DOCUMENT 7.19

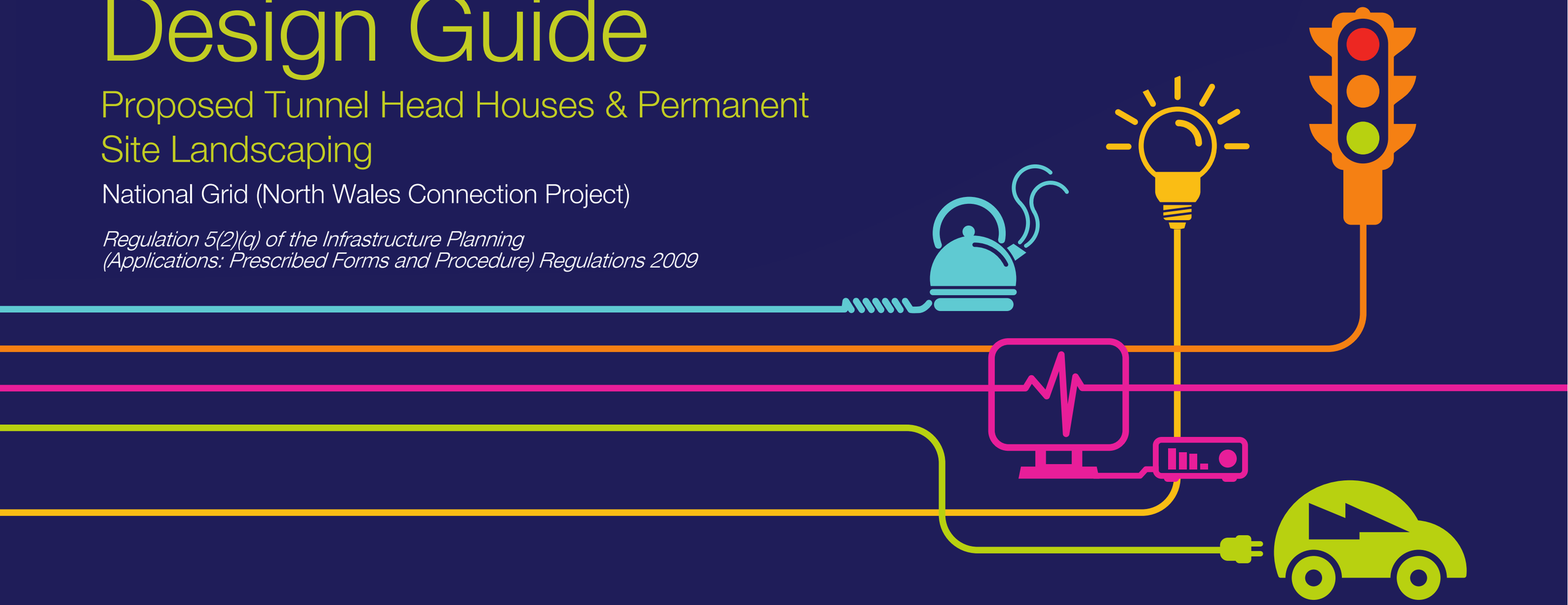
nationalgrid

Design Guide

Proposed Tunnel Head Houses & Permanent Site Landscaping

National Grid (North Wales Connection Project)

Regulation 5(2)(q) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009



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1.0 Introduction

1.1 BACKGROUND TO THE PROJECT

National Grid operates the electricity transmission system in Great Britain and owns the system in England and Wales. The system operates at 400 kV and 275 kV, connecting electricity generators to substations where the higher voltages are transformed to lower voltages, enabling the power to be distributed to homes and businesses by the Distribution Network Operators.

National Grid has a statutory duty to promote competition in the supply of electricity and is obliged to offer a connection to the system to anyone who applies for a connection. Horizon Nuclear Power (HNP) has applied to National Grid to connect their proposed new nuclear power station to the national system at Wylfa, Anglesey (Wylfa Newydd). The proposed power station would be within a site already identified for this type of development in the UK government's National Policy Statement (NPS) EN-6 'Nuclear Power Generation'.

