Scottish & Southern Electricity Networks

Fanellan Hub 400 kV Substation and Converter Station Environmental Impact Assessment Report Volume 4 | Technical Appendices

Appendix 8.5 – Environmental Colour Assessment

February 2025

70112533 - Fanellan Hub EIA

Environmental Colour Assessment

Contents

01 Introduction

1.1 Purpose of this Document

This Environmental Colour Assessment (ECA) has been prepared by WSP on behalf of Scottish and Southern Electricity Networks - Transmission (SSEN-T). The Environmental Colour Assessment has been prepared in accordance with the Landscape Institute's Environmental Colour Assessment - Technical Information Note 04/2018 (TIN 04/18). The National Colour System (NCS) and the RAL colour charts have been used to develop the proposed colour palette.

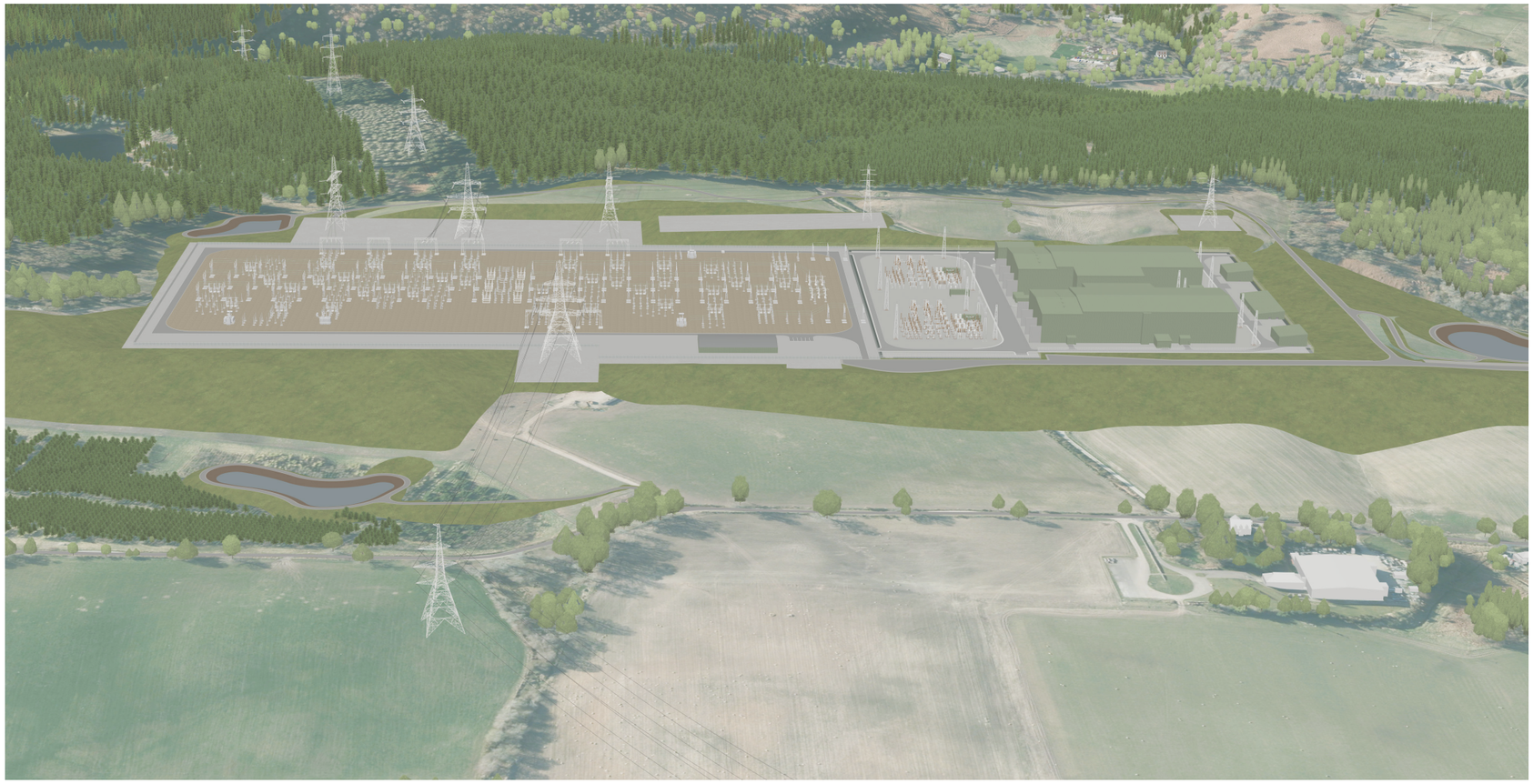
TIN 04/18 states that: '*The main objective of the ECA is to produce a palette of colours that is used to inform and guide choices in relation to the introduction of colour on structures and associated hard and soft surfaces and materials within a particular environment*'.

