substations. However, this Part of the guide also includes visualisations for GIS buildings, as these were produced earlier in the process, and it is considered helpful to continue to include them at this stage, to illustrate how colour is used differently on structures of different scale.

3.7.2 The AIS onshore substation footprint will be up to 210m x 280m giving a maximum site area of 58,800 m² for each project. The electrical infrastructure will consist of buildings and structures, organised across the site in response to technical requirements, such as the direction of incoming and outgoing underground cables. The following indicative list of buildings and electrical infrastructure may be located on the site, which are illustrated indicatively in the axonometric image (however the electrical design is not complete and is subject to changes in layout and dimensions, within the maximum parameters set out):

- 2 x STATCOM (Control & Valve) buildings: 55 x 15 x 7 m
- 1 x Control building (possibly several adjacent containerised buildings): 50 x 20 x 5 m
- 1 x Storage/Amenity building: 20 x 9 x 4 m.
- It is likely that these buildings will be clad and roofed using steel panels with the potential to be coloured.
- Substation buildings will be set amongst the other following structures (indicative dimensions noted):
  - Transformer noise enclosures: 18 x 9 x 7 m high.
  - Reactor noise enclosures: 14 x 14 x 7 m high.
  - Transformers: 6 x 16 x 12.5 m high.
  - Reactors: 4 x 7.5 x 7.1 m high.
  - Harmonic Filters: 22.5 x 20 x 10 to 12.5 m high.
  - Circuit breakers and busbars.
  - Auxiliary transformers.
  - Lightning masts: 18 m.

3.7.3 While there is potential that the transformer noise enclosures and the reactor noise enclosures could be coloured, the other structure present no optionality and are either painted grey or do not take colour on top of the base material.

3.7.4 The OnSS compound will be secured with an inner security fence, making the fencing a readily visible and prominent feature of the site. The inner fence will be steel palisade or weld mesh, with the potential to be coloured.

Buildings, Structures, Layout and Colour

3.7.5 Layout, design and materials guidance is provided in Part 2. An indicative layout of a typical AIS substation is illustrated below, which shows how the electrical structures will define the character of the site, owing to their size and extent. The substation buildings (STATCOM, control building and storage building) are likely to appear comparatively small in in this context and given their dispersal across the site. The substation buildings will be seen behind the perimeter and inner fences and amid the external electrical components. An important consideration in the colour assessment will therefore be the relationship of these comparatively small buildings with the surrounding electrical structures and whether they should be coloured to blend in, coloured to relate to the wider context, or coloured to stand out.

3.7.6 In respect of the wider context, the visualisations that follow illustrate the palette of colours that define the surrounding rural landscape. There is the opportunity to make reference to this context through the colour selections for the buildings and form an association between the two. Consideration of context must also take into account how this will change with the introduction of extensive tree and hedgerow planting. The onshore substations will become increasingly screened by, and seen in the context of emerging and verdant planting, therefore colour selections should respond to this predominance of green leaves in the summer, through autumnal changes and leaf fall, to brown branches in the winter.

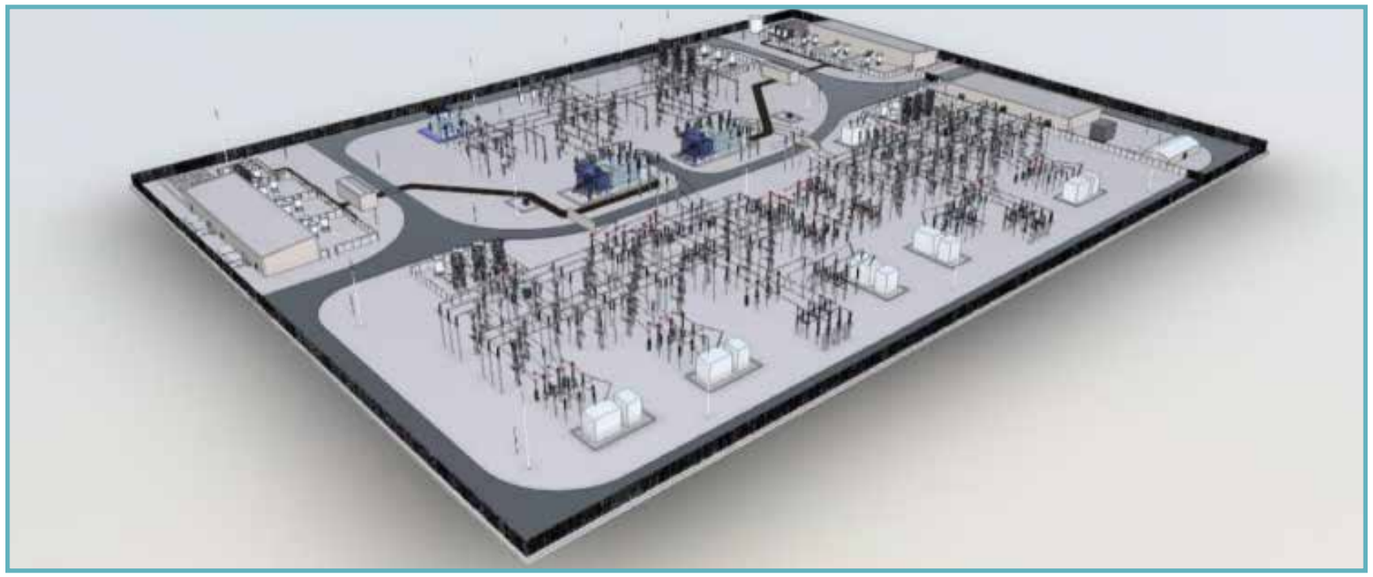


Plate 68 - Typical indicative layout of AIS substation

3.8 Landscape Context

3.8.1 The Landscape and Visual Impact Assessments (LVIA) prepared for the DCO submissions for both Five Estuaries and North Falls, illustrate the limited extents to which the onshore substations will be visible, with containment of views occurring only within the local area. The LVIAs have helped foster an understanding of how the onshore substations will appear within their landscape setting and mitigation planting has been designed to create a landscape framework which will provide effective screening of the onshore substations.

3.8.2 The following photomontages have been taken from the Five Estuaries LVIA and show what the indicative onshore substations will look like in select views from surrounding roads and paths. These show that the onshore substations will be seen in a flat and low-lying agricultural landscape where open views occur across open fields, but where also trees and hedgerows along field boundaries create a sense of depth and enclosure. The horizon line is typically defined by a trim of tree and hedgerow cover, marking the transition form the flat landform and the open sky. It is in this context that the onshore substations will be seen, grounded in a largely open landscape and set against an open sky.

3.8.3 The extent of mitigation planting proposed will extend the existing influence of woodland and hedgerows to create a more enclosed, green and permanent landscape. While the planting will ultimately screen the onshore substations, in the intervening years the onshore substations will be seen at the centre of this emerging planting in the landscape. The concepts for the selected colours and patterns, therefore, need to relate to the colours of this rural landscape through creating a backdrop for the new vegetation, reflecting the transition in colours through earth, vegetation and sky or making reference to cultural colours evident in the architecture of the local area.

Plate 69 - Landscape Context (Landscape and Visual Impact Assessment Views)

3.9 Methodology

Site Surveys

3.9.1 Site surveys were carried out over the winter and spring months of 2025. This involved visiting the site and the surrounding area and identifying suitable locations from which a range of colours representative of the rural landscape and settlements could be experienced. At these locations, the NCS colour charts were used to find the closest match with the predominant colours present in the locality, by holding the chart up so that the swatches could be seen adjacent to the baseline colours. A record of the NCS references and photography were taken on site, along with consideration of the date, time of day, weather conditions, lighting conditions, landscape character, textures and depth of relief. It was also important to identify and record the tonal range evident in the local landscape in order to establish an understanding of the baseline tonality.

3.9.2 The aim of the site surveys was to make an accurate record of the most prevalent and/ or representative colours and tonalities in the local landscape and settlements. This was to ensure the baseline colours of the local context informed subsequent decisions on colour selection. This approach aligned with the design intention that the onshore substations would need to integrate with the local landscape in order to reduce the prominence of the buildings in the onshore substations and to establish a clear and strong association with the local context.

Baseline Tonality

3.9.3 As the onshore substation buildings will typically be viewed from a minimum separation distance of approximately 0.6 to 1.2km the colours, hues and tonalities may change slightly with distance, although the relative tonality between the different colours, hues and tonalities will remain relatively constant. Being able to identify the range of tones present in the baseline landscape was, therefore, important to understand how to 'pitch' the tone of any new colours/ hues being introduced. While the general theory is that an increase in blackness will darken the tone and make the buildings more recessive in the landscape and an increase in whiteness will lighten the tone and make the buildings more prominent in the landscape, there are a number of other factors to also consider including the level of chromaticness, light, distance and the colours of the baseline landscape, as well as the scale of the buildings and the influence form the surrounding electrical infrastructure and fencing.

Shortlist Selection

3.9.4 From the baseline colours identified through the Site Survey, a shortlist was identified by applying considerations around creating a palette that would be representative of the characteristic colours of the local landscape, as well as fulfilling the requirements of the design concepts. Whilst the recording of baseline colours followed an essentially objective approach, the shortlist selection inevitably introduced a degree of subjectivity as judgements were required with regard to the selection of specific colours and omission of other colours. A description of the process of colour selection is provided in respect of the four concepts presented.

Colour Control

3.9.5 From the recording of the baseline colours on site, to their representation on the computer screen and representation on print outs, an inevitable degree of variation occurs. The online NCS helps to reduce this variation by providing a translation for each NCS notation into other colour systems used in computer software and printers. The default is to make reference to the NCS notations which were recorded in the field, and which are presented alongside each of the baseline colours on the following pages.

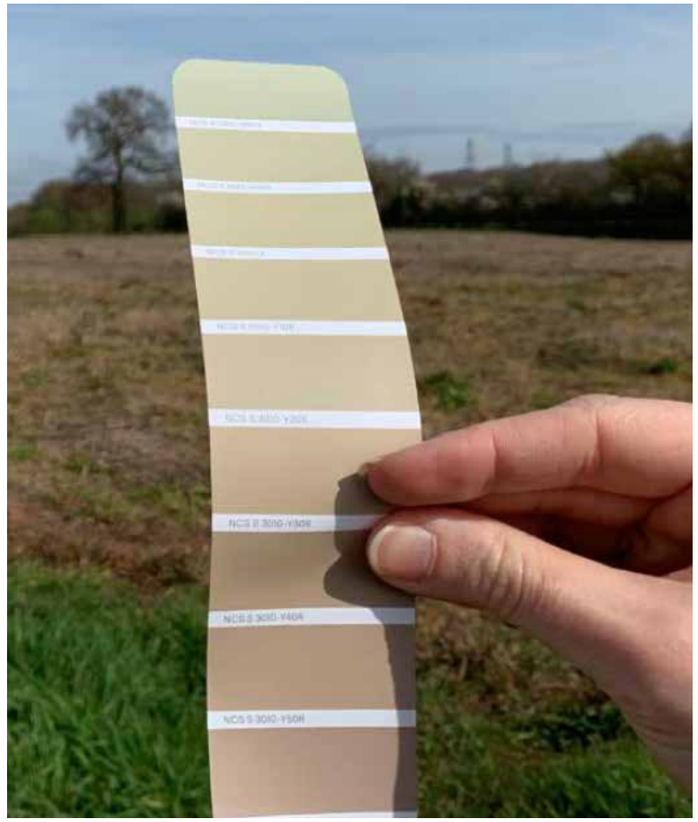


Plate 70 - Site surveys using NCS colour charts

3.10 Colour Range - Summer Landscape

Plate 71 - Colour range summer landscape

3.11 Colour Range - Winter Landscape

Plate 72 - Colour range winter landscape

3.12 Landscape Palette

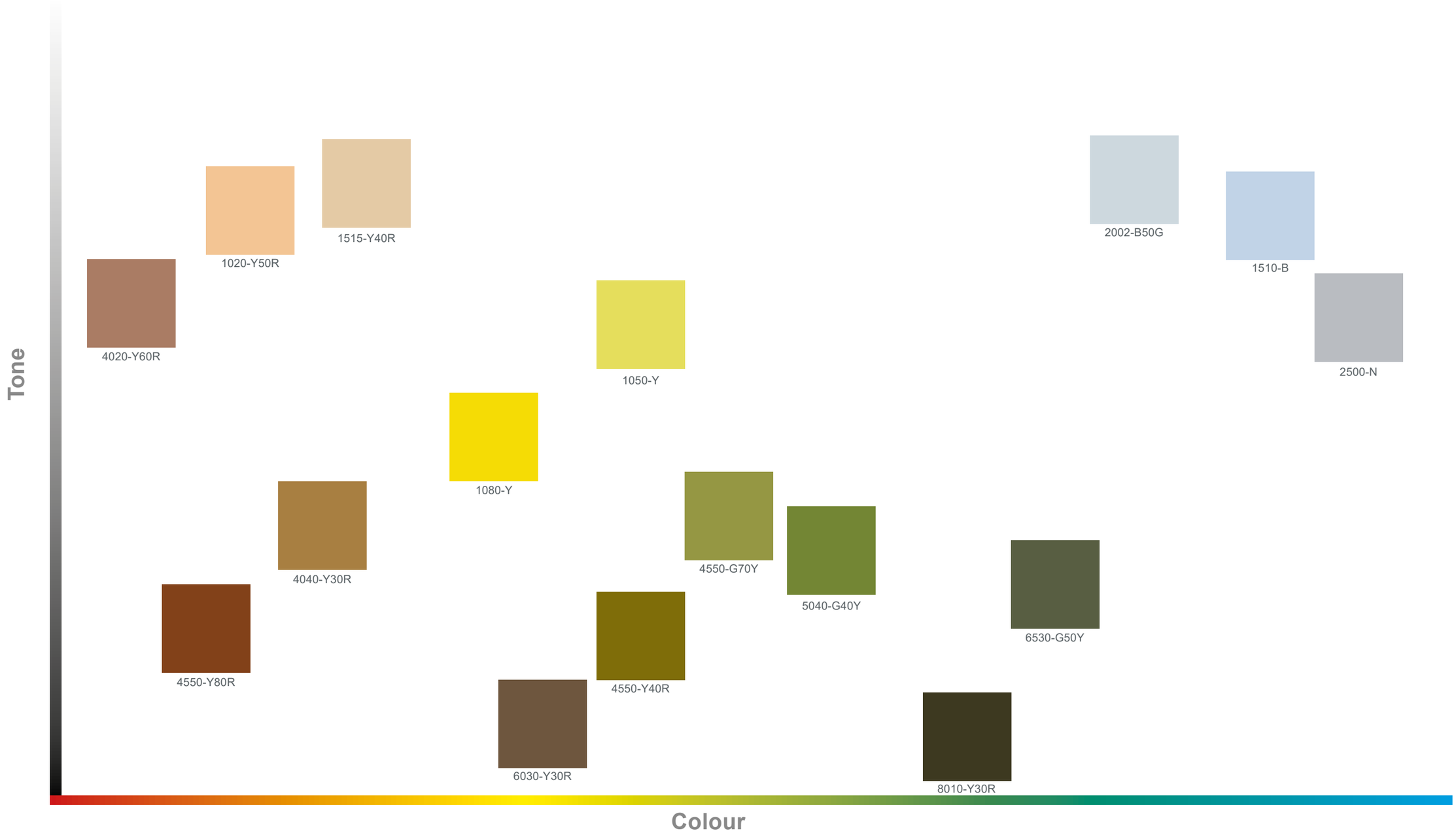


Plate 73 - Landscape colour palette

3.13 Colour Range - Local Architecture

Plate 74 - Local architecture colour palette. Photographs taken during colour study site visit show buildings in the local area around the Five Estuaries and North Falls substations. Colour is applied both vertically and horizontally.

3.14 Colour Range - Architecture Schematic

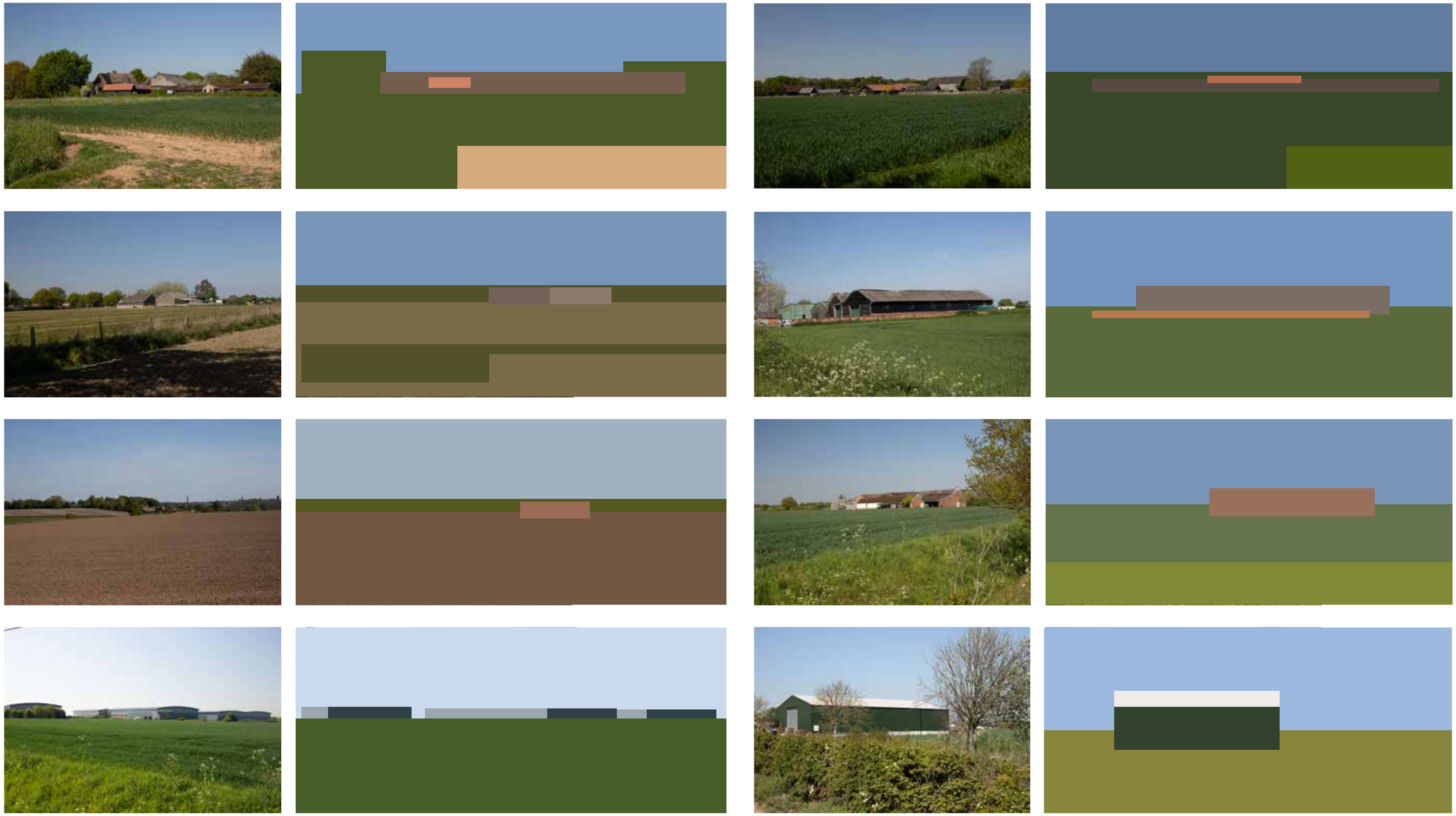


Plate 75 - Colour range architecture schematic. Photographs taken during colour study site visit show farm buildings in the local area around the Five Estuaries and North Falls substations