National Grid owns and operates an existing substation at Wylfa, which the proposed Wylfa Newydd power station would connect to. This substation is connected to the main transmission system on the mainland in North Wales by a 400 kV overhead electricity line, connecting at the existing National Grid substation at Pentir, in Gwynedd. To provide reliable electricity supplies, National Grid cannot allow more than 1,800 mega-watts (MW) of power generation to be connected by any single overhead line. As the HNP proposal would have a total output of 2,940 MW, a second connection is required between Wylfa and the transmission system on the mainland.

The Preferred Route Corridor Selection Report **(Document 9.2)** stated:

The large number and concentration of sensitive sites on both shores of the Menai Strait was acknowledged. Given the nature of the landscape and the importance of these sites an overhead line crossing of Anglesey AONB and the Menai Strait would result in significant adverse landscape and visual effects.

The Report went on to conclude that:

The significant economic cost of using cables instead of overhead lines to cross the Menai Strait would be considered appropriate when set against the significant environmental effects of an overhead line option. Further work would be required at the detailed design stage to confirm the preferred SEC locations, crossing location and construction methodology for the Menai Strait crossing and link to Pentir Substation.

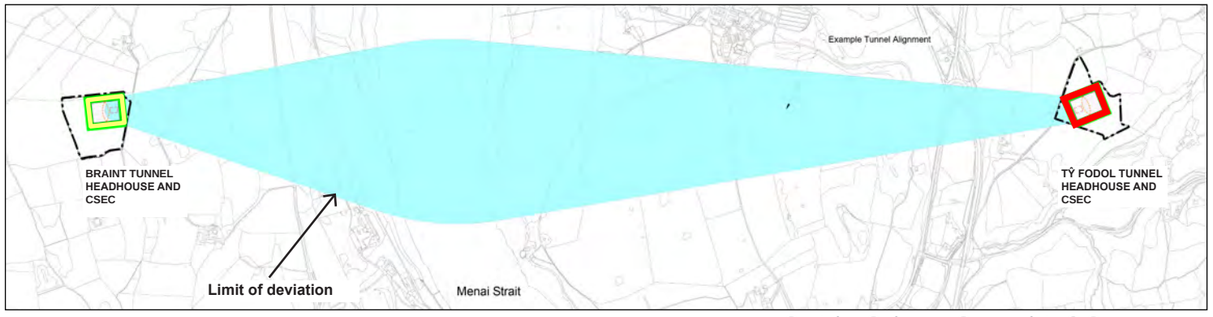
Following a detailed appraisal of the options available for crossing the Anglesey AONB and the Menai Strait National Grid concluded that the most appropriate means of achieving the crossing was through the installation of cables in a new deep tunnel. This conclusion is explained in more detail in National Grid's published 'Menai Strait Crossing Report' **(Document 9.6)**.

Two sites on either side of the Menai Strait have been identified as locations for Tunnel Head Houses (THH): ***Braint*** on the Anglesey side and ***Tŷ Fodol*** on the Gwynedd side. This Design Guide describes the context analysis carried out around both these sites. This document explains the various design approaches that have been considered for the Tunnel Head Houses and the surrounding landscaping and presents a preferred design approach that takes account of the site's local context. It should be read in conjunction with other documents being submitted as part of the DCO application.

This Design Guide has helped to inform the proposed parameters within which the final design for the Tunnel Head Houses at Braint and Tŷ Fodol would need to comply, as defined in the draft Development Consent Order for the North Wales Connection Project. This Guide will also inform the final detailed architectural form and treatment for the Head Houses, together with the landscape treatment at the two tunnel compound sites and in the vicinity of Pentir Substation. The design guide sets out the design concepts for each of the sites exploring ideas, approaches and materials that reflect the individual nature of each of the sites. Contents will be developed further at detailed design stage based on the design principles established in this document. The detailed design will be developed with full compliance of the current health and safety regulations and in accordance with CDM regulations.

The sites included within this Design Guide are:

- Braint Tunnel Headhouse and CSEC;
- Tŷ Fodol Tunnel Headhouse and CSEC; and
- Pentir Substation.