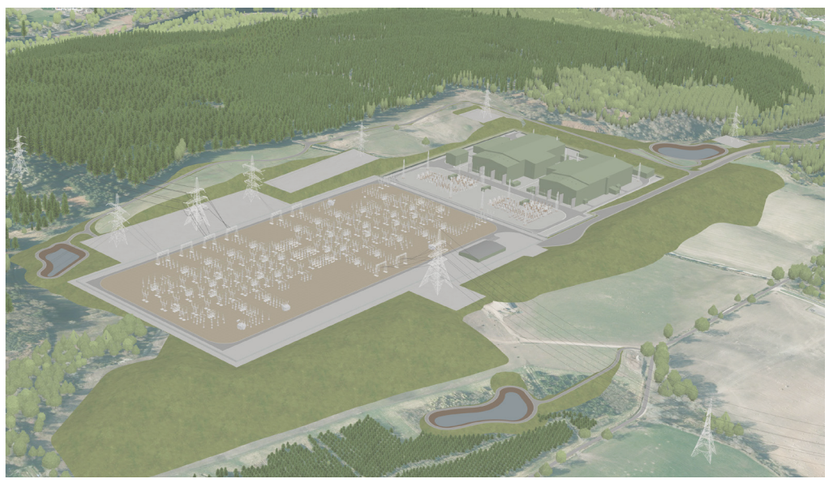
1.2 Fanellan Hub

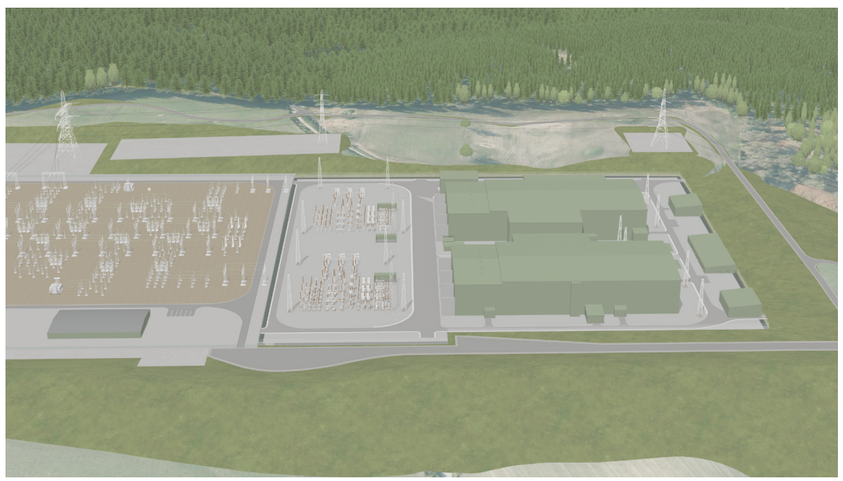
The proposed Fanellan Hub is comprised of a Substation (Switching Station) and a HVDC Converter Station. The Converter Station is of large scale, with the main HVDC converter station buildings being up to 27.5m in height. The Proposed Development is located in an undesignated rural landscape on rising ground just below the ridgeline of Torr Mor. The immediate landscape is characterised by pastoral farmland and scattered trees. The Proposed Development is contained to the north and west by Ruttle Wood, comprised of predominantly pine plantation. The Proposed Development will be static with no requirement for movement, outside routine maintenance requirements.

The visual impact of Fanellan Hub will be mitigated in views from the north and west by Ruttle Wood, which extends across the rising land of Torr Mor before following the landscape as it falls away towards the southern bank of the River Beauly. To the east and south however, views towards the Proposed Development are more open with views only contained by intermittent vegetation within the landscape.

This ECA seeks to develop a colour strategy that will help integrate the Proposed Development into its surroundings. Consideration is given to the longevity and cost of use of colour by using a palette from an approved paint supplier.







Model correct as of October 2024.

01 Introduction

1.3 ECA Methodology

The steps taken in preparation of this assessment are as follows:

Step 1: Identify key and representative views from publicly accessible locations.

Step 2: From the viewpoints, identify the range of colours present within the landscape during different seasons and weather conditions.

Step 3: Research successful precedent schemes to assist in identifying a colour strategy relevant to the Hub.

Step 4: Present a range of colour options and patterns using the viewpoint photography and stills from the 3D model to test suitability.

Step 5: Prepare a proposed colour palette which reflects the outputs from Steps 1 to 4 to to inform the colour of the key external elements, particularly the converter station building facades. These colours will be based on the RAL colours identified but that are easily available commercially. For the purposes of this ECA, we are referencing the commercial external paint colours produced by Kingspan. Both RAL and Kingspan-equivalent colours will be identified.

1.4 Terminology and the use of colour

'Hue' refers to the 'colours' seen in the landscape whereas 'Tonality' relates to the 'relative darkness'. Measurement of tonality in the landscape is achieved by reference to the Natural Colour System and relies upon a visual assessment of the landscape compared to a calibrated grey scale, (see tonality scale below).

TIN 04/18 advises the following with regard to hue and tonality: *'Tonality is a particularly relevant factor in ECA. Whilst the nature of hue alters with distance, tonal contrasts between built form and landscape remain largely constant. Also, the difference in tone between a building or structure and its surroundings is probably the most important factor contributing to recognition of its form. It is therefore the tonal qualities of the colour rather than the hue of the colour that will help to achieve a desired objective (such as camouflaging, integrating, or accenting a building, structure or surface in the landscape)'.*

If the objective of the colour palette is to help 'lose' the structure in the landscape, tones are therefore typically selected to match, or be slightly darker than, the tonality of the landscape background/ context colours against which the development would be viewed.

The interplay of light on different materials also affects how colour is perceived. For example, black reflective surfaces can appear to be bright white in certain light conditions. Light and visibility also changes with seasonality. TIN 04/18 suggests that the colour palette identified during the winter months is likely to give the best results, as this presents the landscape at its most elemental and bare-boned, without the distraction of leaf screening or light on foliage. The colours present during the winter months will remain year-round and will therefore always be relevant.

This ECA therefore focusses on winter photography and winter colours to ensure relevance all year round.

02 Landscape Analysis

2.1 Site Context and Viewpoints

The Site lies on elevated land on an eastern facing slope, surrounded by the dense woodland of Ruttle Wood to the north and west, and agricultural farmland, hedgerows and copses to the east and south. The land form of Torr Mor and the woodland of Ruttle Wood help screen all but the highest sections of the Proposed Development from visual receptors to the north and west, whilst much clearer views across the whole site are available from the south and east, both in close proximity (such as from Fanellan Road) and at distance from across the valley. Views from the south and east are interrupted by woodland (such as Fanellan Wood and Boblainy Forest), garden vegetation, hedgerows, scattered trees, and buildings, all contributing to a rural, natural colour palette.

For the Landscape and Visual Assessment in the Environmental Statement, representative viewpoints were selected to illustrate the view from sensitive visual receptors. Four viewpoints have been chosen to be used for the ECA to assist in identification of the natural hues present in the local landscape. The viewpoints represent a range of views at different compass directions, distances, and different elevations and also demonstrate different weather conditions.