3.15 Architectural Palette

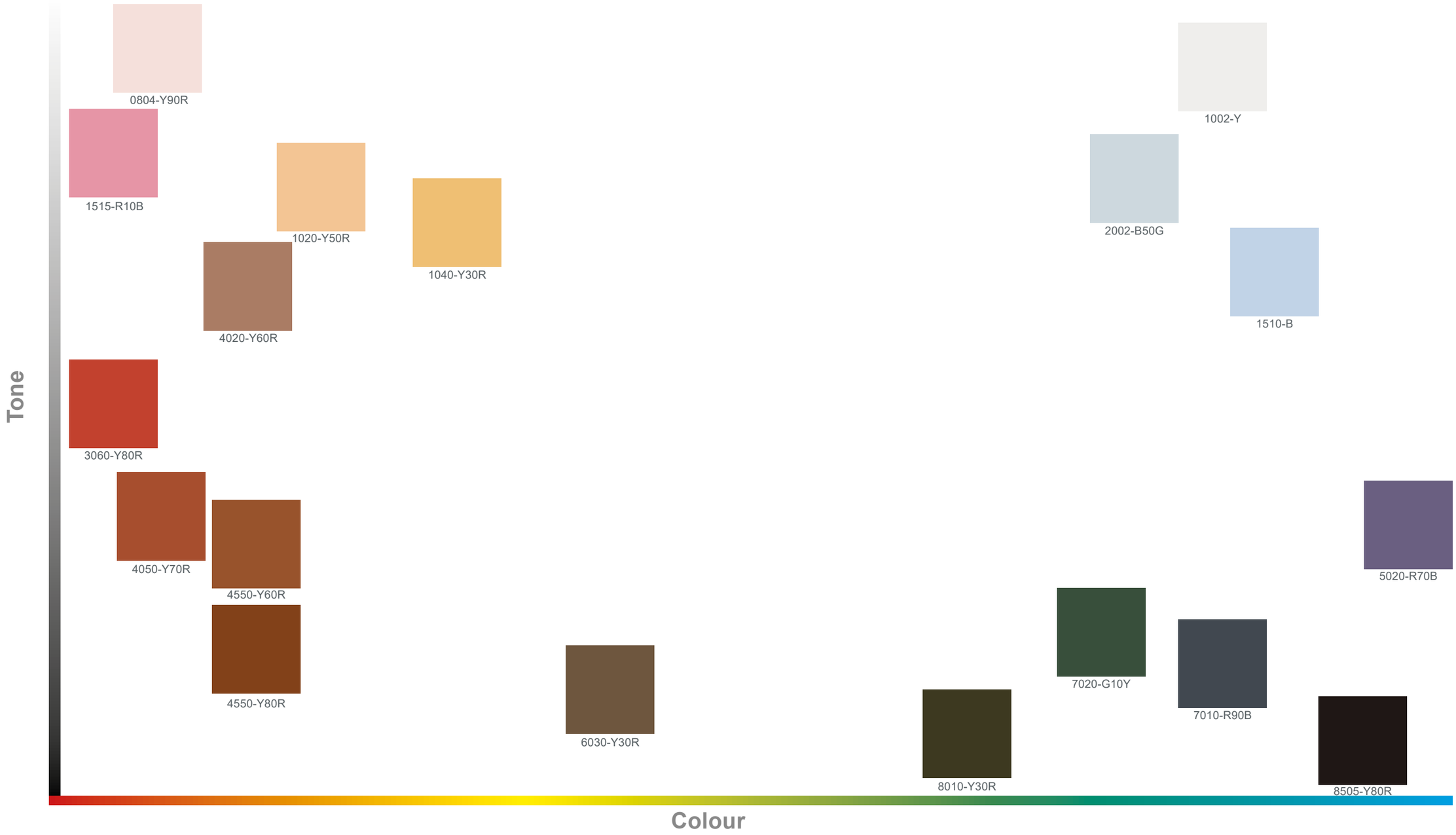


Plate 76 - Architectural palette

3.16 Core Colours

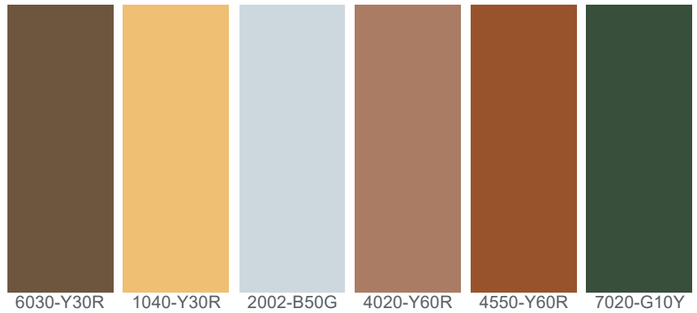
3.16.1 The following Architecture and Landscape Core Palettes are a summary of the most common and representative colours found within the local landscape context in the colour analysis. The core palettes are then used to derive a set of further refined colour palettes (right), which can be used to develop a range of concepts for the colour of the substation buildings.

Architecture Core Palette

Landscape Core Palette

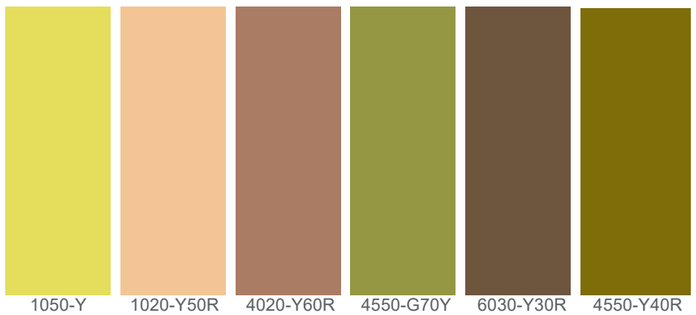
3.17 Palettes for Concept Development

Plate 77 - Palettes for concept development



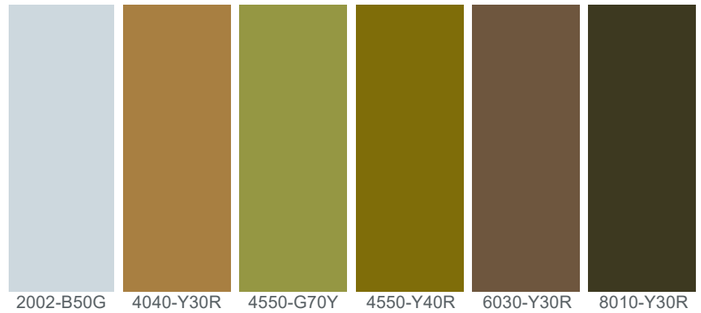
Architecture- Bold:

3.17.1 A statement colour palette taken from the Architecture Core Palette. These colours can be combined to create facades which allow the building to stand out and be seen within the landscape, while maintaining harmony due to these colours being present within the existing palette of the surrounding environment. Most tones within the architecture palette stand out against the surrounding landscape, but a warm grey/brown tone has been included to be used as a base.



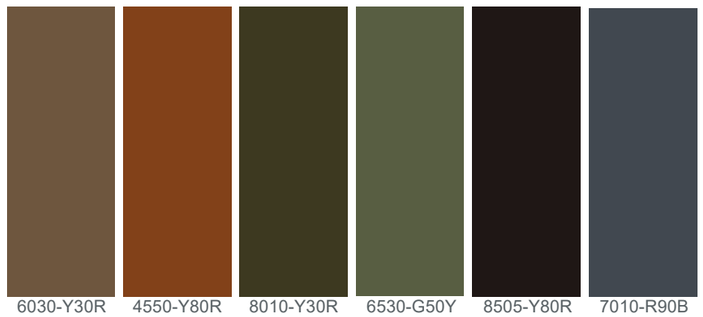
Landscape- Bold:

3.17.2 A statement colour palette taken from the Landscape Core Palette. Similarly to the Architecture Bold palette, the Landscape Bold palette includes a range of colours which stand out against the surrounding landscape. Each is directly taken from a colour present within the surrounding landscape, so the colours, while bold, are harmonious and fitting within the local environment.



Landscape- Subtle:

3.17.3 A palette of more subtle colours from the Landscape Core Palette. These colours are found most often within the landscape, so are most likely to assist in the camouflage of the building within the landscape. These colours are also some of the darkest from the Landscape Core Palette. The use of darker colours is another method which can help a building blend in with its surroundings.



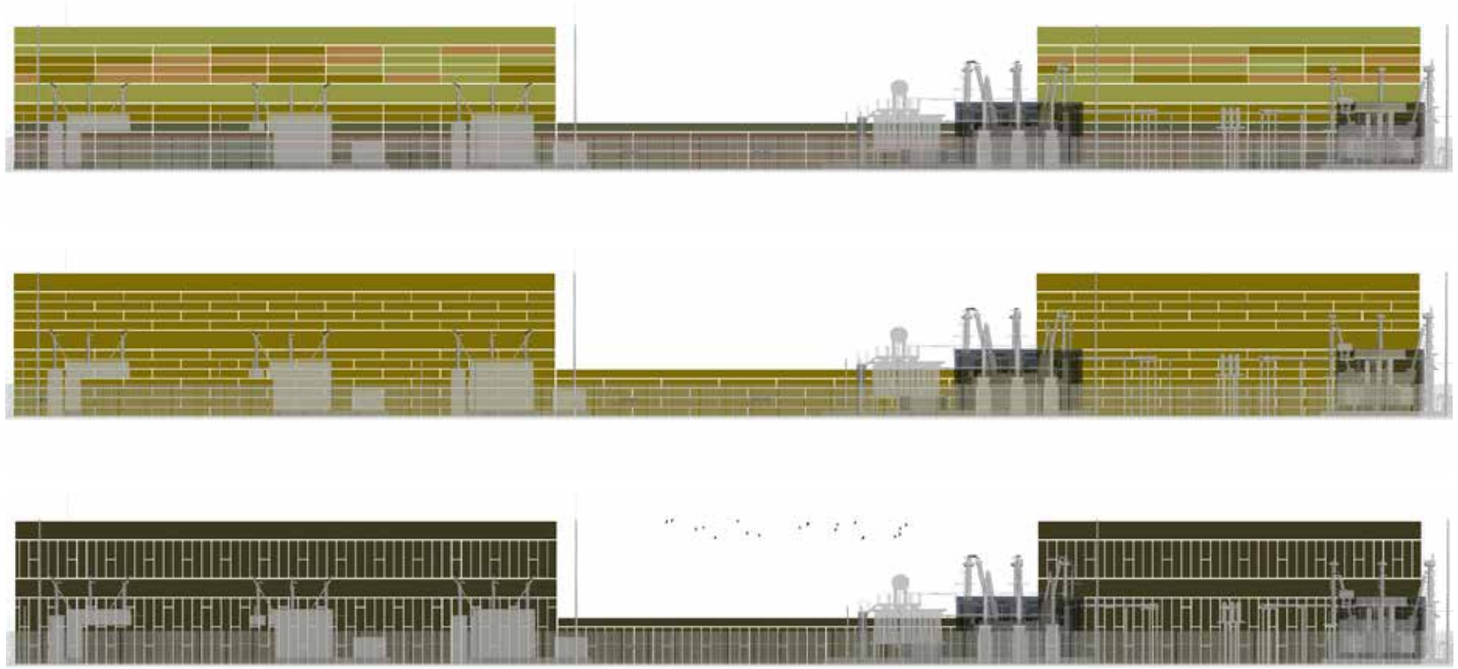
Recessive tones

3.17.4 This palette draws from both the Landscape and Architecture Core Palettes. Colours which are darker than the majority of the surrounding landscape, and even contrasting in colour (opposite on the colour wheel), appear set back within the landscape. This can make them appear as shadows when screened with mitigation planting.

3.18 Visual Integration

3.18.1 "Visual Integration" aims to camouflage the building within the landscape. Colours which align with or are slightly darker than the background are used to help buildings blend in when viewed from a distance. This concept does not use bold patterns like some of the others, instead the façades are generally a single colour, or a subtle gradient which gets lighter towards the top, where more light would naturally hit the building. Subtle patterns can be employed to further break up the facade of the building, mimicking the variety of seasonal colours present within the trees in the landscape. As mitigation planting matures, the building will become even more effectively camouflaged within its surroundings.

GIS elevations



AIS elevations

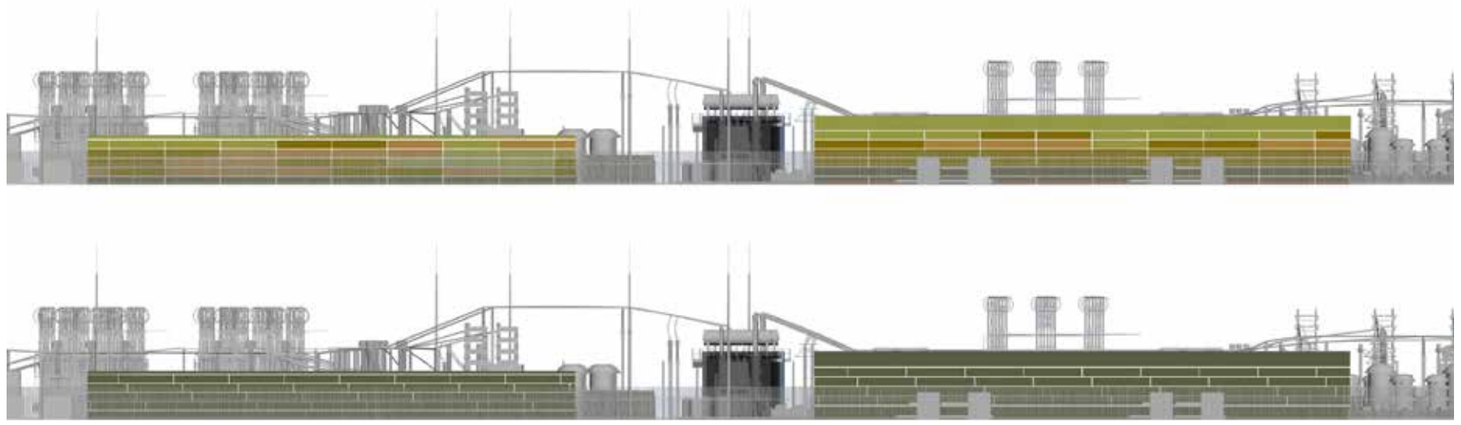


Plate 78 - Visual integration colour concept elevations

Plate 79 - Indicative photomontage showing Five Estuaries GIS substation with visual integration colour concept - from Barn Lane (ES Viewpoint 2)

Plate 80 - Indicative photomontage showing both North Falls AIS substation and Five Estuaries GIS substation with visual integration colour concept - from Barn Lane (ES Viewpoint 2)

Plate 81 - Indicative photomontage showing Five Estuaries GIS substation with visual integration colour concept - from Ardleigh Road / Jenning's Farm (ES Viewpoint 4)

Plate 82 - Indicative photomontage showing both North Falls AIS substation and Five Estuaries GIS substation with visual integration colour concept - from Ardleigh Road / Jenning's Farm (ES Viewpoint 4)

Advantages:

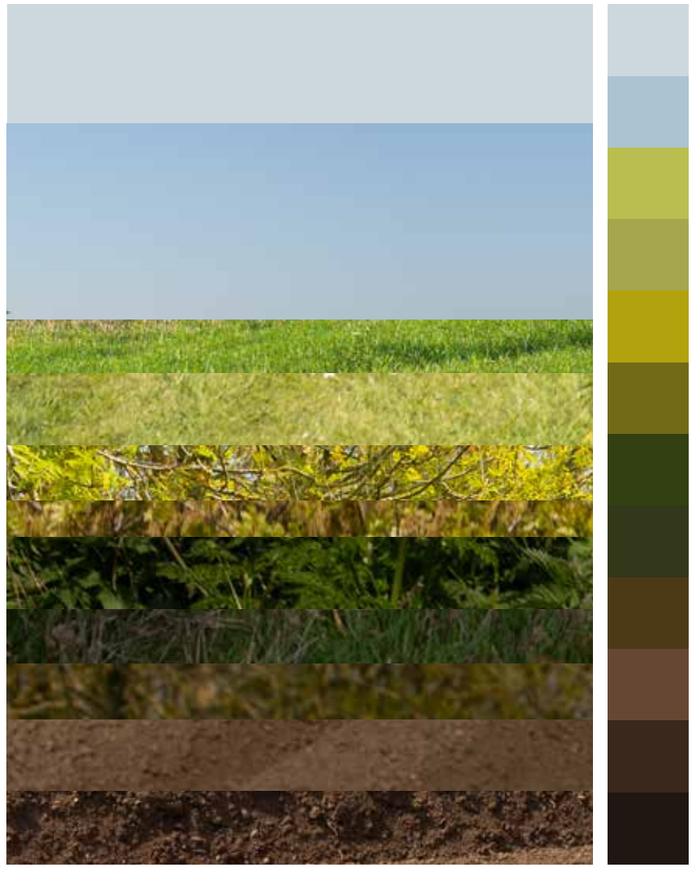
- Recessive colour on lower elements of GIS and AIS buildings integrate and align with surrounding woodland heights and colours/background.
- Facades of lower AIS buildings consisting single colour have simple relationship with external electrical components.
- Simple to implement if non-patterned variant used.

Disadvantages:

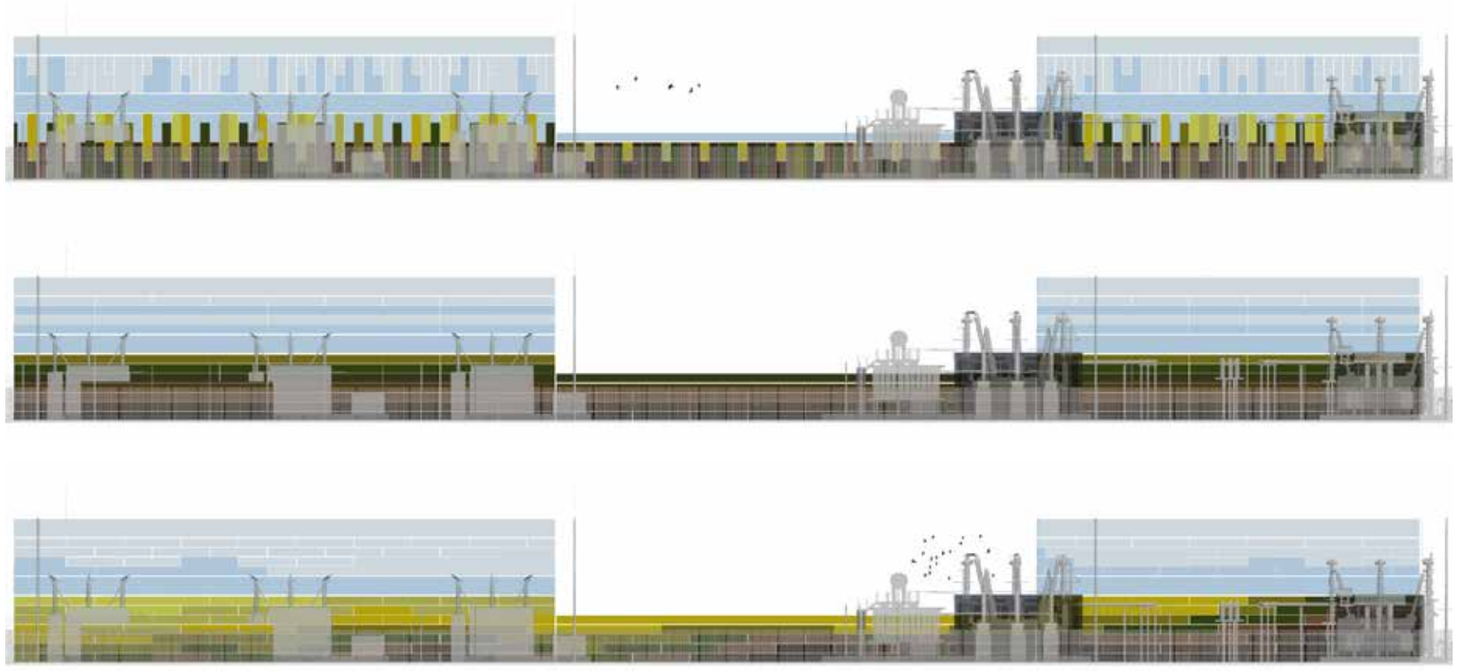
- Upper elements of GIS buildings contrast with the sky, emphasising their height and massing.
- Bold colours and strong patterns may contrast with electrical infrastructure and fencing at lower levels.
- Reads as one large block if single colour variant used - no fragmentation through pattern.