Tunnel Head House Locations and tunnel alignment

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1.2 PURPOSE AND STRUCTURE OF THE REPORT

In May 2017, a series of stakeholder engagement meetings were held with the Isle of Anglesey County Council and Gwynedd Council to discuss the potential design approaches for the proposed tunnel head houses at the Anglesey and Gwynedd tunnel shaft sites. Subsequently National Grid has agreed that a Design Guide presenting overall site and context analysis followed by potential design approaches, colour and materials palettes should be presented as part of the DCO application to provide a clearer understanding of the likely final form for these elements of the proposed development. This Design Guide considers the immediate site contexts as well as wider landscape character. It presents site specific design approaches to the tunnel head house buildings and describes the associated landscape treatments. Objectives set out in the National Policy Statement (NPS) EN-1 and EN-5 have been addressed. Relevant Landscape Character Areas and LANDMAP visual and sensory aspect areas, as well as the strategic contextual landscape issues have been considered.

This Design Guide supplements the North Wales Connection Project Design and Access Statement (DAS) **(Document 7.16)**. It relates to the following sites identified as part of the North Wales Connection Project:

- Braint Tunnel Headhouse and CSEC;
- Tŷ Fodol Tunnel Headhouse and CSEC; and
- Pentir Substation.

This Design Guide focuses on the proposed tunnel head houses on the Braint and Tŷ Fodol sites and technical design and landscape treatments for the Pentir Substation site. While this document focuses on the site-specific infrastructure listed above, this does not change National Grid's commitment to good design, as set out in Design and Access Statement **(Document 7.16)** in relation to all aspects of the North Wales Connection (NWC) Project.

The primary purpose of this document is to provide a framework of design principles within which National Grid will develop detailed design proposals for the tunnel head houses associated with the NWC Project.

The Design Guide includes:

- design Context including National Policy Statement (NPS) EN-1 and EN-5;
- a summary of the initial stakeholder engagement on the general design approach that was favoured;
- landscape context analysis, design vision, built form design approaches, landscape design approaches, materials palettes and design examples for the Braint and Tŷ Fodol sites; and
- technical design and landscape design approach for the Pentir Site.

Braint Site, Anglesey

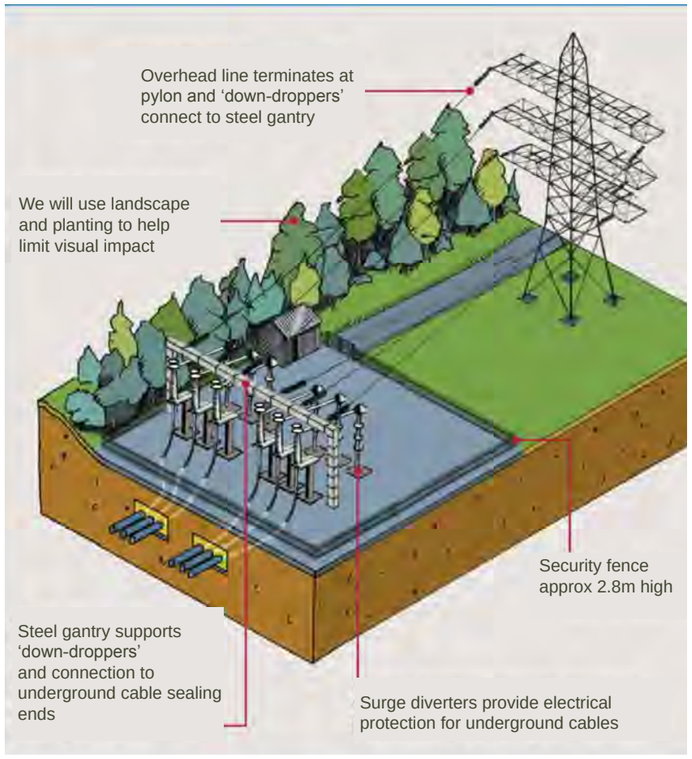
Tŷ Fodol Site, Gwynedd

Existing Pentir Substation

1.3 PROPOSED INFRASTRUCTURE

The new 400 kV connection would comprise the following:

- Overhead Line approaches to the tunnel compounds: The key components of an overhead line are as follows:
  - Pylons: Steel lattice structures, which typically would be 52.5 m in height, and spaced approximately 360 m apart. On Anglesey National Grid proposes that the three pylons closest to the site would be low height pylons to reduce effects upon more distant views. These are typically around 35 m in height, but wider than more conventional pylons. Within Gwynedd the first pylon from the site is proposed to be low height;
  - Earth Wire: The highest most line connecting the pylons and connected to the ground at every pylons in order to protect the overhead line and towers during lightning strikes;
  - Conductor: Wire strung between pylons, used for transmitting electricity;
  - Crossarm: Arms of the pylon that carry the wires and keep them separated; and
  - Insulator: Holds the conductors to the pylon arms and provides electrical clearance from the ground and tower structure.
- Cable Sealing End Compounds: A Cable Sealing End Compound (CSEC) is required when an overhead line changes to an underground cable or vice versa. CSECs are secure sites surrounded by a palisade fence where the overhead conductors are connected to the ends of buried cables which are brought vertically upwards out of the ground;
- Underground Cables: There are several methods for installing underground cables. The preferred technique, due to significantly lower installation costs, is laying underground cables in open cut trenches (or directly on the seabed for marine crossings);
- Anglesey AONB and Menai Crossing: A number of techniques have been considered for crossing the Menai Strait by the use of new National Grid infrastructure. The proposal to cross the Menai, is a tunnel;
- Tunnel Head Houses: Tunnel head houses would be required on top of the shaft cover slabs to provide direct access into the shafts and tunnel for inspection and maintenance. The head house also contains all necessary ventilation equipment and utilities. Typically equipment inside the head house, shaft and tunnel would comprise:
  - lighting systems;
  - heating and air conditioning units;
  - radio systems (for personnel to communicate with each other when in the tunnel during construction and over operational life of the asset);
  - stairwell ventilation (required to maintain safe and clean air for personnel to enter the tunnel via the shaft);
  - person and goods lift (capable of taking personnel and equipment into the tunnel);
  - system ventilation (needed primarily to maintain a correct temperature in the shaft and tunnel to ensure that the cables do not overheat. It can be natural air flow backed up with mechanical fans if required);
  - gas monitors (to ensure tunnel is free from gas ingress before workers persons enter);
  - Distributed Temperature System (DTS) (to measure the temperature of a core/cable. This is part of the overall system design and works in conjunction with the system ventilation);
  - pumped drainage (to collect and pump out ground water in the tunnel and shaft);
  - generators (maybe permanent or temporary) (a tunnel requires a power supply, and a backup system should this supply fail. Generators can either be brought to site in the event of a failure or left in situ); and
  - tunnel inspection vehicle (a vehicle used travel along a tunnel for the purpose of inspection of the cables and carrying equipment to point of any cable or joint failure).
- This Design Guide is mainly focused on the design approaches, design principles, material pallets, colours and design treatments of the Tunnel Head Houses and their interface elements. The technical details of all of the infrastructure are described in other associated documents.



National Grid

Schematic of Typical Sealing End Compound

National Grid

Example of a Tunnel Head House under construction

The development of the design approaches outlined in this Design Guide was based on several considerations regarding the functional requirements for the tunnel head houses in terms of both engineering as well as design and contextual issues. Some key considerations in the design development discussions included:

- the industrial fans for cooling and ventilation are key features in the THHs. They do tend to determine the highest point of the built form. Generally air is expelled at the highest point of any tunnel, working with rather than against the natural direction of airflow. In this case the highest point of the tunnel would be at Tŷ Fodol, and therefore it is proposed that air is extracted using larger fan units located at this end of the tunnel. In Braint, the height is kept at a minimum as high ventilation fans are not required at this end of the tunnel. The Tŷ Fodol built form needs to be higher to accommodate bigger fan units;
- the THHs also need to accommodate associated welfare facilities and some of the control rooms which could be lower in height; and
- vehicle access points for maintenance and plant replacement, shaft access gantry cranes etc. are other key design considerations. The design approaches include placing such features along less sensitive interfaces.