The selected viewpoints for this ECA are:

Viewpoint 1: View from Fanellan Cottages looking West

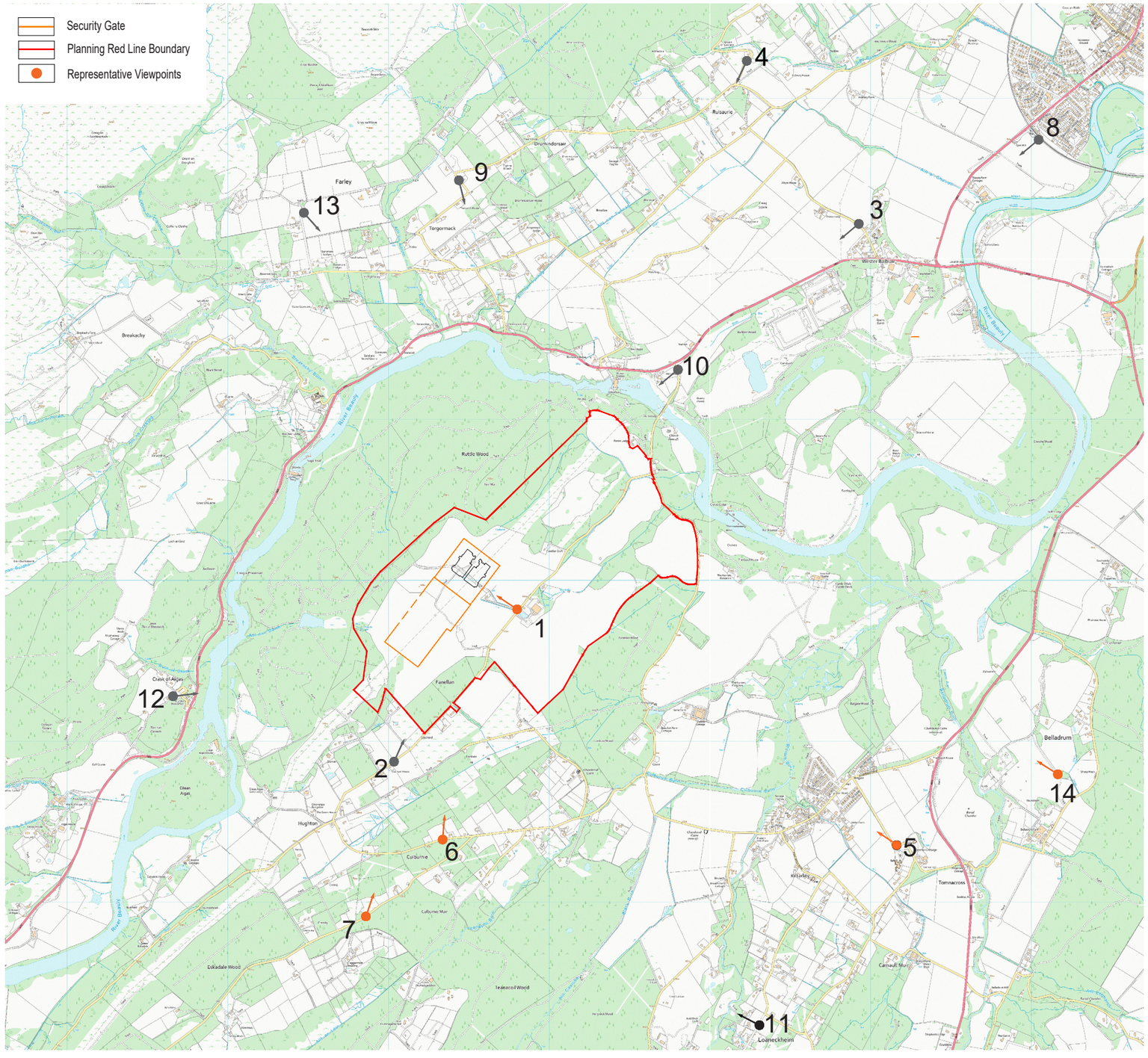
Viewpoint 5: View looking north from near Sunnybrae and Bredaig

Viewpoint 6: View looking north-west from Tomnacross Primary School entrance south of Kiltarity

Viewpoint 7: View looking north-east from near Crerag

Viewpoint 14: Belladrum

Zone of Theoretical Visibility and Selected Viewpoints



02 Landscape Analysis

2.3 Illustrative Landscape Masterplan showing proposed landform and soft landscape

TECHNICAL CONSTRAINTS

- Site Boundary
- Land Ownership Boundary
- Existing fencing
  To be retained
- Existing Watercourse
  Burn to be retained
- Secure boundary fencing 4.2m high
- Overhead Lines (Existing and Proposed)
  with indicative 90m easement
  Note: No alteration to landform or planting of trees

FEATURES
TO BE HANDED OVER AFTER COMPLETION OF THE PROJECT

- Existing Vegetation to be retained
- Existing Tree to be retained
- Pastoral Land to be re-seeded and made good

PROPOSALS

- Timber post and rail fencing
- Deer fencing with badger gates 2.4m high
- Vehicle access roads
- Landform Screen
- Woodland and woodland edge
  (e.g. Scots Pine, Birch, Oak)
- Neutral wildflower grass seeding -
  Wildflower Meadow Mix, Emorsgate EM34 or similar approved
- Seeding to SUDS basin floor -
  Wetland Meadow Mix, Emorsgate EM8 or similar approved
- Wetland margin grass seeding -
  Wetland Meadow Mix, Emorsgate EM8 or similar approved

NOTES

1. All existing hedgerows to be retained on the Site boundary where possible. Cable and drainage construction easements may restrict potential to add in replacement hedgerow planting. This will be finalised at detail design stage. The current assumption is to retain as much of the existing boundary hedgerows as possible.
2. Bat roost features (e.g., bat boxes) to be added to retained trees and as standalon features – the number and location to be finalised at detailed design stage.

03 Viewpoint Colour Analysis

The following colour analysis identifies the hues and tones characteristic within the local landscape during different weather conditions.
This will enable a colour palette to be derived and then tested using different angles of view, seasons and light conditions.