3.19 Transition

3.19.1 ‘Transition’ reflects the range of colours that occurs through a typical vertical section of the local rural landscape. This cuts through the soils at the base, the layers of vegetation form the fore to background, and the big skies that shroud this landscape. While the colours form a match with the baseline colours, that will reduce the prominence of the buildings, the stylised pattern defines it as an interpretation of the existing landscape rather than a complete reflection. This design will help the buildings to merge with the surrounding context in all seasons and merge with the mitigation planting as it matures.



GIS elevations



AIS elevations

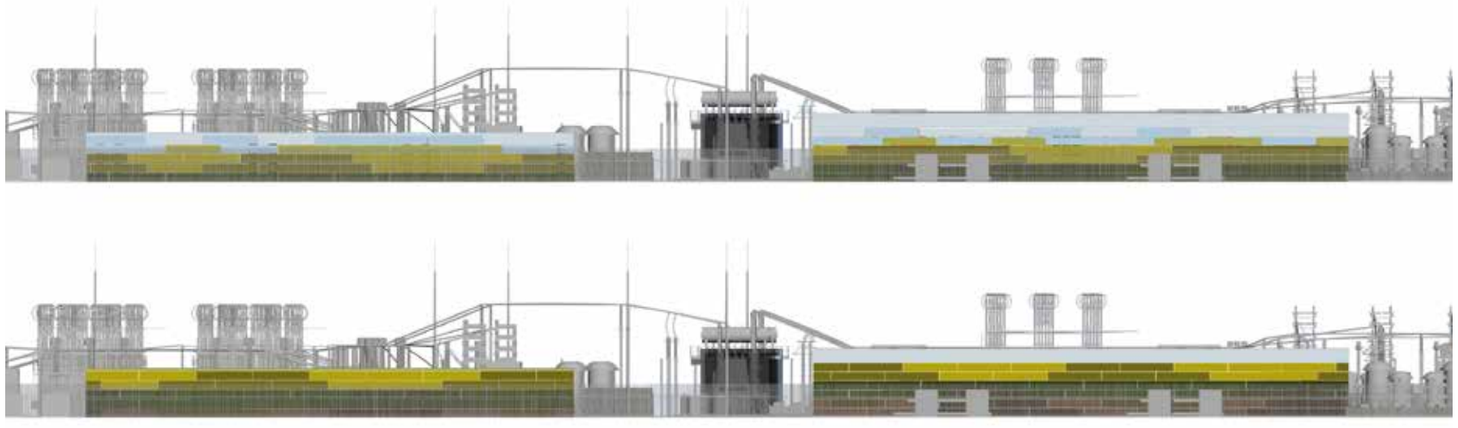


Plate 83 - Transition colour concept elevations

Plate 84 - Indicative photomontage showing Five Estuaries GIS substation with transition colour concept - from Barn Lane (ES Viewpoint 2)

Plate 85 - Indicative photomontage showing both North Falls AIS substation and Five Estuaries GIS substation with transition colour concept - from Barn Lane (ES Viewpoint 2)

Plate 86 - Indicative photomontage showing Five Estuaries GIS substation with transition colour concept - from Ardleigh Road / Jenning's Farm (ES Viewpoint 4)

Plate 87 - Indicative photomontage showing both North Falls AIS substation and Five Estuaries GIS substation with transition colour concept - from Ardleigh Road / Jenning's Farm (ES Viewpoint 4)

Advantages:

- Subtle lighter colours on upper parts of GIS buildings integrate with sky, minimising their apparent height.
- Darker recessive base course on lower part of buildings provides grounding and potential to integrate with the landscape.
- Interesting and novel to look at when views of the building are unavoidable, particularly as mitigation planting establishes.

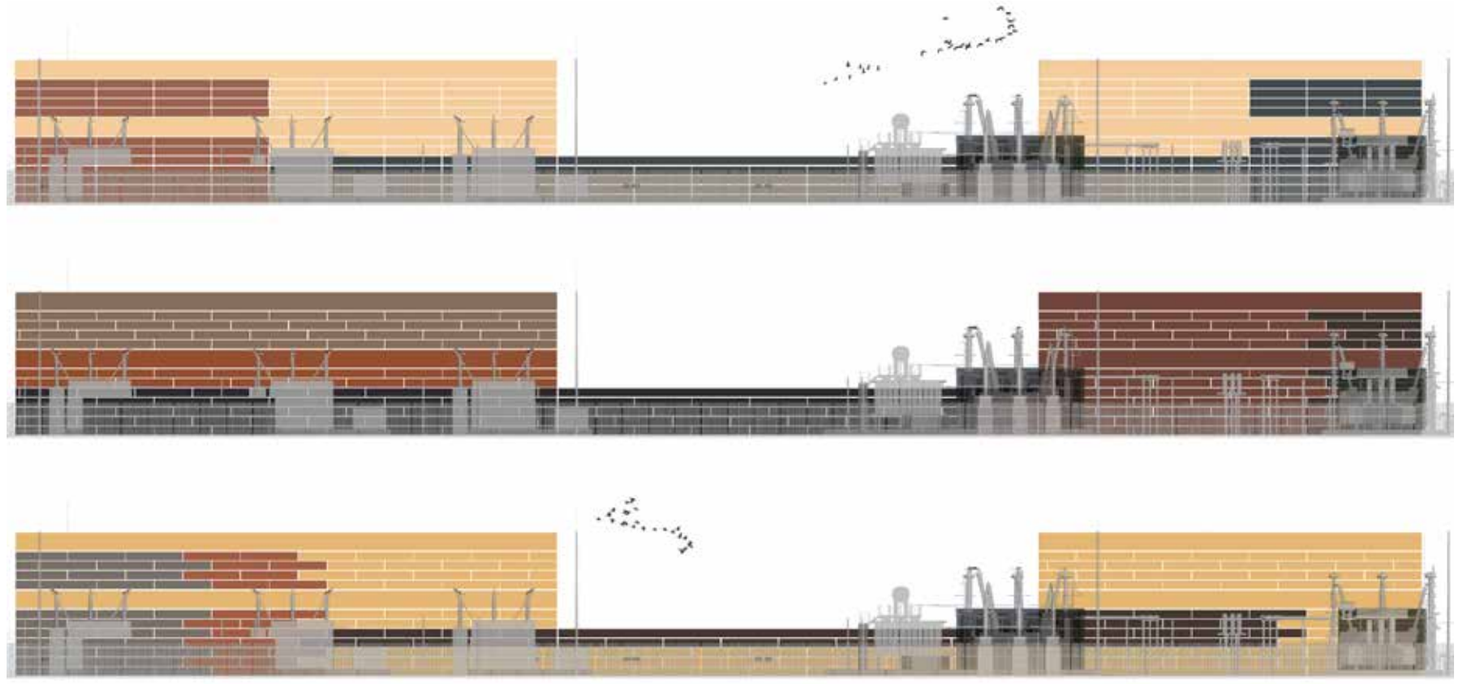
Disadvantages:

- Potential for lighter colours in the transition to contrast with darker background and woodlands.
- Careful selection of colour transition/gradation needed informed by key views.
- More complex

3.20 Architectural Blocks

3.20.1 Architecture is a common feature in the rural landscape and this study has illustrated how the blocks created by agricultural sheds create a contrasting feature through their colour and shape. Traditional local materials present a predominance of reds, browns and oranges, often set against more neutral greys and dark browns and blacks. With reference to these traditional colours and patterns, designs have been developed which break up the mass of the buildings through contrasting horizontal and vertical alignments marked by contrasting colours from a palette with a contained range. While the reds and oranges present a direct contrast to the greens of the landscape, the tones and hues have been tempered and offset against more neutral browns, greys and blacks.

GIS elevations



AIS elevations

Plate 88 - Architectural blocks colour concept elevations

Plate 89 - Indicative photomontage showing Five Estuaries GIS substation with architectural blocks colour concept - from Barn Lane (ES Viewpoint 2)

Plate 90 - Indicative photomontage showing both North Falls AIS substation and Five Estuaries GIS substation with architectural blocks colour concept - from Barn Lane (ES Viewpoint 2)

Plate 91 - Indicative photomontage showing Five Estuaries GIS substation with architectural blocks colour concept - from Ardleigh Road / Jenning's Farm (ES Viewpoint 4)

Plate 92 - Indicative photomontage showing both North Falls AIS substation and Five Estuaries GIS substation with architectural blocks colour concept - from Ardleigh Road / Jenning's Farm (ES Viewpoint 4)

Advantages:

- Darker base course grounds the buildings and integrates well with ploughed fields/agricultural land.
- Architectural colours relate to local vernacular of other farm buildings in the landscape.
- Architectural blocks colours do not blend in, but provide a distinct element which stands out in the landscape, similar to local fam buildings.
- Warm tones relate not only to the local architecture, but also to the earth tones of the agricultural landscape.

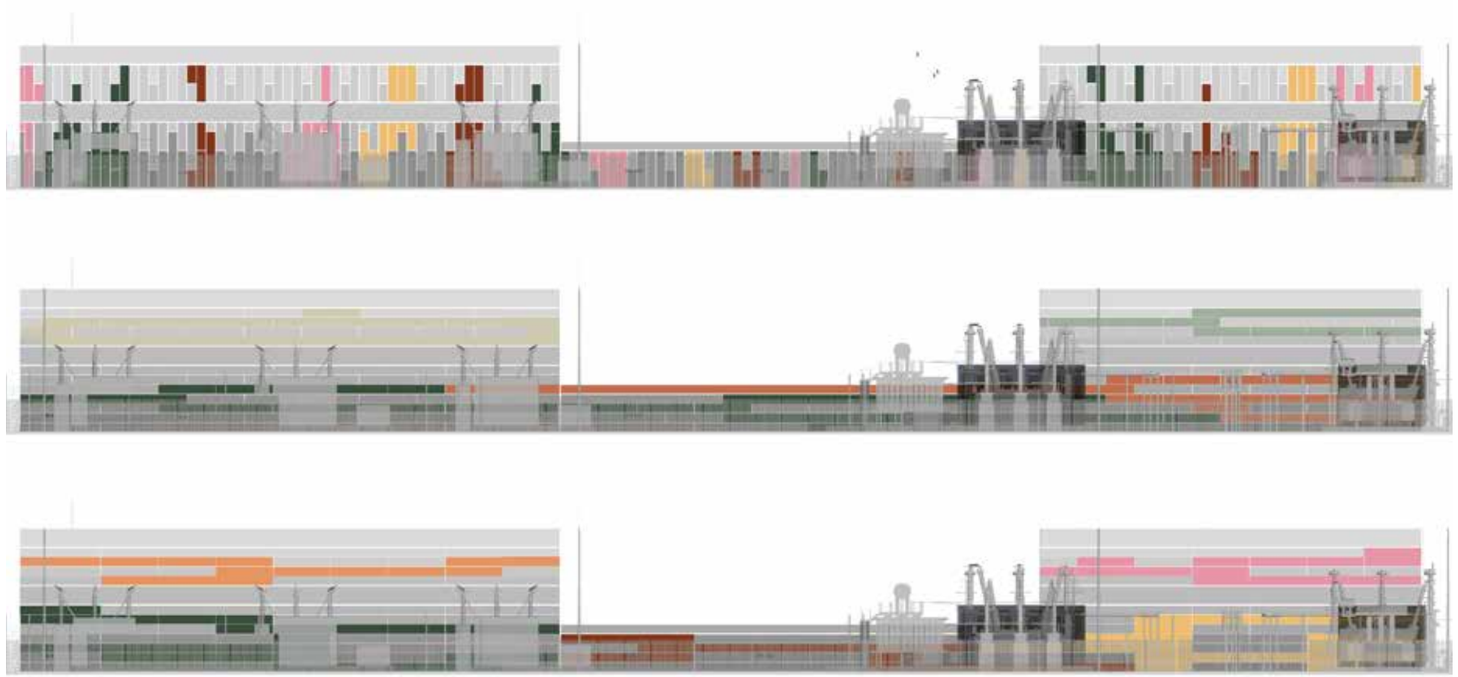
Disadvantages:

- Bold architectural colours emphasise the GIS building form against the horizon/landscape and may emphasise presence of AIS buildings within the electrical layout.
- Upper elements of GIS buildings contrast with the sky, emphasising their height and massing.
- Surrounding external electrical infrastructure within substation layout means that buildings are not seen

3.21 Accents

3.21.1 The traditional architecture of this local area uses a broad range of colours, with bright or contrasting colours often used to emphasis specific architectural features, such as doors and windows. In respect of the onshore substations, bright or contrasting colours would not be appropriate for the buildings as it would make them appear overly prominent in the landscape. There is, however, scope to add bright or contrasting colours in small amounts to a predominantly neutral background. The bright or contrasting colours would add visual interest and individuality to each of the buildings and could be used to symbolise the flow of electricity or other flows of movement in the landscape.

GIS elevations



AIS elevations

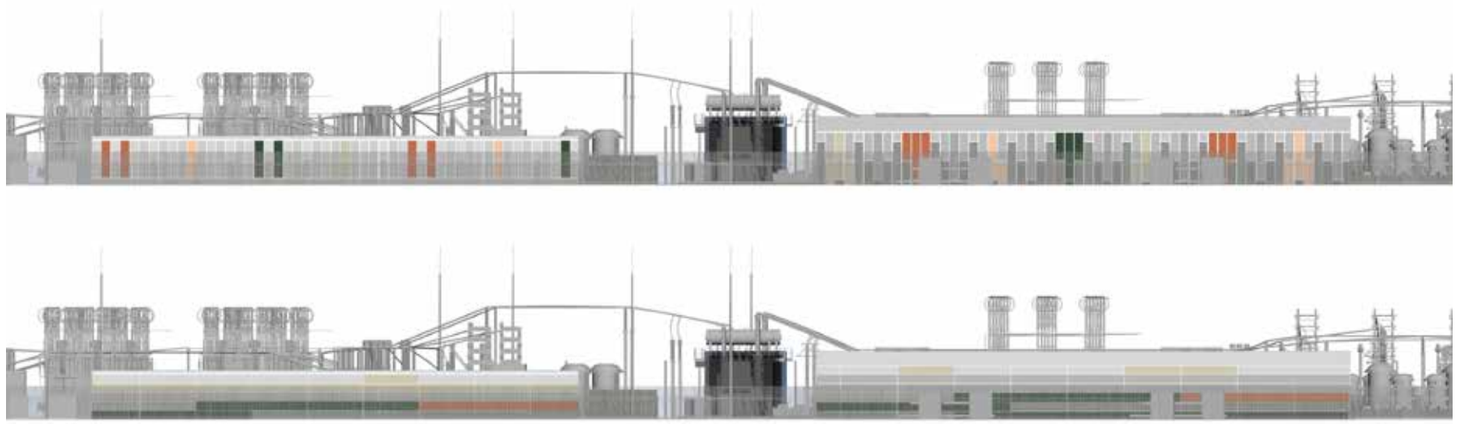


Plate 93 - Accents colour concept elevations

Plate 94 - Indicative photomontage showing Five Estuaries GIS substation with accents colour concept - from Barn Lane (ES Viewpoint 2)

Plate 95 - Indicative photomontage showing both North Falls AIS substation and Five Estuaries GIS substation with accents colour concept - from Barn Lane (ES Viewpoint 2)

Plate 96 - Indicative photomontage showing Five Estuaries GIS substation with accents colour concept - from Ardleigh Road / Jenning's Farm (ES Viewpoint 4)

Plate 97 - Indicative photomontage showing both North Falls AIS substation and Five Estuaries GIS substation with accents colour concept - from Ardleigh Road / Jenning's Farm (ES Viewpoint 4)

Advantages:

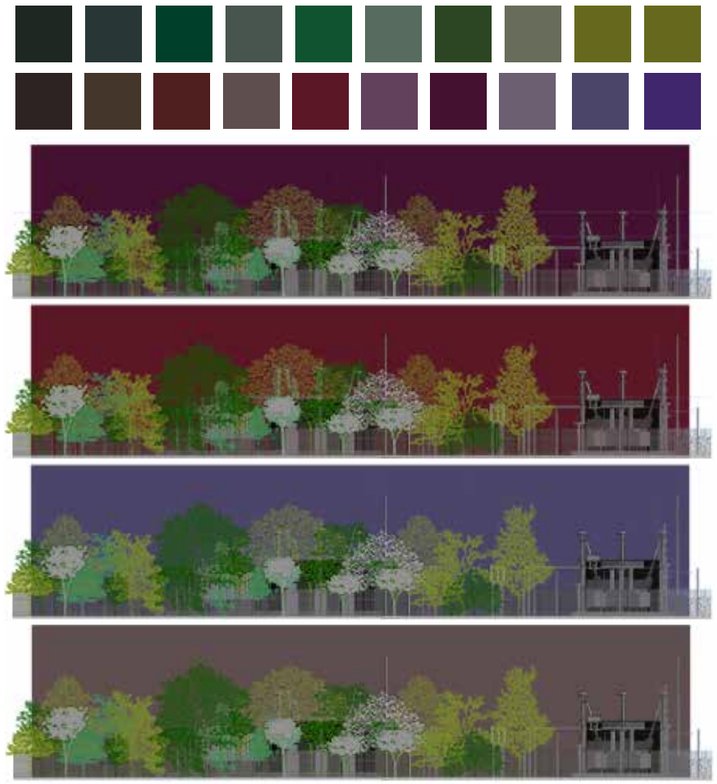
- Colour accents add visual interest to buildings, may symbolise ‘flow’ of electricity and offer a common design language between different substation buildings.
- Darker ‘landscape’ accent colours on lower parts of buildings integrate with landscape/woodlands, while lighter subtle accents on upper part of buildings integrate with sky.
- Neutral grey offers integration with backdrop and sky.