The functional requirements have influenced the overall design approaches that are outlined in later sections of this document in terms of determining internal heights, placement of single and double storey areas, minimum likely footprint dimensions, minimum height requirements etc. There is often limited design flexibility due to the fact that functional requirements of the complex infrastructure that these tunnel head houses enclose are often determined by mechanical and safety specifications. However, the Design Guide presents design approaches that take into account these restrictive functional design requirements but balances them with the contextual setting and local sensitivities. The key aim is to balance the functional requirements against the need to limit apparent scale of the buildings in rural, generally undeveloped, locations.

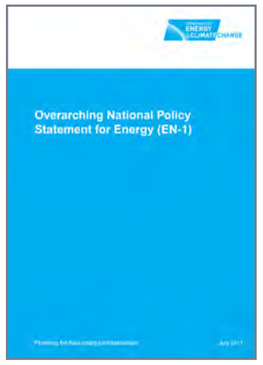
National Grid is not able to submit a detailed fixed design for the tunnel head houses at this stage. This is because a final contractor has not been appointed at this early design stage. Hence, there is a need to retain flexibility to accommodate design innovation and allow a range of design solutions to be put forward, ensuring high quality, cost effective designs are available.

National Grid appreciates that stakeholders and communities need to be reassured about the final scale and form of the building, especially given the rural, sensitive settings that these tunnel head houses would be located in. Hence there is a hierarchy of control measures that are being proposed which include:

- the Parameter Plans impose absolute restrictions on the building location and scale. They determine zones within which the tunnel head houses would need to be sited and suggest maximum heights and maximum volume for the buildings, which are specific to the functional requirements at each of the two sites. Maximum footprint dimensions in terms of length and width have not been stipulated as it is believed that a modest increase in building footprint (albeit within the location parameters imposed) might allow some elements of the building to be reduced in height, and potentially afford opportunities to further break up the overall massing; and
- Requirement 4 of the draft DCO states: *Unless otherwise agreed with the relevant planning authority, the above ground elements of the authorised development comprised in Works No 8 (Braint Tunnel Head House and Cable Sealing End Compound to Tŷ Fodol Tunnel Head House and Cable Sealing End Compound) must be carried out in general accordance with the Key Design Principles set out in the "Tunnel Head House Design Guide"*.

Hence the Tunnel Head House Design Guide as well as the Parameters Plans combine to establish and impose the key design principles for the proposed tunnel head houses.

1.4 DESIGN CONTEXT



EN-1

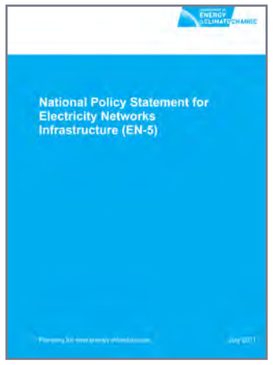
Section 4.5 of Overarching National Policy Statement for Energy (EN-1) sets out the criteria for “good design” for energy infrastructure, whilst recognising the importance of the functional requirements and physical constraints which apply to infrastructure projects of this nature.

EN-1 states that applying “good design” to energy projects should produce sustainable infrastructure that is sensitive to place, efficient in the use of natural resources and energy used in it’s construction and operation, matched by an appearance that demonstrates good aesthetic as far as possible. EN-1 acknowledges, however that the nature of much energy infrastructure development will often limit the extent to which it can contribute to the enhancement of the quality of the area.

In considering applications, EN-1 states that the Secretary of State should take into account the ultimate purpose of the infrastructure and bear in mind the operational, safety and security requirements that the design has to satisfy.

This Design Guide explains how the Proposed Development has taken into account functionality (including fitness for purpose and sustainability) and aesthetics (including contribution to the local context and quality of the area) in the design approach to the tunnel head houses.

This Design Guide explains the studies, principles and design approaches that have influenced the siting, building design (including form, colour and materials), and landscape design approach for the tunnel head houses to ensure they respond to the site context and are attractive, durable and adaptable. This has included consideration of existing landscape character, landform and vegetation in order to help mitigate adverse impacts and other effects.