3.1 Viewpoint 1 - Fanellan Road at Fanellan Cottages looking West

Panorama

Colour swatches

RAL 6014
NCS 7020-Y70R

RAL 7006
NCS 6020-G90Y

RAL 7030
NCS 4020-G70Y

RAL 1024
NCS 3050-Y

RAL 1019
NCS 4020-Y10R

RAL 7001
NCS 3020-Y10R

RAL 7038
NCS 4000-N

RAL 7040
NCS 3005-R80B

RAL 9002
NCS 1502-B50G

03 Viewpoint Colour Analysis

3.2 Viewpoint 5 - View looking north-west from Tomnacross Primary School entrance south of Kiltarity

Panorama

Colour swatches

RAL 8017 NCS 7020-Y90R	RAL 1035 NCS 6020-Y20R	RAL 7002 NCS 5030-G50Y	RAL 7034 NCS 5020-G70Y	RAL 7034 NCS 5020-G90Y	RAL 7030 NCS 4010-Y70R	RAL 6034 NCS 3010-R90B	RAL 7047 NCS 1515-B

3.3 Viewpoint 6 - View looking north from the western edge of Culburnie

Panorama

Colour swatches

RAL 9017 NCS 8505-Y80R	RAL 6006 NCS 8005-G80Y	RAL 8019 NCS 7502-R	RAL 8019 NCS 7502-Y	RAL 8014 NCS 8505-G80Y	RAL 7006 NCS 6010-Y10R	RAL 1024 NCS 3050-Y	RAL 9018 NCS 1015-B	RAL 9018 NCS 1005-R90B

03 Viewpoint Colour Analysis

3.4 Viewpoint 7 -View looking north-east from near Crerag

Panorama

Colour swatches

RAL 6022
NCS 8505-Y80R

RAL 8028
NCS 7020-Y20R

RAL 8015
NCS 6030-Y70R

RAL 7039
NCS 6005-Y20R

RAL 3012
NCS 4020-Y20R

RAL 3012
NCS 3030-Y50R

RAL 1013
NCS 1015-Y30R

RAL 9018
NCS 1015-B

3.5 Viewpoint 14 - Belladrum

Panorama

Colour swatches

RAL 6022
NCS 8505-Y80R

RAL 6014
NCS 8010-Y10R

RAL 8008
NCS 6530-G50Y

RAL 7008
NCS 5540-G40Y

RAL 8014
NCS 8505-G80Y

RAL 7002
NCS 5030-G50Y

RAL 8004
NCS 4550-Y70R

RAL 7047
NCS 1015-R90B

RAL 7038
NCS 3005-R80B

03 Viewpoint Colour Analysis

3.6 Viewpoint colour palette

The colour swatches shown are a collation of the individual hues and tones derived from the viewpoint photography above.

3.7 Landscape Hues

In winter, the landscape is dominated by dull colours, with shades of brown and dark green stretching across the terrain. This is punctuated by some warmer, lighter colours of green, beige and russet.

On the horizon, the elements blur into a blue-grey hue, creating a generally somber and muted scene

RAL 9017
NCS 8505-Y80R

RAL 6022
NCS 8505-Y80R

RAL 6022
NCS 8505-Y80R

RAL 6006
NCS 8005-G80Y

RAL 8017
NCS 7020-Y90R

RAL 8017
NCS 8010-G90Y

RAL 8028
NCS 7020-Y80R

RAL 6014
NCS 7020-Y70R

RAL 8019
NCS 7502-R

RAL 8019
NCS 7502-Y

RAL 8028
NCS 7020-Y20R

RAL 8015
NCS 6030-Y70R

RAL 8004
NCS 4550-Y70R

RAL 3012
NCS 3030-Y50R

RAL 1024
NCS 3050-Y

RAL 7006
NCS 6010-Y10R

RAL 7039
NCS 6005-Y20R

RAL 7006
NCS 6020-G90Y

RAL 7036
NCS 5010-Y50R

RAL 3012
NCS 4020-Y20R

RAL 7030
NCS 4010-Y70R

RAL 7034
NCS 5020-G90Y

RAL 1019
NCS 4020-Y10R

RAL 7001
NCS 3020-Y10R

RAL 1013
NCS 1015-Y30R

RAL 6022
NCS 8505-Y80R

RAL 8014
NCS 8505-G80Y

RAL 6009
NCS 8010-G30Y

RAL 6014
NCS 8010-Y10R

RAL 8008
NCS 6530-G50Y

RAL 1035
NCS 6020-G50Y

RAL 7008
NCS 5540-G40Y

RAL 1035
NCS 6020-Y20R

RAL 7008
NCS 6530-G50Y

RAL 7002
NCS 5030-G50Y

RAL 8014
NCS 8505-G80Y

RAL 7034
NCS 5020-G70Y

RAL 7030
NCS 4020-G70Y

RAL 7002
NCS 5030-G50Y

RAL 7040
NCS 4005-B20G

RAL 7038
NCS 4000-N

RAL 7040
NCS 3005-R80B

RAL 7038
NCS 3005-R80B

RAL 6034
NCS 3010-R90B

RAL 7047
NCS 1015-R90B

RAL 7047
NCS 1515-B

RAL 9018
NCS 1015-B

RAL 9018
NCS 1015-B

RAL 9018
NCS 1005-R90B

RAL 9002
NCS 1502-B50G

04 Precedent examples

4.1 Use of colour in industry

Wylfa Nuclear Power Station, Wales - the use of varying shades of greys, greens, pinks and browns for the bulk of the built form breaks up the solidity of the large scale mass of buildings. The colours used relate to the natural hues and tones of sea, sky, ground and irregularities of the surrounding rocky landscape.

Oil refinery: Use of a range of muted colours related to each other in hue and tone, reflecting colours of sea and sky.

Ringhaus, Sweden – the buildings have a varied range of light coloured hues with the tallest buildings capped by a darker tone. This appears to shorten the height of the taller buildings.

Wylfa Nuclear Power Station, Wales - in sunnier conditions, the use of dark colours at the base grounds the buildings with lighter colours at the top giving less contrast to the sky. The use of yellow draws the eye away from the mass of built form.