Disadvantages:

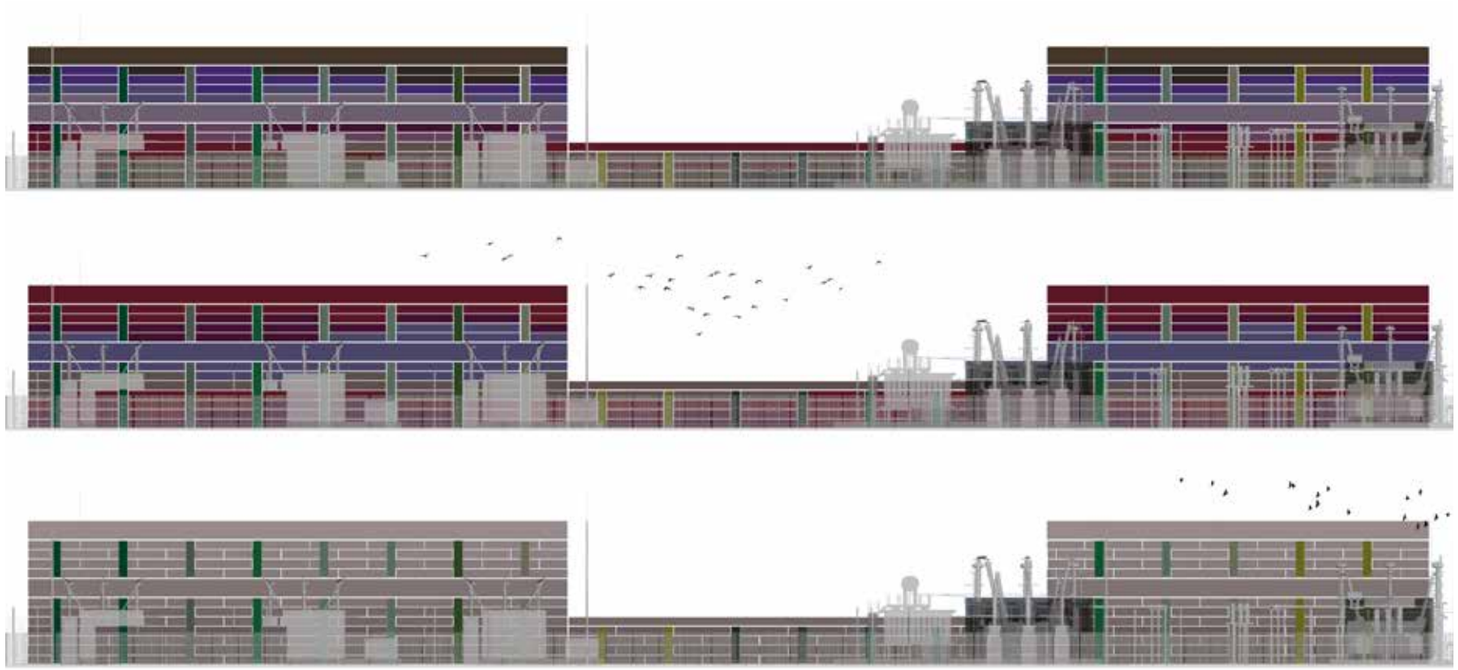
- Bright or contrasting colours may appear overly prominent in the landscape and draw attention. Careful selection of accent colours and their positioning on buildings needed.
- Potential for visual complexity with combination of accents and external electrical infrastructure.

3.22 Foils

3.22.1 'Foils' is a concept in which the onshore substation buildings are viewed as a backdrop to the mitigation planting which will occupy the fore to middle ground. The buildings would, therefore, be coloured to 'set-off' the predominant greens, yellows and browns of the vegetation, by using contrasting colours on the opposite of the colour wheel and darker tones. The colour samples along the top show the colours of the vegetation with the colours below reflecting contrasting colours and tones. These are then tested against the foreground feature of the vegetation, as well as the electrical infrastructure and fencing which will also be seen to the fore. The photomontages show the 'greyer' tones (c) and (d) with green accents, rather than the brighter colours.



GIS elevations



AIS elevations

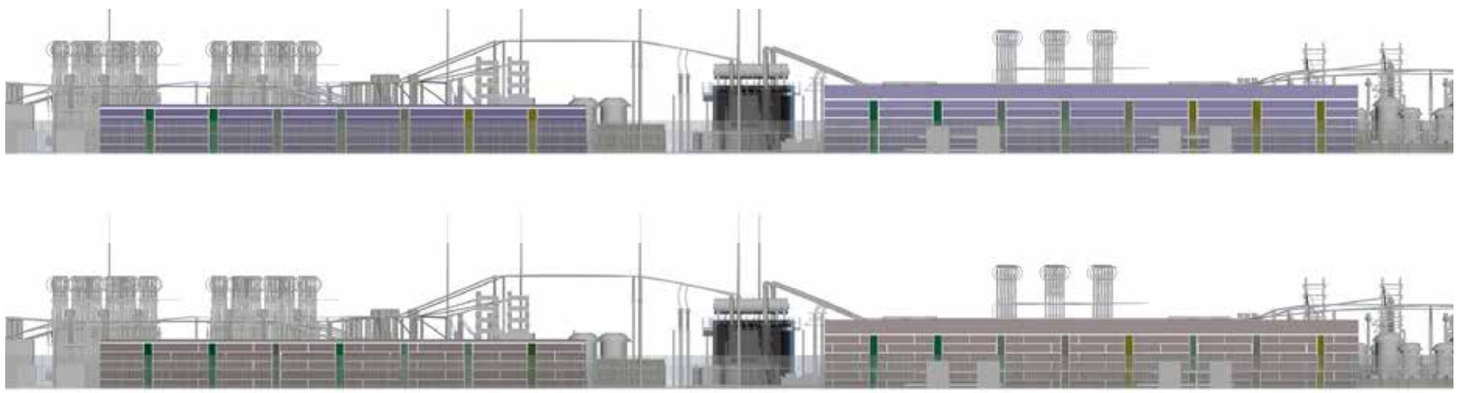


Plate 98 - Foils colour concept elevations

Plate 99 - Indicative photomontage showing Five Estuaries GIS substation with foils colour concept - from Barn Lane (ES Viewpoint 2)

Plate 100 - Indicative photomontage showing both North Falls AIS substation and Five Estuaries GIS substation with foils colour concept - from Barn Lane (ES Viewpoint 2)

Plate 101 - Indicative photomontage showing Five Estuaries GIS substation with foils colour concept - from Ardleigh Road / Jenning's Farm (ES Viewpoint 4)

Plate 102 - Indicative photomontage showing both North Falls AIS substation and Five Estuaries GIS substation with foils colour concept - from Ardleigh Road / Jenning's Farm (ES Viewpoint 4)

Advantages:

- Potential for subtle colour options (e.g. S7502-B grey in photomontage) to integrate with background while also providing a foil to 'set-off' the proposed (green) planting.
- Introduction of green 'accents' within the building façades has potential to provide visual link to proposed planting.
- Darker and warmer colours create the effect of a shadow, contrasting with the greens and yellows in the landscape and allowing the building to appear recessive, particularly once planting establishes.

Disadvantages:

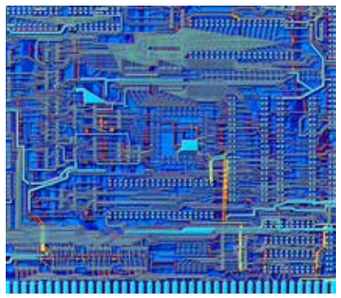
- Foils could place bold, dark colours of taller GIS buildings above the skyline and draw attention to the substations.
- Bold, dark colours on smaller AIS buildings likely to stand out amongst electrical components.
- 'Foil' to planting likely to only be realised after a long-time period, when tree planting matures.

3.23 Electricity

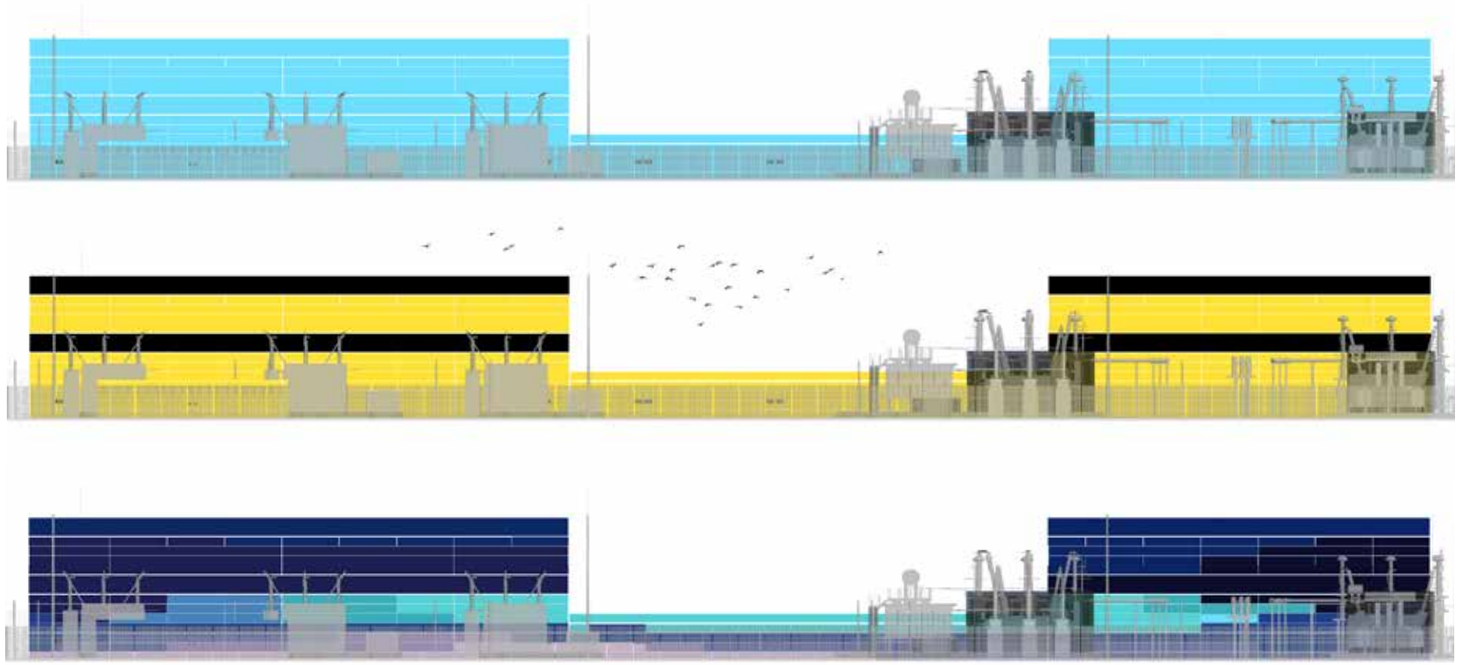
3.23.1 The 'Electricity' concept makes direct reference to the purpose of the substation, making a bold and honest statement. It takes the opportunity to celebrate and highlight the renewable energy generated by the offshore wind farm.

3.23.2 Electricity cannot typically be seen, however natural occurrences such as lightning bolts, aurora borealis or static shock sparks help to visualise it. Cues towards a colour that symbolises electricity can also be taken from societal perception and signage, which would generally portray electricity in a bright yellow colour, for example on electrical warning signs.

3.23.3 The colours representing this concept have not been selected from the ECA palette in order to achieve the bold contrast that it relies upon, with colours selected to refer to the perceived colour of electricity and to allow the buildings to stand out against the surrounding landscape.



GIS elevations



AIS elevations

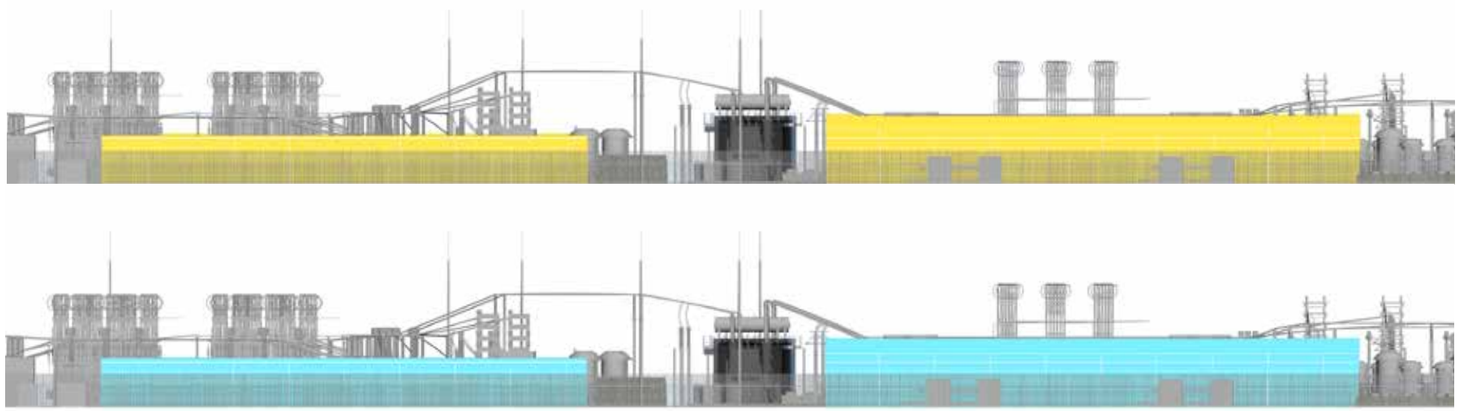


Plate 103 - Electricity colour concept elevations

Plate 104 - Indicative photomontage showing Five Estuaries GIS substation with electricity colour concept - from Barn Lane (ES Viewpoint 2)

Plate 105 - Indicative photomontage showing both North Falls AIS substation and Five Estuaries GIS substation with electricity colour concept - from Barn Lane (ES Viewpoint 2)

Plate 106 - Indicative photomontage showing Five Estuaries GIS substation with electricity colour concept - from Ardleigh Road / Jenning's Farm (ES Viewpoint 4)

Plate 107 - Indicative photomontage showing both North Falls AIS substation and Five Estuaries GIS substation with electricity colour concept - from Ardleigh Road / Jenning's Farm (ES Viewpoint 4)

Advantages:

- The concept makes a direct link to the electricity generated from the offshore wind farm in the design.
- The colour of the substation conveys its function and would provide a bold landmark in the landscape.
- One bold colour is simple in design and easy to install

Disadvantages:

- Bold colours are likely to draw attention to the substation, which contradicts with other preferences to screen and blend the building into the landscape.
- The colours do not draw from the surrounding landscape and could clash with the prevailing colour of the landscape

3.24 Design Guide Recommendations

Summary

3.24.1 An Environmental Colour Assessment (ECA) has been carried out that included a site based survey of baseline colours in the landscape, in order to inform the choice of colour palettes to be applied to the onshore substation buildings.

3.24.2 The colour range of the landscape in summer and winter has been identified, together with the prevailing colours of local architecture, in order to establish the colour palettes that are most common and representative in the local landscape context.

3.24.3 Four colour palettes have been identified, including bold architectural and landscape colours, subtle landscape colours and recessive tones drawing from the landscape and local architecture. These colours have been used to review the advantages and disadvantages of six different concepts for the substation buildings:

- Visual integration - aiming to camouflage the building using colours that align with background/ landscape, generally with a single 'landscape' based colour.
- Transition - reflecting the range of colours that occurs through a typical vertical section of the local rural landscape, from darker landscape to lighter sky.
- Architectural blocks – use of bold architectural colours relating to the local vernacular, with colour articulated to break up the mass of the buildings.
- Accents - a predominantly neutral (grey) colour with bright or contrasting accent colours in small amounts to add visual interest to the buildings and visual link to local architecture and landscape.
- Foils - buildings coloured to 'set-off' the predominant greens of the new planting, by using contrasting colours on the opposite of the colour wheel and bolder, darker tones.
- Electricity - colours selected to refer to the perceived

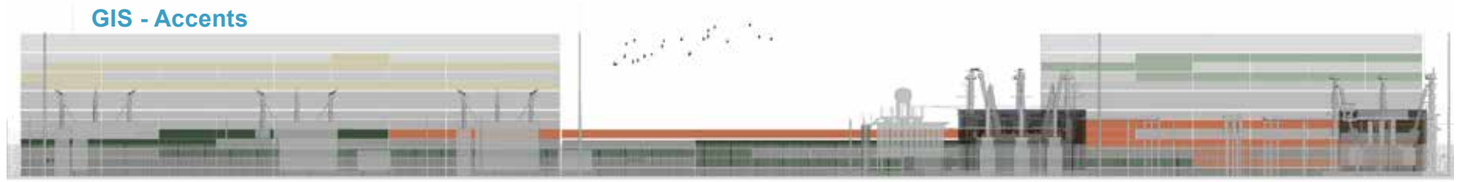
Optionality - AIS and GIS

Accents

- **Accents colour concept is recommended for both AIS and GIS technology, being effective for both technologies.**
- The use of accents symbolises the 'flow' of electricity and makes direct reference to the function and purpose of the substation.
- A neutral grey should form the 'base' colour (with lighter and darker shades), with optionality to adjust accent colours to either stand out (bold) or to integrate with colours of the local landscape/architecture.
- Optionality to vary building facade treatment by adjusting pattern and position of accent colours.
- Accents should be arranged in a horizontal pattern (rather than vertical).
- Neutral grey base colour integrates with the backdrop and sky. Bright or contrasting accent colours should be in small amounts to add visual interest to the buildings and a visual link to electricity, local architecture and the landscape.
- Darker 'landscape' accent colours on lower parts of buildings should integrate with landscape/woodlands.
- Lighter subtle accents on upper part of buildings should integrate with sky.

AIS - Accents

GIS - Accents



Colour palette

Accents colour palette should consist of neutral grey 'base' colour (lighter and darker) and a palette of accent colours selected from local landscape and achitecture.

Base colour: 3000-N, 1500-N

Accent colours:

- 2010-Y20R
- 1040-Y30R
- 1040-Y60R
- 5040-Y60R
- 5540-Y90R
- 7020-G10Y
- 3020-G10Y
- 1515-R10B

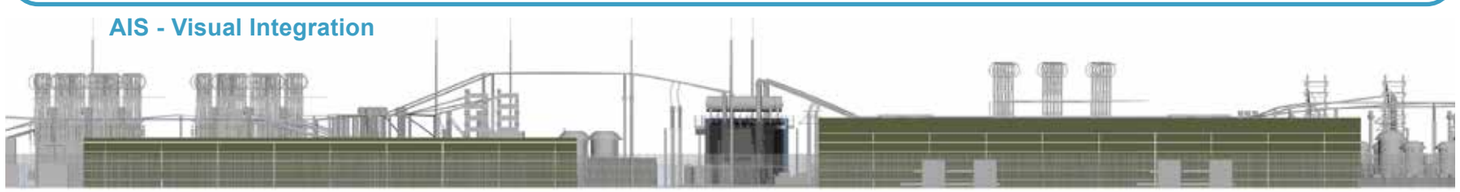
Optionality - AIS

Two further colour concepts should also be considered for AIS technology - **Visual Integration** and **Foils** to provide colour of electricity and to allow the buildings to stand out against the surrounding landscape.

Visual Integration

- A single consistent colour on the facades of AIS buildings to achieve a simple relationship with external electrical components.
- A recessive colour on AIS statcom and control buildings to integrate and align with surrounding woodland heights and colours/background.
- A simple panel arrangement using panels directly above each other should be used rather than a staggered 'brickwork' arrangement.