Murco Refinery, Pembrokeshire: The use of contrasting colour to draw the eye, distracting the viewer from the surrounding clutter of infrastructure.

The use of primary colour on the single tower draws attention away from the clutter of pipework and structural steelwork. The use of yellow as a hazard colour defining the vertical drop for safety.

04 Precedent examples

4.1 Use of Colour in Industry

The use of lighter tones against the sky can lessen the scale of the large industrial buildings

Compressor Stations: Colour can be effective in reducing the effect of bulk as seen in these two examples of Compressor Stations. The use of two colour banding arranged vertically in contrast to the horizontal line of the buildings are designed to relate to the surrounding landscape

The use of primary colours to define entrances breaks up the monotony of the large scale building adding interest in addition to waymarking the entrances

04 Precedent examples

4.2 Use of colour for Converter Stations

The following examples are Converter Stations present in rural areas of Scotland, sited at different elevations within the landscape. The example below is on elevated land and would be viewed by the public with the buildings on the horizon backdropped against the sky. Consequently, the technique used has kept darker hues to the bottom of the buildings, with lighter hues at the top, so there is less contrast between the sky and the land.

Peterhead Substation: The 400kV Substation at Peterhead uses similar hues to that of local agricultural buildings, muted greens for the main buildings and grey for the surrounding ancillary infrastructure of gantries, transmission equipment and security fencing.

Shetland and Beauly:
The following two Converter stations at Beauly and Shetland are sited on lower lying land with views from surrounding high points. The Converter Stations will be visible from the surrounding landscape backdropped by the land, consequently the colour tones are related to hues found in the natural landscape.

04 Precedent Examples

4.3 Summary of themes

From the precedent schemes shown above, a number of key design recommendations for the colour strategy can be made. These recommendations demonstrate how colour could be used to reduce the scale of the development and assist in assimilation into the rural landscape, as follows:

-A colour code based on the hues and tones from the local landscape to assist in blending the development into the surroundings

-Muted colours are suited to rural landscapes

-Lighter colours at the top of the building help to blend with the sky and darker colours at the base help to blend with the landscape. This assists in reducing contrast between the sky and land.

-Use mid hues for colour of the buildings to reduce the contrast between the sky and the ground.

-Use a variety of colours for different buildings to assist in breaking up the monotony of the large bulk of building

-An occasional contrast colour on individual buildings can be used to draw attention away from ground clutter. This one colour acts as a focal point against a background of more neutral colours, increasing the depth of field.

The images opposite illustrate the use of different facade colours on buildings.

05 Colour Strategy

5.1 Colour Palettes

The colour study is based on the colours identified in the local landscape, using winter photography, and collated below under the Viewpoints colour swatch. These are shown alongside the most similar stock colours available from Kingspan. The Kingspan colours include those from their Spectrum Solid range (of smooth polyurethane coatings) and their XL Forte range (of PVC coatings with a leather grain effect). This enables as wide a range of easily commercially available colours to be identified within this ECA, although it is still somewhat limited.

Viewpoints colour swatch

RAL 9017 NCS 8505-Y80R
RAL 6022 NCS 8505-Y80R
RAL 6022 NCS 8505-Y80R
RAL 6006 NCS 8005-G80Y
RAL 8017 NCS 7020-Y90R
RAL 8017 NCS 8010-G90Y
RAL 8028 NCS 7020-Y80R
RAL 6014 NCS 7020-Y70R
RAL 8019 NCS 7502-R

RAL 8019 NCS 7502-Y
RAL 8028 NCS 7020-Y20R
RAL 8015 NCS 6030-Y70R
RAL 8004 NCS 4550-Y70R
RAL 3012 NCS 3030-Y50R
RAL 1024 NCS 3050-Y
RAL 7006 NCS 6010-Y10R
RAL 7039 NCS 6005-Y20R
RAL 7006 NCS 6020-G90Y

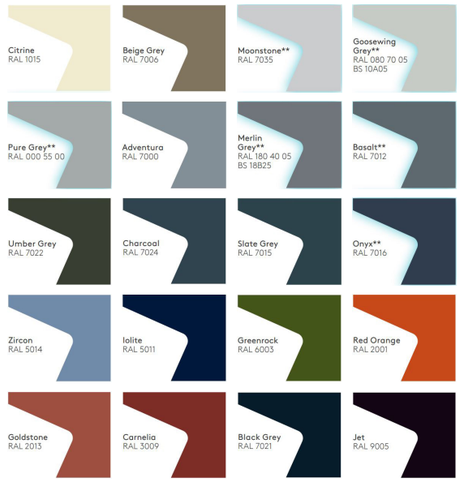
RAL 7036 NCS 5010-Y50R
RAL 3012 NCS 4020-Y20R
RAL 7030 NCS 4010-Y70R
RAL 7034 NCS 5020-G90Y
RAL 1019 NCS 4020-Y10R
RAL 7001 NCS 3020-Y10R
RAL 1013 NCS 1015-Y30R
RAL 6022 NCS 8505-Y80R
RAL 8014 NCS 8505-G80Y

RAL 6009 NCS 8010-G30Y
RAL 6014 NCS 8010-Y10R
RAL 8008 NCS 6530-G50Y
RAL 1035 NCS 6020-G50Y
RAL 7008 NCS 5540-G40Y
RAL 1035 NCS 6020-Y20R
RAL 7008 NCS 6530-G50Y
RAL 7002 NCS 5030-G50Y
RAL 8014 NCS 8505-G80Y

RAL 7034 NCS 5020-G70Y
RAL 7030 NCS 4020-G70Y
RAL 7002 NCS 5030-G50Y
RAL 7040 NCS 4005-B20G
RAL 7038 NCS 4000-N
RAL 7040 NCS 3005-R80B
RAL 7038 NCS 3005-R80B
RAL 6034 NCS 3010-R90B
RAL 7047 NCS 1015-R90B

RAL 7047 NCS 1515-B
RAL 9018 NCS 1015-B
RAL 9018 NCS 1015-B
RAL 9018 NCS 1005-R90B
RAL 9002 NCS 1502-B50G

Kingspan Spectrum Solid



Kingspan XL Forté

05 Colour Strategy

5.2 Proposed colour strategy

Three options have been developed to test the colours with various buildings and visibility conditions, based on the precedent examples and viewpoints previously shown.

Where RAL only colours are identified, there is no matching Kingspan colour currently available commercially. We have included them within the table in order to demonstrate the effect of these colours in the viewpoints in Section 6.

Option 1 - Colour Blending strategy: shows the use of the Kingspan stock colours that best suit the local landscape, with a single colour used for each development

Option 2 - Colour Contrast strategy: introduces two additional, more locally natural colours to create a degree of contrast.

Option 3 - Colour Variation strategy: introduces a further locally natural colour and the more careful use of contrast to start to break up the massing of the developments and draw the eye to a smaller element, so that observers don't immediately register the full extent of what they are seeing.

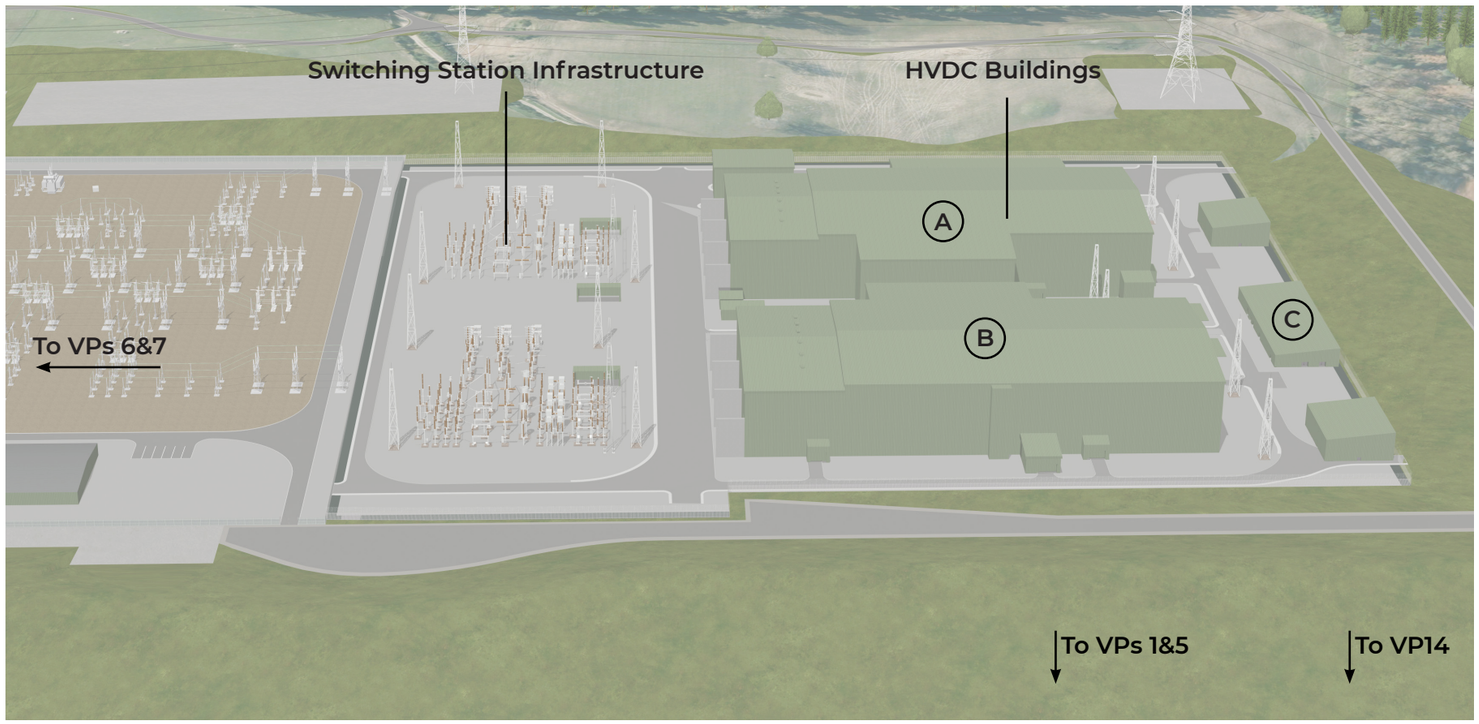
The table below sets out the colours used in the various options illustrated.

OPTION 1 - COLOUR BLENDING	COLOURS
A - HVDC	Kingspan Olive Green
B -HVDC	Kingspan Beige Grey
C - ANCILLARY BUILDINGS	Kingspan Van Dyke Brown

OPTION 2 - COLOUR CONTRAST	COLOURS ADDED
	RAL 7034
	Kingspan Merlin Grey

OPTION 3 - COLOUR VARIATION	COLOURS ADDED
	RAL 7006

Table 1: Colour options assigned to groups of buildings



Site Overview showing infrastructure components

RAL 8028 Kingspan - Van Dyke Brown

RAL 1035 Kingspan - Olive Green

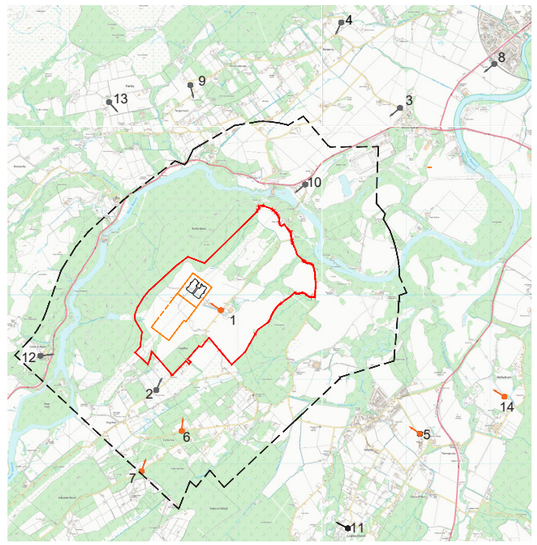
RAL 7030 Kingspan - Beige Grey

RAL 7034

RAL 7006

RAL 7038 Kingspan - Merlin Grey

Overall colour palette



Viewpoint location plan

05 Colour Strategy

5.3 Option 1 Overview

Overall colours used

RAL 8028
Kingspan -
Van Dyke
Brown

RAL 1035
Kingspan -
Olive Green

RAL 7030
Kingspan -
Beige Grey

OPTION 1 - COLOUR BLENDING	COLOUR
A -	Kingspan - Olive Green
B -	Kingspan - Beige Grey
C - ANCILLARY BUILDINGS	Kingspan - Van Dyke Brown