AIS - Visual Integration



Colour palette

Recessive tones:

6530-G50Y

Foils

- Potential for subtle foil colour options to integrate with background while also providing a foil to ‘set-off’ the proposed (green) planting that will grow and mature around the substations over time.
- The introduction of green ‘accents’ within the foil of the building façade has the potential to provide a visual link to the green of the planted vegetation.
- The bolder, darker colours that were explored in the foils concept should not be used on smaller AIS buildings as they would be likely to stand out amongst the surrounding electrical components.

AIS - Foils

Colour palette

Subtle tone (base colour):

5005-G80Y

Vegetation accents:

3.24.4 These concepts are illustrated using elevations and indicatively in photomontages from two representative viewpoints. Five Estuaries is shown as GIS and North Falls as AIS, allowing conclusions to be drawn in respect of each technology. The advantages and disadvantages of each colour concept have been identified from which the following design recommendations are drawn. It is expected that future revisions will reflect the plan that both projects will use AIS substations. As noted in 3.7.1, both sets of visualisations have been left in at this early stage to show how colour is used differently on different scale structures.

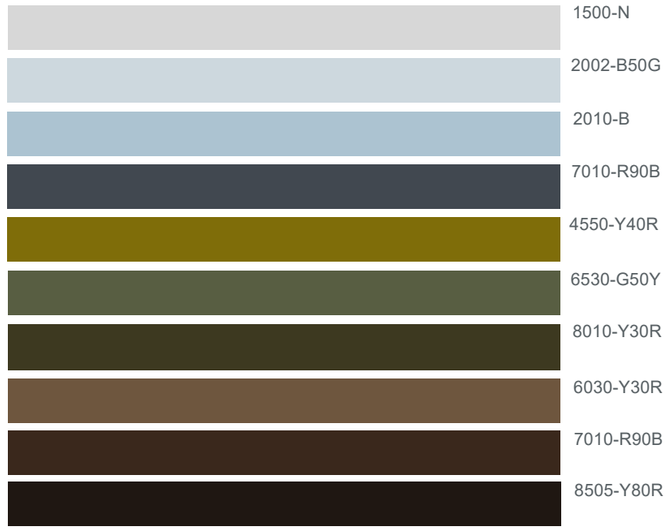
Optionality - GIS only

Transition

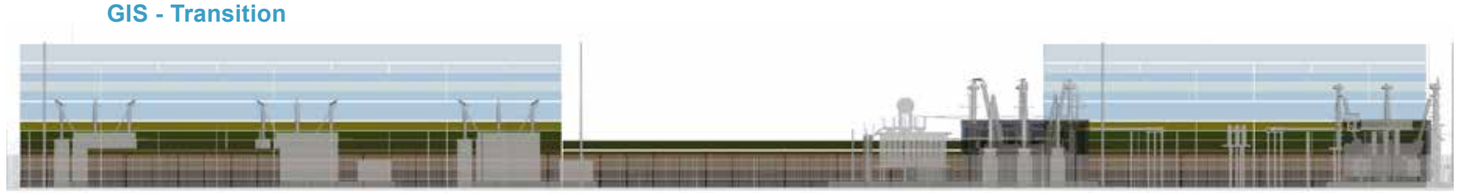
- **Transition colour concept is only suitable for GIS technology (not AIS) due to its higher substation buildings.**
- The transition concept should allow colours to break down the massing of higher GIS buildings.
- The use of a darker recessive base course on the lower part of buildings should be used to provide grounding/ integration with landscape.
- The use of subtle lighter colours should be used on upper parts of GIS buildings to integrate with sky and minimise the apparent height of taller GIS buildings.
- Optionality to vary the building facade treatment, with potential for either a gradual transition of multiple colours from darker lower base course to subtle lighter sky colours on upper parts of buildings; or a ‘two tone’ GIS buildings with darker lower and lighter upper elements. Both options should break down the massing of the GIS buildings.
- The use of ‘transition’ concept is less successful for AIS and is not recommended for AIS due to the lower height of the AIS buildings which are not typically viewed against sky. Lighter colours in the at lower levels tending to contrast with darker background, woodlands and external electrical infrastructure.

Colour palette

Landscape (subtle) and recessive tones:



GIS - Transition



- The use of ‘visual integration’ and ‘foils’ are not recommended for GIS technology, as the bolder landscape or architectural colours tend to emphasise the GIS building form and height against the horizon/ landscape, with the taller upper elements of GIS buildings contrasting with the sky.
- Bolder, darker colours that draw attention to the substations should generally be avoided particularly for the upper elements.

Optionality - other electrical equipment

- This design guide focuses on the colour of the buildings within the substation compounds.
- AIS compounds will also contain a range of external electrical equipment/structures to support the operational requirements, including circuit breakers and busbars, transformers, reactors, harmonic filters, noise enclosures, lightning masts and boundary fencing.
- The colour of this external electrical equipment is heightened for AIS technology, due to the range of equipment and structures visible in the context of the buildings.
- Colour choices for external electrical equipment will be subject to further review as part of the ongoing development of this design guide.

Optionality - fencing

- Colour options to be considered for secure boundary fencing around the substation compound are presented in Part 2, informed by this ECA.
- Fencing colours should be selected to accord with the substation colour concept with colours selected during the detailed design stage.

4: Landscape and Ecology Guidance

4 Landscape and Ecology Guidance

4.1 Introduction

Requirements of the DCO

4.1.1 In accordance with the requirements set out in the North Falls Offshore Wind Farm draft DCO and the Five Estuaries Offshore Wind Farm draft DCO, this Part 4 of the design guide provides recommendations to support the development of a written landscaping scheme to be submitted to and approved by the discharging authority. The design guide aligns with both the Outline Landscape and Ecological Management Plan (OLEMP) for the Five Estuaries Offshore Wind Farm and the Outline Landscape and Ecological Management Strategy (OLEMS) for North Falls Offshore Wind Farm.

4.1.2 This design guide does not form the Landscape and Ecology Management Plan (LEMP) for Five Estuaries or the Written Landscape Scheme (WLS) or Ecological Management Plan (EMP) for North Falls, which will be subject to a detailed design process and be approved by the discharging authority post-consent. The design guide sets out the principles that the Five Estuaries LEMP and North Falls WLS/EMP will follow, building upon and refining the indicative proposals in the OLEMP and OLEMS, offering further detail on the spatial arrangement and composition of proposed planting areas and habitats proposed. The design guide facilitates the continued review of the landscape scheme informed by the ongoing consultations with Essex County Council, Tendring District Council, Essex Quality Review Panel (EQRP) and Interested Parties (IPs).

Aims

4.1.3 The aim of the Landscape and Ecological Design is to use the site surrounding the Five Estuaries and North Falls onshore substations to deliver multiple functions. These functions include commitments made through the DCO process, principally with regard to the screening of the onshore substations and the provision of biodiversity, but also including the enhancement of local landscape character, improvement of soil health, attenuation of storm water and amelioration of the micro-climate. This landscape and ecology chapter of the design guide explores options for the development of the detailed landscape and ecological design for the LEMP.

4.1.4 A further aim of the landscape and ecological design proposals set out in this design guide is to support greater integration with the surrounding green infrastructure network by identifying opportunities to connect with existing vegetation patterns at a broader scale. The proposals set out in the landscape and ecology masterplan (Section 4.16) illustrate potential linkages that should be considered to enable landscape proposals associated with other projects to integrate and form a wider network.

Process

4.1.5 Indicative layouts have been developed for the Development Consent Orders (DCOs) of both Five Estuaries and North Falls, accompanied by the OLEMP/OLEMS. Their indicative status reflects the lack of certainty prior to a final layout and design being fixed at the post examination stage of the process. Comments made during the examination stage by the Examining Authority, Essex County Council, Tendring District Council , and other interested parties will influence refinements to all aspects of the design presented in this Design Guide. The differences in the indicative layouts for Five Estuaries and North Falls have been resolved to create a single plan covering both sites.

4.1.6 This process has involved identifying and responding to opportunities and regulations related to local and national guidance, while also aiming to deliver ecological connection and improvements. These objectives include delivering enhancements in keeping with the National Character Assessment (NCA) statements of opportunity, and landscape management principals of the receiving Landscape Character Assessment (LCA).

4.1.7 The intent of the landscape and ecological design plan set out in the design guide is similar to other successful landscape projects with a focus on nature recovery of areas of arable farmland, including Boothby Wildland Nature Reserve and Knepp Wildland. Users of this design guide may refer to these precedents as a way to understand the outcomes and strategies this Joint Design Guide for North Falls and Five Estuaries intends to emulate.

Objectives

4.1.8 The Landscape and Ecological Plan has been designed to fulfil the following objectives:

- Form an effective screen of planting around the onshore substations which will mitigate landscape and visual impacts in the local area.
- Create a mosaic of habitats that maximises the biodiversity of the site and connects with the wider green infrastructure.
- Retain farm fields where practicable to ensure quality farmland is kept in production.
- Create water features across the site to regulate water levels and enhance landscape character and biodiversity.
- Reintroduce the woodlands, scrublands, grasslands and wetlands that would have characterised the indigenous landscape of this area.
- Inbuild climate resilience by selecting climate resilient species and creating microclimates to ameliorate extremes.
- Organise the site layout to retain key valued landscape, heritage, green and blue infrastructure (GBI), considering the role that existing vegetation can play in integration new development within its surroundings.

Plate 108 - Five Estuaries Offshore Wind Farm OLEMP

4.2 Approach to Biodiversity Net Gain

4.2.1 North Falls and Five Estuaries are committed to delivering measurable Biodiversity Net Gain (BNG) across their onshore footprints. While each project followed slightly different approaches during the consenting stages, this Design Guide aligns them into a consistent, landscape-led, and policy-compliant framework for ecological enhancement and long-term habitat resilience.

4.2.2 North Falls committed to a minimum 10% BNG through habitat creation—such as lowland meadow, species-rich grassland, SuDS ponds, and hibernacula—supported by a 30-year monitoring and management plan. Its OLEMS sets out a structured strategy aligned with the Essex Green Infrastructure Strategy and local priorities.

4.2.3 Five Estuaries took a landscape-led approach, creating priority habitats including lowland meadow, traditional orchards, neutral grassland, woodland, and ponds. Although not driven by a specific BNG unit target, the statutory metric was applied retrospectively to demonstrate compliance and maximise ecological value. All habitats will be managed for 30 years, with a five-year aftercare period, formalised in the final LEMP.

Plate 109 - North Falls Offshore Wind Farm OLEMS

4.2.4 Together, the projects aim to deliver a cohesive ecological network through coordinated planting, shared monitoring protocols, and integrated design enhancing biodiversity, connectivity, and resilience. Commitments in respect of BNG for each project are set out in the following documents:

- Five Estuaries Offshore Wind Farm – Onshore Biodiversity Net Gain Indicative Design Stage Report (March 2024) (Five Estuaries Offshore Wind Farm ES, Volume 6, Part 6, Annex 4.18).
- North Falls Offshore Wind Farm – Biodiversity Net Gain Strategy (July 2024) Doc Ref 7.22).

4.2.5 The methodology for the joint design guide has been primarily landscape-led, with the requirement to deliver ecological mitigation, compensation and enhancements measures in line with current policy and legislation, regardless of the Statutory Biodiversity Metric. While not based on a specific BNG unit target, the scheme has been carefully optimised to deliver biodiversity benefits, and in line with consultee requests, to explore opportunities to provide a minimum of 10% increase in biodiversity. Similarly, the landscape-led approach has prioritised the integration of green and blue infrastructure (GBI) to deliver broader environmental benefits.

Plate 110 - Landscape Baseline Photographs

4.3 Landscape Baseline

4.3.1 The development of the Landscape and Ecological Design has been influenced by consideration of the baseline context, in terms of the evolution of the landscape, the present landscape character and existing habitats at the site and surrounding area.

Landscape and Ecological Evolution

4.3.2 The design has been informed by the historical evolution of the landscape. The 'Tendring District Landscape Character Assessment' (TDLCA) (November 2021) states; 'little more than a century ago, a large portion of the land was covered with woodland and full of swampy ground but is now well drained and intensively cultivated.' In addition to naturally occurring woodland and marsh, descriptions in the TDLCA also refer to woodland, heathland and grassland. The distribution of these habitats would have been influenced by the glacial drift of sands and gravels deposited over the underlying London clays with heathland on thinner soils and woodland on deeper soils. The Enclosure Act of 1750, initiated the gradual removal of vegetation, accelerated further by the mechanisation and intensification of farming practices over the last century, and leading to our current situation in which there is no natural and very little semi-natural vegetation remaining in Tendring District. The objective, to reintroduce the habitats of the indigenous landscape, will create a link with the past, reintroduce land cover that is native to this area and restore the historic character of the landscape.

Landscape Baseline

4.3.3 The site occupies a lowland plateau at an elevation of approximately 34 to 35m, with a gentle fall from north to south causing the land to drain slowly to the south. The general flatness of the plateau means enclosure is created mainly by vegetation and where trees and hedgerows do occur, they make a valuable contribution to the aesthetic of the rural landscape. The soils are described as 'lightly acid loamy and clayey soils with impeded drainage'. Their fertility is considered to be moderate to high and can support a range of woodland and grassland habitats, making them suitable to support the habitat mosaic being proposed. The extensive field drainage system ensures excess water is drained away, such that there is very little surface water. A Sustainable Urban Drainage System (SUDS) is proposed to attenuate surface water associated with the onshore substations. These ponds and other habitat ponds proposed are considered to be positive features that will enhance landscape character and biodiversity potential.

Plate 111 - View towards site from Ardleigh Rd near Jenning's Farm

4.3.4 Agriculture is the predominant land use in the area (much of the land is Grade 1 agricultural land) and the land cover comprises the seasonal production of cereals. This creates a generally open character, albeit with important enclosure from intermittent hedgerows and tree cover. The Landscape and Ecological Design presents an interface between the existing agricultural landscape and the proposed ecological habitats. The agricultural land uses and associated rural character are respected through the retention of farm fields to the south-east and the creation of traditional hedgerows and shelterbelts around the periphery of the site. The creation of species-rich habitats will present a more lush and naturalistic character that will contrast with and complement the rural farmland.

Visibility

4.3.5 The generally flat and low-lying landform coupled with the screening effect of existing dispersed vegetation produces a landscape in which there are few long-range views. This has led to visibility of the onshore substations being contained within the local landscape around the site. A key objective, from the outset of the project, was to mitigate the effects of the onshore substations on local landscape character and visual amenity with extensive shelterbelt, woodland and orchard planting presenting the effective means to deliver this objective. The Landscape and Ecological Design addresses the commitment to screening made through the DCOs by designing the areas of tree planting to be multi-layered, so that there is a density of foliage at each vertical stratum. While effects will be mitigated gradually over time through years of plant growth, the visual effect of the onshore substations will also be enhanced by the application of colour on specific structures in the AIS substations as explored in Part 3: Environmental Colour Assessment.

Climate Resilience

4.3.6 The Met Office publishes data predicting how the UK climate will change during the 21st Century, based on a range of different scenarios and highlights how the climate in the south-east of England is likely to get hotter and drier in the summer months, and warmer and wetter in the winter months, also with an increase in storm events. The Landscape and Ecological Design can ameliorate these effects of climate change through creating woodlands, scrub, grasslands and ponds that will attenuate water, provide shade, shelter and moisture and support a web of wildlife that will support the continuation of natural processes such as pollination, seed dispersal and natural regeneration. Plant species will be selected, layouts designed, and management organised to ensure inbuilt climate resilience.

4.4 Ecological Baseline

4.4.1 The site is located on an expansive lowland plateau where arable crops form the predominant land cover and where surface water is limited to drainage ditches along field boundaries. As a result of the limited range of habitat types present and relative lack of semi-natural habitats, there is great scope to increase the biodiversity value of the site. The richness of local biodiversity can be considerably enhanced through creating a range of habitats comprising native species.

4.4.2 Oak is the dominant tree species in this area and historically, along with ash, would have formed the canopy of woodlands. Other common species include hazel, sycamore, hornbeam and lime, with the coppicing of hazel and sweet chestnut a key feature of ancient woodlands.

4.4.3 There are no landscape or nature designations in the local area and green infrastructure is limited to hedgerows, shelterbelts and small woodland blocks. It is in this nature depleted context that the site presents the opportunity to create an important resource for local wildlife. It is also important that vegetation on the site connects with vegetation in the surrounding landscape to maximise the potential connectivity with other habitats that the site has to offer. This approach reflects both Essex County Council's 'Green Infrastructure Strategy' and 'Essex Green Infrastructure Standards' which require new developments to contribute positively to strengthening and expanding existing green networks across the county.

4.5 Design Concept

Bringing together the outline plans

4.5.1 The Design Guide landscape and ecology masterplan, shown in Section 4.15 (General Arrangement) and 4.16(Illustrative), develops and combines the landscape strategy set out in the North Falls Design Vision Document (Section 5.5) and North Falls OLEMS with the Five Estuaries OLEMP.

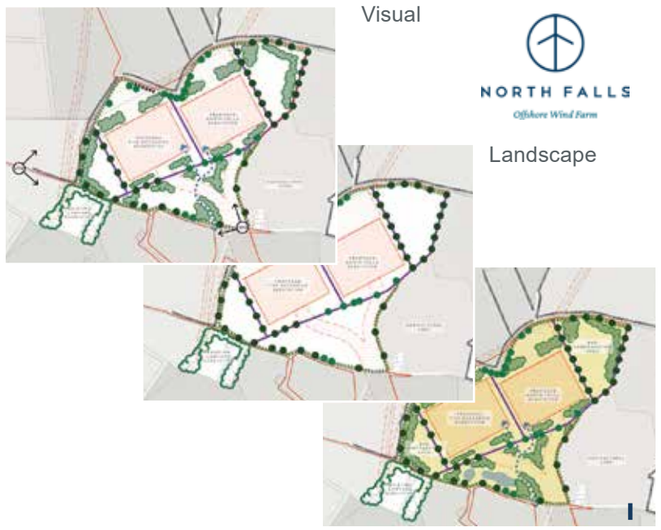
4.5.2 The projects have shared a similar design approach through these outline strategies (Plate 116), based on the layering of information around the development requirements, constraints and existing landscape context, with proposals for visual screening, landscape enhancements and ecological mitigation, compensation and enhancements.

4.5.3 The Design Guide and its Landscape and Ecology Masterplan (Section 4.15 General Arrangement and 4.16 Illustrative) incorporate several updates made during the Examination of both projects and draw together the outline plans, with merging of the North Falls and Five Estuaries landscape plans, to provide an updated and coherent overall masterplan to take forward towards the detailed design stage.

4.5.4 In particular, two key aspects have been incorporated into the plan:

- Woodland shelterbelt along Ardleigh Road to the west of Normans Farm and around field boundary to the west of Jenning's Farm. This provides for a greater and earlier level of visual screening due to its closer proximity to receptors, as well as a larger area of land retained for agricultural use.
- Creation of a traditional orchard (i.e. not intensive) on the northern side of the substations (as per the Five Estuaries OLEMP), to restore a traditional feature and provide habitat enhancement, interspersed with higher landscape screening planting in this area (as per the North Falls OLEMS).