05 Colour Strategy

5.4 Option 2 Overview

Overall colours used

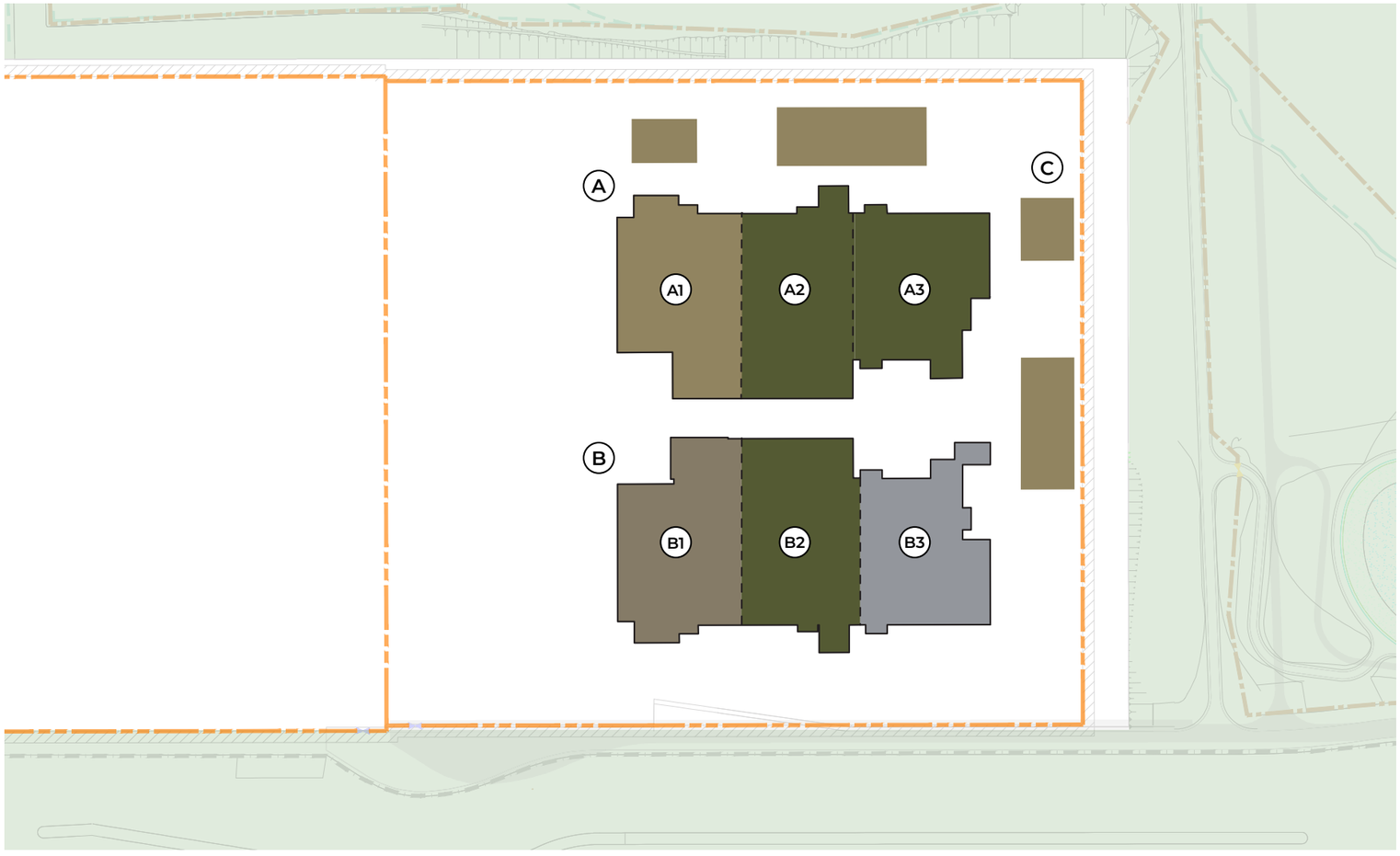
RAL 1035
Kingspan -
Olive Green

RAL 7030
Kingspan -
Beige Grey

RAL 7034

RAL 7038
Kingspan -
Merlin Grey

OPTION 2 - COLOUR CONTRAST	COLOUR
A -	RAL 7034
	Kingspan - Olive Green
B -	Kingspan - Beige Grey
	Kingspan - Olive Green
	KIngspan - Merlin Grey
C - ANCILLARY BUILDINGS	RAL 7034