4.5.5 In addition to these two key areas, the Design Guide provides further definition and illustration of the proposed habitat mosaics (Section 4.6) within the masterplan, including for example, differentiating boundary shelterbelts for screening and locally native broadleaf woodlands, areas of lowland meadow, and proposals for tree copses and wetland areas within the landscape and ecological enhancement areas.



North Falls Design Vision Statement - Outline Landscape Strategy Masterplan

Five Estuaries - OLEMP

Design Guide Landscape and Ecology Masterplan
(Section 4.14 General Arrangement and 4.15Illustrative)

Plate 112 - North Falls and Five Estuaries landscape plan

4.6 Proposed Habitat Mosaics

4.6.1 The Landscape and Ecological Design proposes a range of different habitats, including shelterbelts, hedgerows, woodland, traditional orchards, grassland, scrub and ponds, as shown in the illustrative cross sections in Plate 113. Each of these proposed habitats is described further in sections 4.8-4.13 of this design guide and microhabitats are also described in 4.14.

4.6.2 The spatial arrangement of these habitats and proposed landscape planting areas are shown in the Landscape and Ecology Masterplan in Section 4.15 (General Arrangement) and 4.16 (Illustrative). Together with the habitat descriptions, this Landscape and Ecology Masterplan (Section 4.15 and 4.16) refines the indicative proposals in the OLEMP, providing additional information on spatial layout and composition of planting areas and habitats proposed.

4.6.3 The ecological gain that will be delivered through the Landscape and Ecological Design is derived from the combination of these habitats and microhabitats on one site, with the whole becoming greater than the sum of the parts. The diversity and presence of habitat mosaics will ensure that there is a range of habitat and food sources for all seasons and that such provisions will benefit existing species and encourage the return of lost or dwindling species. The following sections of the design guide provide a description and illustration of these proposed habitat mosaics, for example, showing how woodland will transition to scrubland and grassland, as well as wetland areas and associated aquatic species, with a mix of opportunities for wildlife to thrive.

4.6.4 A key element of these habitat mosaics is the understanding that the specifications listed are intended to address multiple requirements that may conflict with one another; for example, planting locally appropriate species in addition to climate resilient species, or species that provide screening.

4.6.5 The intention of this design guide is to provide an indicative plan that meets the overall objectives of the site design, and that these specific interventions will be reviewed and refined on a case-by-case basis throughout the site.

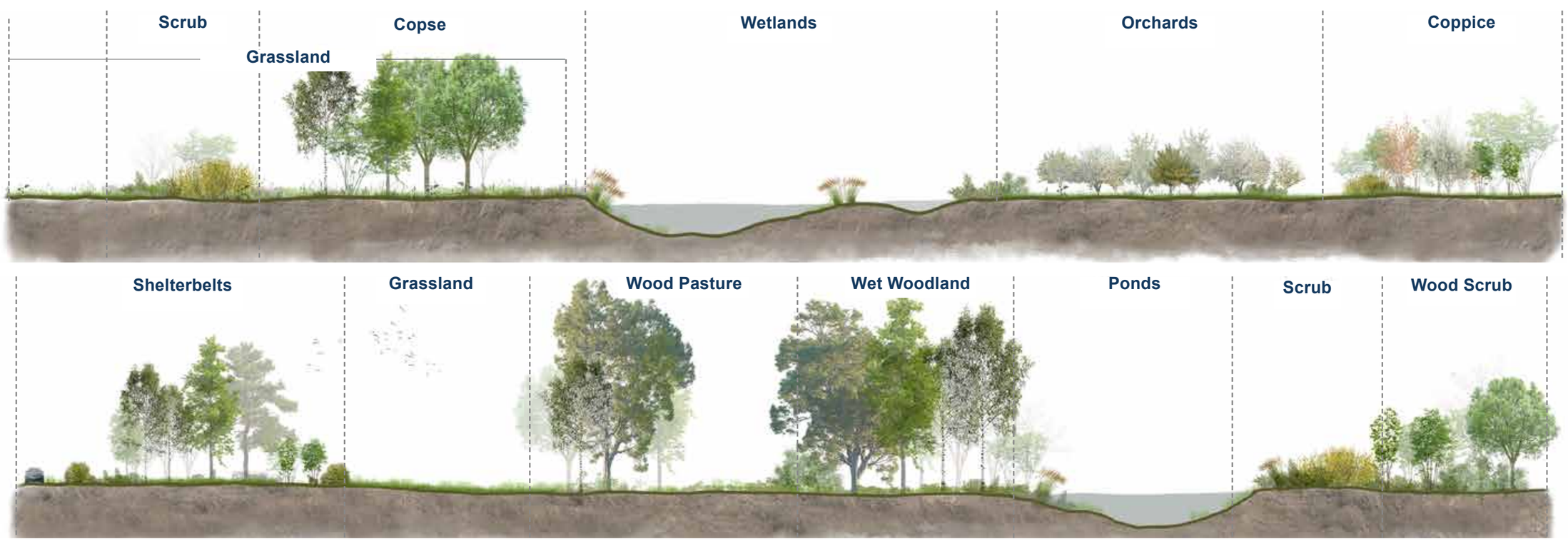


Plate 113 - Habitat mosaics illustrative cross sections

4.7 Planting Progression

4.7.1 The design guide presents an indicative framework, with the understanding that specific interventions will be assessed and refined individually across the site as the project progresses. The proposed habitat mosaics will continue to grow and develop over time, and maintenance interventions will be made where appropriate to best support and compliment the development of healthy and appropriately located habitats. As detailed in the OLEMS/OLEMP, planting should create an effective visual screen within 5 to 15 years as it grows and matures over time after establishment. Opportunities for advanced planting will be identified and implemented to accelerate early growth, intending to significantly reduce the time needed to achieve effective screening. Plates 114-116 show illustrative cross sections of proposed habitats at Year 1, Year 5, Year 15 and Year 30 to show what the planting is trying to achieve over time.

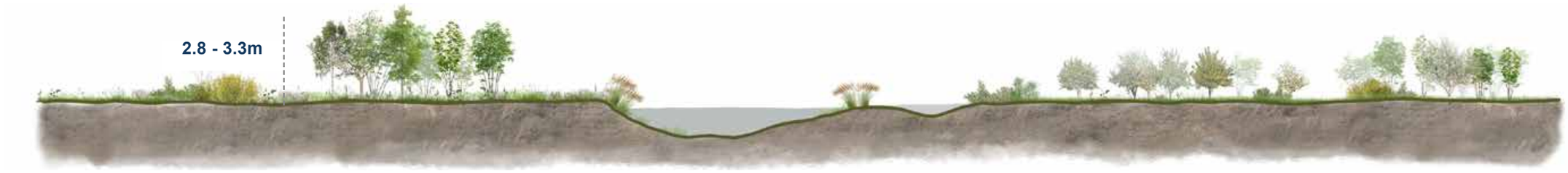


Plate 114 - 5 year planting diagram

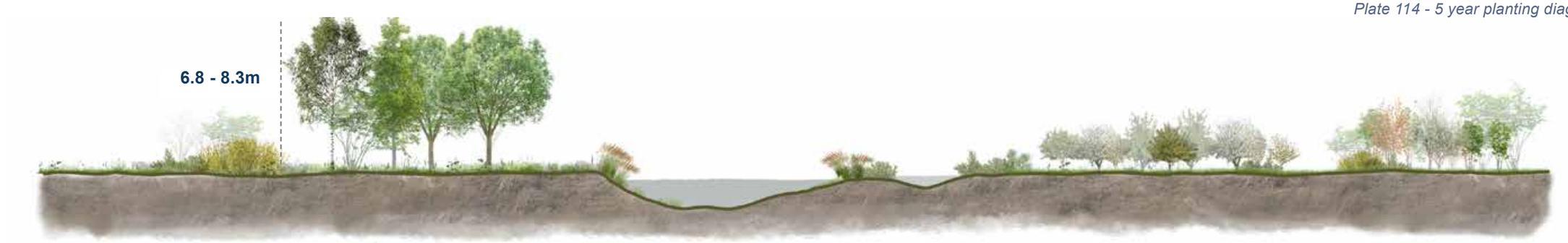


Plate 115 - 15 year planting diagram

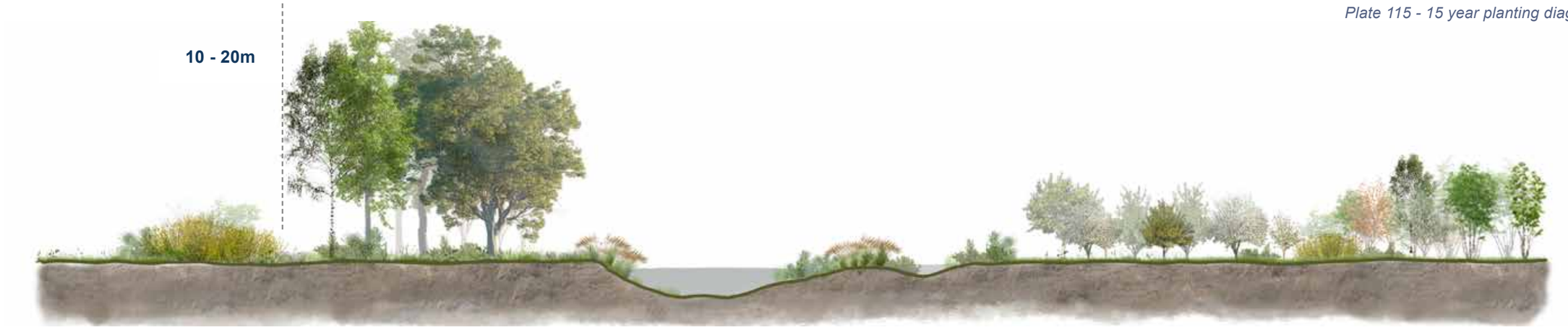


Plate 116 - 30 year planting diagram

Plate 117 - Shelterbelt and hedgerow habitat illustrative plan and cross section; 1:200

4.8 Shelterbelts

4.8.1 Shelterbelt planting will extend around the western, southern and eastern peripheries of the site. It has been designed to create a visual screen of the onshore substations and will typically be 15m to 20m in width and will reach a height of approximately 6 to 8m after 15 years growth.

4.8.2 The shelterbelt comprises hedgerows along one or both outer edges, enclosing a mix of canopy trees, understorey trees and ground cover between to create a layered profile and effective screen. The woodland mix will be planted as whips with canopy trees and associated nurse species located close to the roadside edge to provide immediate height. The shelterbelt profile will taper down through smaller trees, and understorey towards the hedgerow on the field side, in order to avoid excessive shading of crops. The trees will be thinned to ensure the strongest specimens have space to grow.

Proposed Species

4.8.3 Proposed species for shelterbelts are set out below and are informed by the Essex Tree Palette (Essex County Council, 2018):

- **Canopy Trees:** *Quercus robur* (English Oak), *Pinus sylvestris* (Scot's Pine), *Populus nigra* (Black Poplar)
- **Understorey Trees:** *Corylus avellana* (Hazel), *Acer campestre* (Field Maple), *Carpinus betulus* (Hornbeam), *Sorbus aucuparia* (Mountain Ash), *Salix caprea* (Goat Willow), *Prunus avium* (Wild Cherry), *Alnus glutinosa* (Alder), *Betula pendula* (Silver Birch)
- **Understorey and Hedgerows:** *Crateagus monogyna* (Hawthorn), *Prunus spinosa* (Blackthorn), *Corylus avellana* (Hazel), *Ilex aquifolium* (Holly), *Carpinus betulus* (Hornbeam), *Rosa canina* (Dog Rose), *Quercus robur* (English Oak), *Salix caprea* (Goat Willow), *Cornus sanguinea* (Dogwood).
- **Ground Cover:** (Wood Sage) (Bugle) (Wood Speedwell) (Honeysuckle) (Bluebell) (Hairy Woodrush) (Wood Sorrell) (Greater Stitchwort) (Creeping Soft-Grass)

4.9 Hedgerows

Species-Rich Native Hedgerows with Hedgerow Trees

4.9.1 Hedgerows will be planted around the majority of the boundary of the site both independently and in accompaniment of the shelterbelt habitat profile. The aims of the hedgerows are to provide screening, restore any gaps in existing hedgerow, and overall to maintain, extend, and connect the existing network of hedgerows. Hedgerows provide connective habitat between different sections of the site, acting as a physical link between areas and habitats.

4.9.2 Hedgerows will be planted in a double staggered row, with whips spaced at 50cm and rows 30cm apart. Hedgerows that are planted alongside and /as part off the shelterbelts matrix will be maintained at approximately 1.5-2m wide. Stand-alone sections of hedgerows should be allowed to grow wider, up to a maximum of 5m wide maximum.

4.9.3 Traditional hedge-laying and sensitive management will ensure a tall, dense hedgerow with a wide base and few gaps. The hedge will comprise alternate groupings of native hedge species. Hedgerow trees will be planted along certain hedgerows and spaced with variation every 10-20m to allow the canopy to grow over time.

4.9.4 Once established, hedge cutting will occur on a rotational basis with each section being cut every two or three years, in order to ensure year-round availability of habitats and food sources. Some sections of hedge will have hedgetrees integrated while strong saplings can also be left to grow into hedgetrees. Protective fencing will likely be installed, where required, around areas of new planting to complete boundaries and protect new hedging and woodland.

Proposed Species

- **Hedgerows:** *Crateagus monogyna* (Hawthorn), *Prunus spinosa* (Blackthorn), *Corylus avellana* (Hazel), *Ilex aquifolium* (Holly), *Carpinus betulus* (Hornbeam), *Rosa canina* (Dog Rose), Q*uercus robur* (English Oak), *Salix caprea* (Goat Willow), *Cornus sanguinea* (Dogwood).

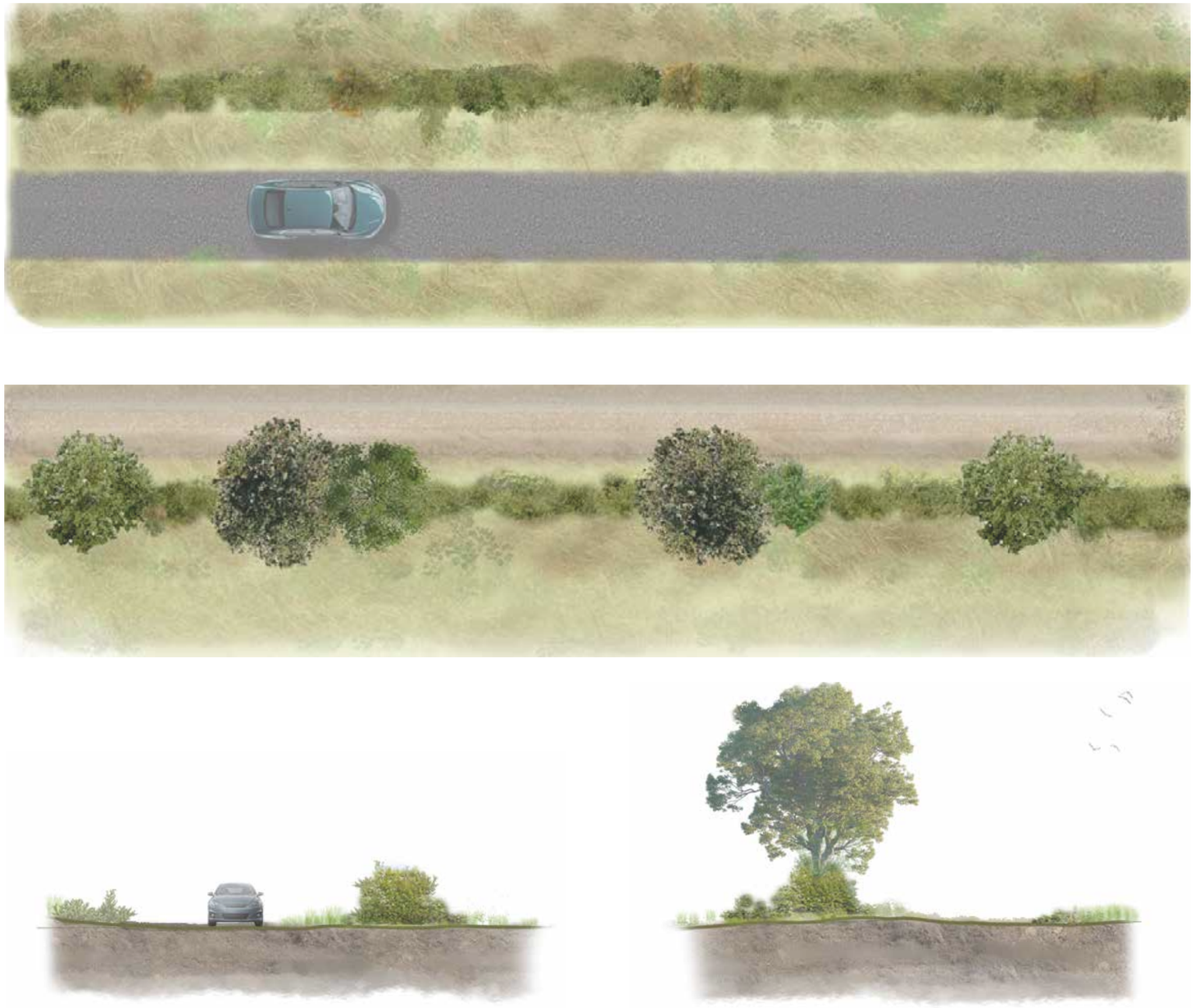


Plate 118 - Hedgerow illustrative plan and cross section

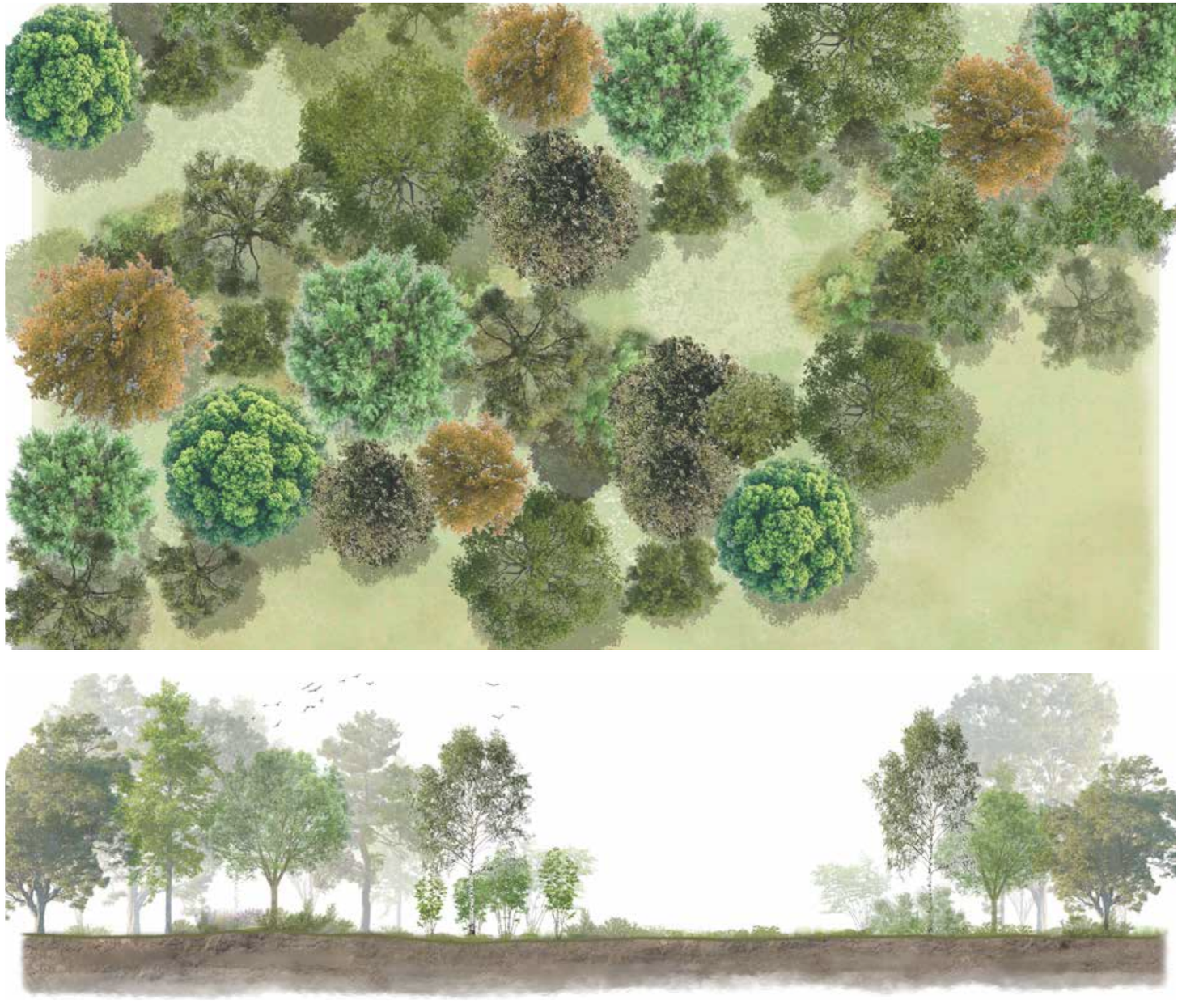


Plate 119 - Woodland habitat illustrative plan and cross section; 1:200

4.10 Woodland

Locally Native Broadleaf Woodland

4.10.1 The selection of woodland species has been informed by the presence of native trees in the nearby Weely Hall Wood, Bullock Wood and Riddles Wood SSSIs. While the native woodland of this lowland region comprises oak and ash with hazel and sweet chestnut coppice, the risks of ash die back disease means the alternative species of sweet chestnut, black poplar and small-leaved lime have been selected. A good mix of species is essential in building resilience to climate change, pests and disease. Protective fencing will likely be installed, where required, around areas of new planting to complete boundaries and protect new hedging and woodland.