05 Colour Strategy

5.5 Option 3 Overview

Overall colours used

RAL 8028 Kingspan - Van Dyke Brown

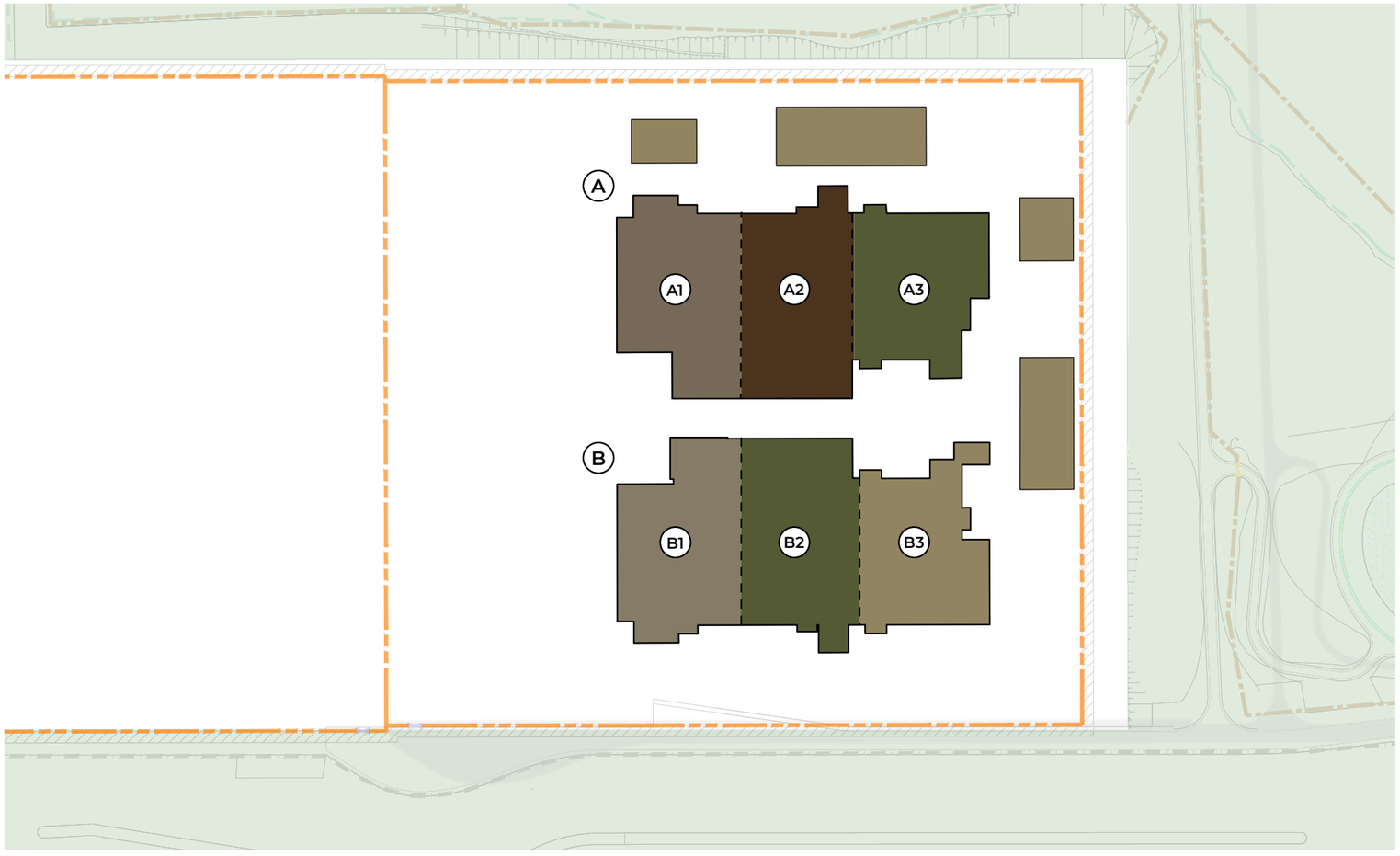
RAL 1035 Kingspan - Olive Green

RAL 7030 Kingspan - Beige Grey

RAL 7034

RAL 7006

OPTION 3 - COLOUR VARIATION	COLOUR
A -	RAL 7006
	Kingspan - Van Dyke Brown
	Kingspan - Olive Green
B -	Kingspan - Beige Grey
	Kingspan - Olive Green
	RAL 7034
C - ANCILLARY BUILDINGS	RAL 7034



06 Colour Study Development

Viewpoint 1 - Year 1

Option 1

Option 2

Option 3

06 Colour Study Development

Viewpoint 1 - Year 15

Option 1

Option 2

Option 3

06 Colour Study Development

Viewpoint 5 - Year 1

Option 1

Option 2

Option 3

06 Colour Study Development

Viewpoint 5 - Year 15

Option 1

Option 2

Option 3

06 Colour Study Development

Viewpoint 6 - Year 1

Option 1

Option 2

Option 3

06 Colour Study Development

Viewpoint 6 - Year 15

Option 1

Option 2

Option 3

06 Colour Study Development

Viewpoint 7 - Year 1

Option 1

Option 2

Option 3

06 Colour Study Development

Viewpoint 7 - Year 15

Option 1

Option 2

Option 3

06 Colour Study Development

Viewpoint 14 - Year 1

Option 1

Option 2

Option 3

06 Colour Study Development

Viewpoint 14 - Year 15

Option 1

Option 2

Option 3

07 Conclusions

The first Colour Option divides the buildings into functional groups and assigns them colours from the Kingspan Palette to blend with the surroundings. While this results in overall harmony with the landscape, it tends to draw the eye to the blocks of colours, encouraging observers to focus on the entirety of the development, which is not desirable.

The second option of colours introduces custom colours to further blend with the surrounding greens and incorporates an accent hue to direct the observer's attention to specific buildings. This helps to reduce the perception of overall mass of built form. Whilst this proposal achieves better colour blending, the accent colour is overly strong and perhaps more associated with vast warehouse buildings, resulting in drawing the observer's eye too strongly.

The third option maintains the same colour bases but introduces more variety among the buildings, interrupting the view of the entire scheme. Utilising a mix of toned-down landscape hues and the Kingspan Palette, each building becomes visually distinct, making the scheme easier to visually process and break up into smaller units. Strategic placement of the accent colour ensures balance in the composition, effectively diverting the eye from the rest of the development. Additionally, a grey roof colour is added to blend with the faded sky and planting colours within the horizon line, further integrating with the landscape.

The optioneering visualisations were crucial in testing the different versions and understanding the best fit for Fanellan Hub.

In conclusion, the third option is preferred as it offers maximum adaptability with the landscape, creates the illusion of smaller development portions, and directs focus to designated locations. This effect will be further accentuated by the Overhead Line (OHL) equipment, which is not currently showcased in the views, diverting attention away from the clutter of cables above.

Scottish & Southern Electricity Networks

wsp