Proposed Species

4.10.2 Proposed species for locally native broadleaf woodlands are set out below and are informed by the Essex Tree Palette (Essex County Council, 2018):

- **Canopy Trees:** *Quercus robur* (English Oak), *Castanea Sativa* (Sweet Chestnut), *Populus nigra* (Black Poplar), *Tilia Cordata* (Small-leaved Lime).
- **Understorey:** *Corylus avellana* (Hazel), *Acer campestre* (Field Maple), *Carpinus betulus* (Hornbeam), *Sorbus aucuparia* (Mountain Ash), *Prunus Avium* (Wild Cherry), *Salix caprea* (Goat Willow), *Salix x fragilis* (Crack Willow), *Alnus glutinosa* (Alder), *Betula pendula* (Silver Birch), *Crateagus monogyna* (Hawthorn), *Prunus spinosa* (Blackthorn), *Corylus avellana* (Hazel), *Ilex aquifolium* (Holly), *Carpinus betulus* (Hornbeam), *Rosa canina* (Dog Rose), *Quercus robur* (English Oak), *Salix caprea* (Goat Willow), *Cornus sanguinea* (Dogwood) (Honeysuckle).
- **Ground Cover:** *Teucrium scorodonia* (Wood Sage), *Ajuga reptans* (Bugle), *Veronica montana* (Wood Speedwell), *Hyacinthoides non-scripta* (Bluebell), *Luzula pilosa* (Hairy Woodrush), *Oxalis acetosella* (Wood Sorrell), *Stellaria holostea* (Greater Stitchwort), *Holcus mollis* (Creeping Soft-Grass)

4.11 Traditional Orchards

4.11.1 Traditional orchards are defined for priority habitat purposes as orchards managed in a low intensity way, in contrast with orchards managed intensively for fruit production. Traditional orchards are proposed in areas to the north of the onshore substations (Landscape and Ecology Masterplan, Section 4.15).

4.11.2 Traditional orchards are an historic feature of the Essex landscape. East of England Apples and Orchards Project (EEAOP) is a registered charity that promotes the preservation and creation of traditional orchards and local varieties grown by EEAOP that are unique to the local area, are being proposed for planting in the traditional orchard area.

4.11.3 The design guide specifies areas of traditional orchard for the following key benefits provided:

- Priority habitat with greater return on biodiversity provided to the site.
- The range of available tree varieties are adaptable to the constraints on the areas of the site to the north of the onshore substations (dwarf varieties can be planted underneath overhead cables and shallow-rooted varieties being planted above buried cables).
- Ability for habitat to establish more quickly than wood-pasture or parkland due to the shorter lifespan of proposed tree species.

4.11.4 Fruit trees will be planted as half standard rootstocks between 3 and 4.6m in height. A traditional Quincunx pattern will be used, with trees spaced on a 10m grid with an additional tree planted in the centre of each square. The additional tree will be a faster growing pollinator tree which will bring the fruit trees on, enable pollination to set the fruit, add to the overall density of the traditional orchard and eventually removed once the other trees become well established.

4.11.5 The traditional orchard will be underplanted with a species rich neutral grassland. Trees are best planted in early spring and watered regularly over the first three weeks. They will need to be staked and guarded with a1m radius around the base of the fruit trees kept mown to reduce competition during the first three years of establishment. The intention is that the fruit form the trees will provide an important food source for local wildlife.

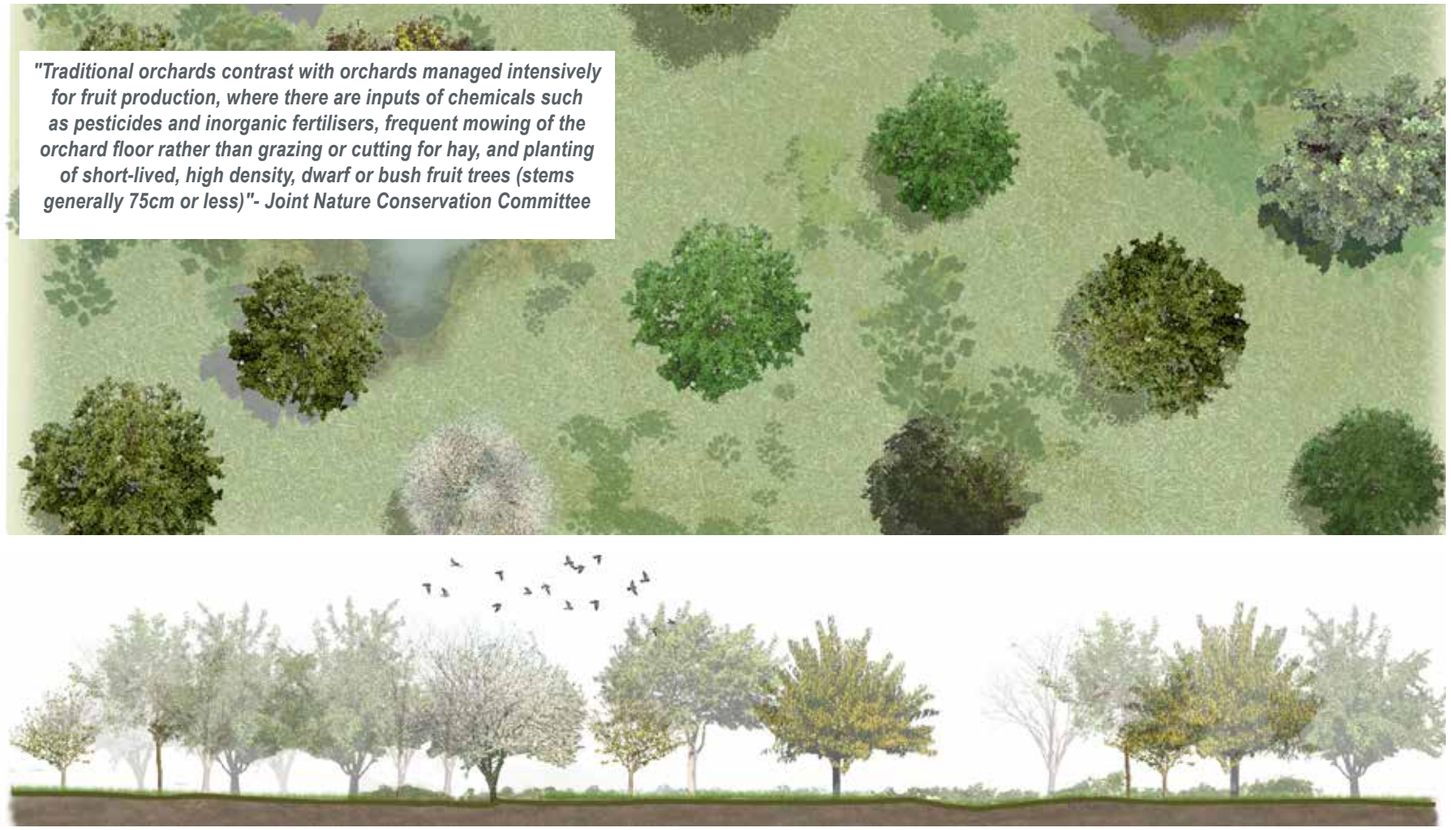


Plate 120 - Traditional orchard habitat illustrative plan and cross section; 1:200

Proposed Species

- Fruit Trees: Traditional Apple Trees – Nolan's Pippin and Stanway Seedling. Traditional Pear Trees – Gansel's Bergamot and Johnny Mount Pear. Traditional Plum Tree – Burrell's Red Myrobalan
- Coppice Trees: Corylus avellana (Hazel), Carpinus betulus (Hornbeam), Castanea Sativa (Sweet Chestnut)
- Species-Rich Neutral Grassland: Centaurea nigra (common knapweed), Leucanthemum vulgare (ox-eye daisy), Lotus corniculatus (bird's-foot trefoil), Galium verum (lady's bedstraw), Rumex acetosa (common sorrel), Lathyrus pratensis (yellow meadow

4.12 Scrub and Grassland

4.12.1 The Landscape and Ecological Design includes large areas of grassland with smaller patches of scrub. Whilst the soil type across the site does not vary much from a slightly acid loam, there is scope for variability in response to water levels in proximity to ponds and ditches, degree of shading from buildings and other vegetation and depth of soil. Therefore grassland that experiences shade will be sown with a woodland edge or hedge mixture of grasses, parts of the site will be sown with tussocky mixtures, and most parts sown with a mix that broadly accords with NVC community MG5 Cynosurus cristatus - Centaurea nigra grassland - which could be from a green hay cut on a nearby site, or seed gathered from existing meadows. Patches of scrub interspersed across the grassland, will provide additional habitat and food sources but will need to be managed to prevent succession.

Plate 121 - Grassland and scrub habitat illustrative plan and cross section

4.12.2 The management regime will also vary depending on the locations and grassland type: the bulk being subject to a haycut and either removed from site or a proportion retained as compost heaps for use by sheltering reptile and mammal species. Margins and portions will be left intentionally unmanaged for 2 to 3 years, with the exception of the removal of invasive species or encroaching scrub – this will provide shelter and overwintering for a range of animals on site.

4.12.3 The following proposed species mixes will be sown in appropriate locations based upon further examination of the site conditions at later stages in the design process. Their terminology refers to ecologically recognized terms rather than s41 habitat typologies, and their species mixes are not prescriptive for the final design, as other mixtures could be chosen to achieve the same design intention. The following species are proposed to intentionally promote species diversity (in structure, height, supported habitat, etc.) and climate resiliency across a variety of possible grassland types.

Proposed Species

- **Lowland Meadow Grasses:** *Centaurea nigra* (common knapweed), *Leucanthemum vulgare* (ox-eye daisy), *Lotus corniculatus* (bird's-foot trefoil), *Galium verum* (lady's bedstraw), *Rumex acetosa* (common sorrel), *Lathyrus pratensis* (yellow meadow vetchling), R*anunculus acris* (meadow buttercup), *Plantago lanceolata* (ribwort plantain), *Primula veris* (cowslip), *Hypochaeris radicata*
- **Grassland herbs**: *Cynosurus cristatus* (crested dog's-tail), *Briza media* (quaking grass), *Anthoxanthum odoratum* (sweet vernal grass), *Trisetum flavescens* (yellow oat-grass), *Festuca rubra* (red fescue), *Agrostis capillaris*
- **Tussocky Grassland:** *Agrostis capillaris* (Common Bent), *Alopecurus pratensis* (Meadow Foxtail), *Carex divulsa ssp divulsa* (Grey Sedge), *Cynosurus cristatus* (Crested Dogstail), *Dactylis glomerata* (Cocksfoot), *Festuca ovina* (Sheep's-fescue), *Festuca rubra ssp rubra* (Slender-creeping Red Fescue), *Phleum bertolonii* (Smaller Cat's-tail), *Schedonorus arundinaceus* (Tall Fescue)
- **Shady Grassland:** *Agrostis capillaris* (Common Bent), A*nthoxanthum odoratum* (Sweet Vernal-grass), *Brachypodium sylvaticum* (False Brome), *Cynosurus cristatus* (Crested Dogstail), *Deschampsia cespitosa* (Tufted Hair-grass), *Festuca rubra* (Red Fescue), P*oa nemoralis* (Wood Meadow-grass), *Alliaria petiolata* (Garlic Mustard), *Arctium minus* (Lesser Burdock), *Centaurea nigra* (Common Knapweed), *Dipsacus fullonum* (Wild Teasel), *Galium album* (Hedge Bedstraw), *Lathyrus sylvestris* (Narrow-leaved Everlasting-pea), *Leucanthemum vulgare* (Moon Daisy), *Malva moschata* (Musk Mallow), *Silene dioica* (Red Campion).
- **Scrub:** *Crateagus monogyna* (Hawthorn), *Prunus spinosa* (Blackthorn), *Rubus fruticosus* (Brambles), *Ulex europaeus* (Gorse), *Saliux cinerea* (Grey Willow), *Salix caprea* (Goat Willow), V*iburnum opulus* (Guelder-rose), *Rosa canina* (Dog rose).

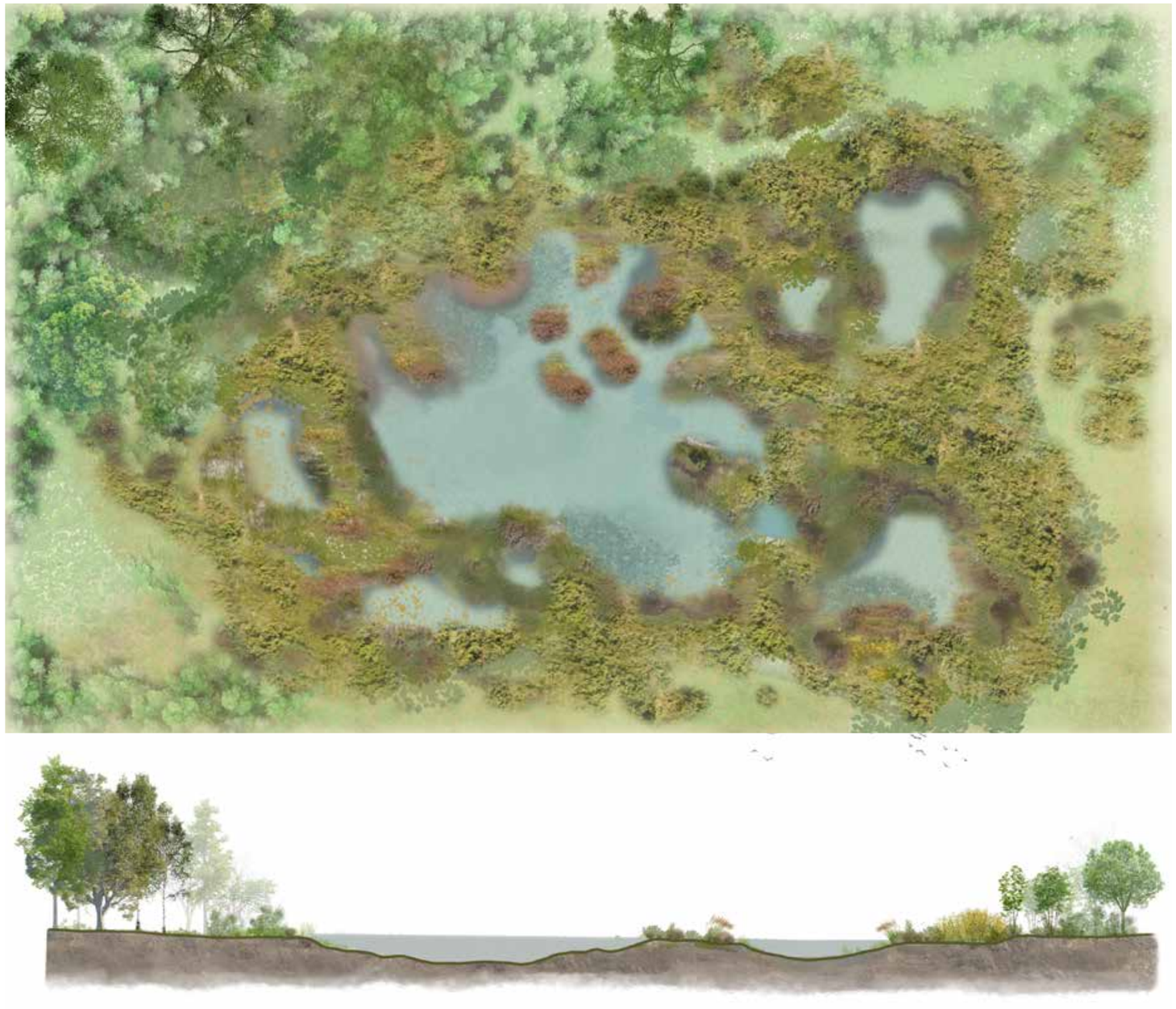


Plate 122 - Wetland habitat illustrative plan and cross section; 1:200

4.13 Wetlands

Wetlands and SUDs

4.13.1 There are two types of ponds proposed for the site; SUDS ponds, which will provide water management and wildlife habitat; and wetland area ponds, which will provide wildlife habitat. The SUDS ponds will be located to the south of the Five Estuaries substation and although will be designed to regulate water levels across the site, will also be designed to maximise biodiversity through creating a wide draw down at the shallow ends, albeit with greater potential depths across the ponds to enable attenuation during storm events. The wetland area ponds will generally be shallower and will occur within a wider wetland area where a mix of larger and smaller and permanent and temporary ponds provide a variety of different conditions for wildlife. The preferred pond slope is 1:20, with a maximum of 1:5, and varying depths, scalloped edges and the creation of embayments all help to create a readily habitable pond.

4.13.2 Important aspects of SUDS pond management will include management of water levels, vegetation, trees and silt to ensure the ponds are able to perform their water management function. The wetland area ponds will largely be self-managing with a fluctuation in water levels and the seasonal drying out of smaller ponds forming an important aspect of the natural water system to which species have adapted. Similarly, if ponds silt up then future management may look to create new ponds rather than excavating existing ponds. Management may be needed where non-native, invasive species are taking over or where dense tree growth is reducing light levels in the pond that in turn is reducing biodiversity.

4.13.3 Despite summer dryness, the site being winter-wet indicates that areas will be suitable for establishing wetland areas. Permanent standing water is not essential - temporary pools, scrapes, and wetted areas can support wetland habitat. Wetlands should be located anywhere on-site where surface or high groundwater can be retained, with placement guided by a detailed water management plan. Wetlands can exist even with water at or just below the surface.

4.13.4 Wetland areas are currently shown indicatively in the Landscape and Ecology Masterplan Section 4.15) within the areas of lowland meadow, but these can be developed and expanded over time in any location on the site best suited to water retention. The intention is for all ecological wetland features to be unlined and may include scrapes, temporary pools, and puddles. Given the rarity of this habitat type in Essex, its creation would be ecologically valuable.

Proposed Species

4.13.5 Planting up of ponds with locally appropriate species is not initially proposed, as wetland habitats typically vegetate naturally within a relatively short period of time; this also represents the most bio secure method, minimising the risk of importing non-native species or disease.

4.14 Microhabitats

4.14.1 Microhabitats are localised areas that offer specific conditions favourable for particular species. These niches can be as small as a patch of moss on a rock or as large as a hedgerow. They can include different types of soil, moisture levels, light exposure, and plant communities that support various organisms such as insects, birds, amphibians, and mammals. Each species has its own set of habitat requirements; thus, providing diverse microhabitats can lead to a richer and more resilient ecosystem. This design guide landscape masterplan proposes the inclusion of microhabitats that will be accommodated in appropriate locations across the habitat mosaic, with indicative locations shown in the Landscape and Ecology Masterplan in Section 4.15 (General Arrangement) and 4.16 (Illustrative).

Protected and Notable Species: Special Considerations

4.14.2 The landscape and ecology masterplan (Section 4.15) aims to expand upon the measures and commitments addressing potential impacts on protected and notable species set forth in the North Falls OLEMS (Section 2.2.3) and the Five Estuaries OLEMP (Section 7) in regard to local species habitats and protection. The described microhabitats will provide a variety of additional habitat support for the key species described. As described in these documents, the aim is to minimise impacts to ground-nesting birds, providing some provision for grey partridge and nesting skylark by incorporating hedgerows and tree planting, alongside low banks with dense grassy cover for nesting, and areas of semi-improved grassland to support chick-rearing.

4.14.3 Additional food sources will be available through provisional habitats supporting invertebrate species, and the establishment of wetland habitats will be helpful for species utilizing mud in their nesting. In relation to Barn Owls, consultation with the Essex Wildlife Trust, Tendring District Council and the relevant Statutory Nature Conservation Body has agreed aims to repair or replace existing nest boxes or add new ones in suitable locations across the onshore project area to enhance nesting conditions. For further measures and commitments addressing potential impacts on protected and notable species, please refer to Five Estuaries OLEMP (Section 7) and North Falls OLEMS (Section 2.2.3).

Log Piles

4.14.4 Many species are adapted to use dead wood found naturally in woodlands. A small pile of logs can support a multitude of different types of fungi, insects, provide a refuge and hunting ground for small mammals, reptiles and amphibians, and shelter for over-wintering and hibernating wildlife.

Rock Piles

4.14.5 Rock piles create a range of conditions that are useful to a variety of wildlife including reptiles, amphibians, small mammals and insects. The temperature and humidity of the interior nooks and crannies tends to be stable and acts as a safe place to shelter or take refuge. Conversely the surface heats up quickly in the sun and can be used by basking reptiles and invertebrates, and as a result make great hunting grounds for other reptiles, birds and mammals. Rock piles are best located close to ponds, scrub, hedgerows or log piles

Hibernaculum

4.14.6 Hibernacula are shelters or underground chambers that amphibians and reptiles use throughout the winter to protect themselves from the cold. A hibernaculum comprises a hole in the ground, loosely filled and heaped with logs, branches, bricks and stones but with gaps for access, and then covered over with soil and planted. This will provide amphibians and reptiles with warmth and shelter throughout the winter months.

Temporary Pools

4.14.7 Temporary pools are an important microhabitat that have declined significantly due to extensive drainage of farmland. A huge variety of wildlife uses temporary pools and they often support rare and scarce species which thrive in the unique combination of periodic flooding and drying. Many scarce plants and insects are associated with the damp muddy margins exposed as temporary pools dry out. Free from predators, tadpoles and aquatic insects can often thrive and birds and mammals in arable areas often rely on pools for their drinking water.

Invertebrate Bank

4.14.8 An invertebrate bank comprises a permanent grassy bank sown with tussocky grass plus finer grasses and flowers. The bank will typically be ~0.4m high and 3 to 5m wide and will provide winter habitat for bees, beetles and spiders, who in spring and summer will spread out to feed on insects and plants in the surrounding land. The bank can also incorporate exposed earth faces (described below), and is also beneficial habitat for ground nesting birds and small mammals.

Nest Boxes

4.14.9 In the absence of cracks and crevices in trees and buildings, there are few opportunities for nesting birds and roosting bats. Bird and bat boxes provide places of shelter year round, but are also used for raising young and in the case of bats, also for hibernating. A range of types of bat and bird box are proposed, with suitability for barn owls, kestrels and passerines, summer and winter roosting bats to be included on this site.

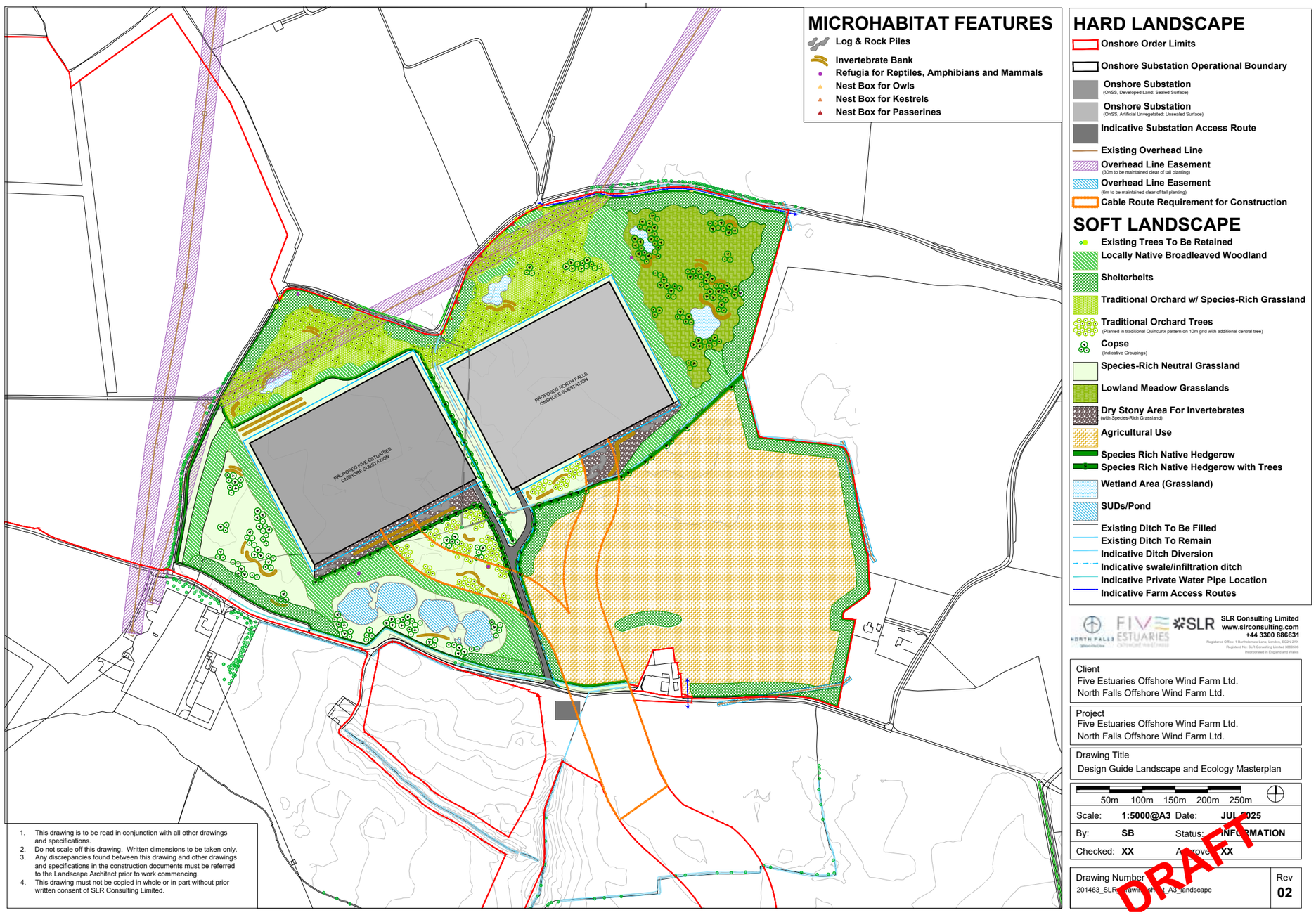
Compost Heaps

4.14.10 The construction of compost boxes across the site will be possible by using organic materials that arise from maintenance operations such as grass and hedgerow cutting. These materials will be retained as heaps across the site, and allowed to decompose naturally. In so doing they will provide an important habitat for a diverse range of fungi, insects, reptiles, amphibians and small mammals, that feed and shelter in and on the heap. These type of traditional compost hears are particularly beneficial for wildlife in winter when they remain warmer than surrounding habitats, providing shelter and food.

Exposed Earth Faces

4.14.11 Exposed earth faces provide a habitat for ground nesting insects such as miner bees, solitary wasps and beetles. These insects burrow into the soil but in order to do so, need an exposed face free from vegetation. Creating small earth banks that are steep enough to be free from vegetation and south facing to benefit from the warmth of the sun, helps create favourable conditions for these insects.

4.15 Landscape and Ecology Masterplan - General Arrangement



MICROHABITAT FEATURES
- Log & Rock Piles
- Invertebrate Bank
- Refugia for Reptiles, Amphibians and Mammals
- Nest Box for Owls
- Nest Box for Kestrels
- Nest Box for Passerines

HARD LANDSCAPE
- Onshore Order Limits
- Onshore Substation Operational Boundary
- Onshore Substation (OnSS, Developed Land: Sealed Surface)
- Onshore Substation (OnSS, Artificial Unvegetated: Unsealed Surface)
- Indicative Substation Access Route
- Existing Overhead Line
- Overhead Line Easement (30m to be maintained clear of tall planting)
- Overhead Line Easement (6m to be maintained clear of tall planting)
- Cable Route Requirement for Construction

SOFT LANDSCAPE
- Existing Trees To Be Retained
- Locally Native Broadleaved Woodland
- Shelterbelts
- Traditional Orchard w/ Species-Rich Grassland
- Traditional Orchard Trees (Planted in traditional Quincunx pattern on 10m grid with additional central tree)
- Copse (Indicative Groupings)
- Species-Rich Neutral Grassland
- Lowland Meadow Grasslands
- Dry Stony Area For Invertebrates (with Species-Rich Grassland)
- Agricultural Use
- Species Rich Native Hedgerow
- Species Rich Native Hedgerow with Trees
- Wetland Area (Grassland)
- SUDs/Pond
- Existing Ditch To Be Filled
- Existing Ditch To Remain
- Indicative Ditch Diversion
- Indicative swale/infiltration ditch
- Indicative Private Water Pipe Location
- Indicative Farm Access Routes

1. This drawing is to be read in conjunction with all other drawings and specifications.
2. Do not scale off this drawing. Written dimensions to be taken only.
3. Any discrepancies found between this drawing and other drawings and specifications in the construction documents must be referred to the Landscape Architect prior to work commencing.
4. This drawing must not be copied in whole or in part without prior written consent of SLR Consulting Limited.

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Client
Five Estuaries Offshore Wind Farm Ltd.
North Falls Offshore Wind Farm Ltd.

Project
Five Estuaries Offshore Wind Farm Ltd.
North Falls Offshore Wind Farm Ltd.

Drawing Title
Design Guide Landscape and Ecology Masterplan

50m 100m 150m 200m 250m

Scale: 1:5000@A3 Date: JUL 2025
By: SB Status: INFORMATION
Checked: XX Approved: XX

Drawing Number
201463_SLR_Drawing_Sheet_A3_landscape

Rev 02

DRAFT

4.16 Landscape and Ecology Masterplan - Illustrative

5: Consultation

5 Consultation

5.1 General approach to the JDG consultation

5.1.1 The production of the Design Guide will be an iterative process, informed by input from internal Design Champions, an independent design review panel (Essex Quality Review Panel) and feedback provided by:

- Representatives from Essex County Council, who will be responsible for approving the detailed proposals for the OnSSs;
- Representatives from Tendring District Council;
- Parish councils intersecting the proposed co-located onshore substations: Ardleigh, Lawford, Little Bromley, Great Bromley;
- Landowners intersecting the proposed co-located onshore substations;
- Local residents; and
- Other interested parties within the parishes intersecting the proposed co-located onshore substations.

5.1.2 An independent design review panel are also appointed. The role of the Independent Design Panel is defined in the Overarching National Policy Statement for Energy, EN-1 (2024);

- *'Applicants should also consider taking independent professional advice on the design. In particular, the Design Council can be asked to provide design review for NSIPs'.*

5.2 Approach

Internal Design Champion

5.2.1 In 2018, the NIC's first National Infrastructure Assessment recommended the creation of the Design Champion role. NFOWF and VEOWF have committed to appointing a Design Champion. They will oversee the design review process and retain overarching responsibility for design quality throughout. They will review each draft of the Design Guide, assisted by an internal design review team.

Stakeholder Engagement

5.2.2 VEOWF and NFOWF will engage with the local authorities, Parish Councils, landowners and communities that intersect and immediately neighbour the projects' proposed substation sites. Early engagement in the process will allow adequate time to respond to the information. The engagement programme has been designed with this in mind while adhering to safety and technical constraints.

June	Online Parish Council and district councillor briefing session hosted by North Falls and Five Estuaries offshore wind farms, in collaboration with representatives from Essex County Council and Tendring District Council to introduce the Design Guide, engagement approach and how we would like them to engage in the process.
	Landowner letters issued introducing the design guide and upcoming engagement with offer of a briefing facilitated by the projects' appointed land agent, Dalcour Maclaren.
Phase 1 of Engagement	
18 August	Design Guide first draft issued, triggering start of a six-week engagement period with the stakeholders listed on page one. Landowner briefings to take place facilitated by the projects' appointed land agent, Dalcour Maclaren.
2 September	Drop-in public information day at Lawford Venture Centre
29 September	Four-week review period on Design Guide first draft concludes.
Phase 2 of Engagement	
13 October	Online Parish Council and district councillor briefing session to introduce Design Guide second draft. Design Guide second draft issued, triggering the start of a six-week engagement period.
24 November	Four-week review period on Design Guide second draft concludes.
December	Online Parish Council and district councillor briefing session to present the final version of the Design Guide.

Plate 123 - Design Guide engagement and review timetable

5.2.3 Through the engagement, as well as providing clear information on what aspects of the substations' designs are open to further influence, the following will also be set out:

- The purpose of the Design Guide;
- What has informed it to date; and
- What is not open to influence and why, for example due to safety and technical constraints.

5.2.4 It is noted that this is highly focused engagement on key aspects of a single document. It is not a further round of public consultation. This engagement follows over six years of project development, including three and four rounds of public consultation for Five Estuaries and North Falls, respectively.

Independent Design Review Panel

5.2.5 Alongside the two-step review process, an external review of the Design Guide will be undertaken by an independent body, the Essex Quality Review Panel (EQRP).

5.2.6 The Essex Quality Review Panel (EQRP) were appointed by VEOWF and NFOWF in May 2025. The independent review will take place once the first draft has been prepared in Summer 2025.

5.3 Timetable and Feedback Process

5.4 The engagement timetable is outlined in Plate 123.

5.4.1 Feedback from Essex County Council, Tendring District Council, the Parish Councils, interested residents and landowners will be submitted to North Falls and Five Estuaries directly for consideration.

5.4.2 Local residents will be able to submit their feedback directly to VEOWF and NFOWF through the usual channels. Where possible and if appropriate, Parish Councils will also be encouraged to act as a conduit for feedback from their respective communities and can play a role in collating and consolidating opinion on the contents of the Design Guide.

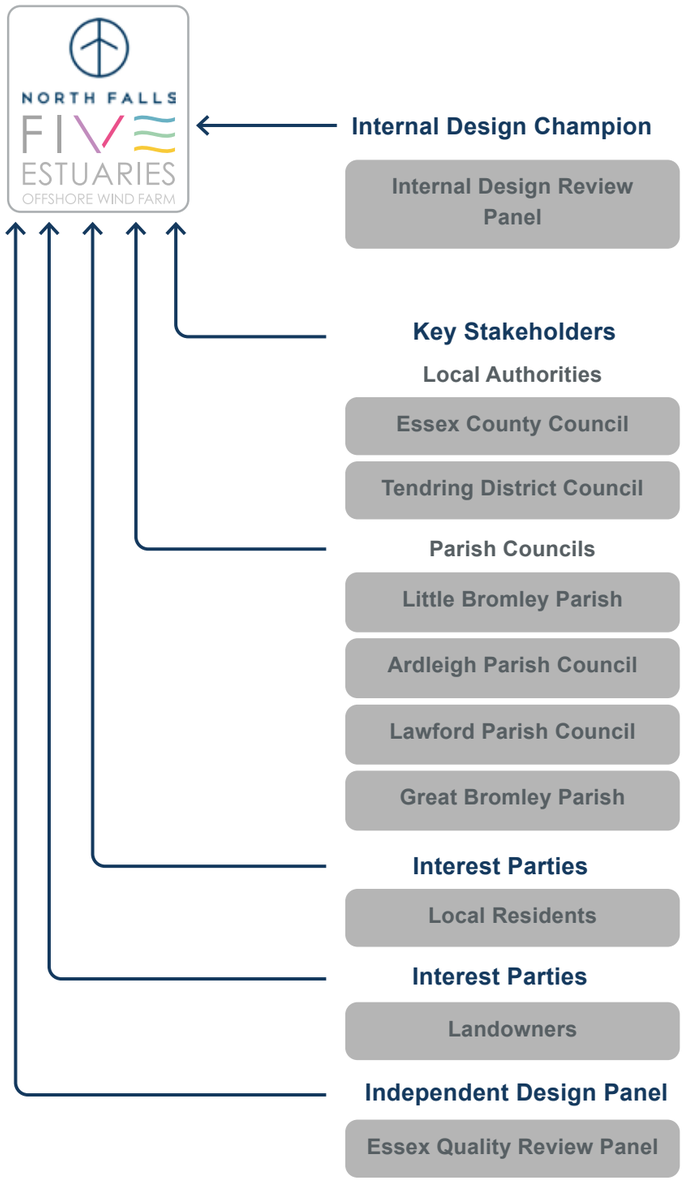

Plate 124 - JDG feedback process

5.4.3 Landowners will also submit their feedback directly to VEOWF and NFOWF

5.4.4 Feedback received will be added to Part 5 and agreed actions noted.