EN-5

Section 2.5 of National Policy Statement for Electricity Networks Infrastructure (EN-5) states that proposals for electricity networks infrastructure should demonstrate good design in their approach to mitigating the potential adverse impacts which can be associated with overhead lines, particularly those relating to:

- landscape and visual;
- biodiversity and geological conservation;
- noise and vibration; and
- electric magnetic fields (EMFs).

EN-5 paragraph 2.8.2 states that new substations, sealing end compounds and other above ground installations that form connection, switching and voltage transformation points on the electricity networks can also give rise to landscape and visual impacts.

In accordance with EN-5 paragraph 2.8.10 this Design Guide sets out the opportunities for mitigating potential adverse landscape and visual impacts.

EN-5 paragraph 2.8.11 identifies specific measures that might be used.

This Design Guide identifies site-specific mitigation comprising peripheral planting and sensitive re-profiling of landforms in views into the THHs and Pentir substation in order to help screen or soften the visual effects of the sites. It also provides built form massing and design options that show design responses to limit potential effects on views.

National Grid's Substation Siting Guidelines

The Substation Siting Guidelines set out National Grid's approach to substation siting and design in the context of National Grid's duties under Schedule 9 of the Electricity Act to have regard to amenity considerations. Substation Siting Guidelines were applied in determining the location of proposed site-specific infrastructure comprising substation and CSE compounds and aim to:

- limit environmental effects;
- seek to avoid internationally and nationally designated areas of the highest value;
- protect areas of local amenity value, important existing habitats and landscape features;
- take advantage of screening provided by landform and existing features and utilise site layout and levels to minimise intrusion into surrounding areas;
- consider land-use effects of the proposal when planning siting;
- consider options available for terminal pylons, equipment, buildings and ancillary development appropriate to individual locations, seeking to keep effects to a reasonably practical minimum;
- use space effectively to limit the development area and provide appropriate mitigation to minimise adverse effects on land use and rights of way;
- ensure the design of an access road, perimeter fencing, earthworks, planting and ancillary development forms an integral part of the site layout and design to fit in with the surroundings;
- keep high voltage line entries visually separate from low voltage lines and other overhead lines to avoid a confusing appearance; and
- ensure the inter-relationship between pylons and substation structures and background and foreground features are studied to reduce the prominence of structures from main viewpoints.

The North Wales Connection Project Design and Access Statement

Section 3 of the Design and Access Statement (DAS, **Document 7.16**) considers the policy context for the consideration of design issues, focusing on EN-1 and EN-5.

Local Planning Policy

The Joint Local Development Plan (JLDP) for Anglesey and Gwynedd was adopted in July 2017 (Ref 19) and is the planning policy document for Anglesey and Gwynedd (excluding that area within the Snowdonia National Park Planning Authority). It contains the key policies and land use allocations that will facilitate the Plan area's development up to 2026.

As set out in NPS EN-1 (para 4.1.5), Local Development Plans are one of the matters which the decision-maker may consider to be important and relevant.

The Proposed Development has therefore also been considered against JLDP for Anglesey and Gwynedd (2017) (Ref 19). The compliance of the Proposed Development as a whole with relevant planning policy is considered in the Planning Statement **(Document 7.14)**.

The development plan policies do not provide criteria for determining the acceptability of NSIPs, and in their detail they are not always directly applicable to linear infrastructure projects. Notwithstanding this the overarching principles of responding to place, minimising adverse impacts and enhancing the local environment have been objectives for the Proposed Development.

1.5 INITIAL STAKEHOLDER ENGAGEMENT

At the initial stakeholder engagement meeting National Grid presented three suggested design approaches for the tunnel head house structures:

- Standard Industrial approach;
- Architectural Statement; and
- Rural Architecture Approach.

The general consensus from discussions with officers working for both local authorities was that the Rural Architecture style would be more appropriate in the given contexts of both the Braint and Tŷ Fodol sites. However, it was suggested that they have distinctly different landscape and characteristics, which need to be considered in the design development. Some key differences include:

- the Braint landscape character is considered as being more planned and is heavily influenced by the estate architecture found in the surrounding context; and
- the Tŷ Fodol context is characterised by individual farmsteads, with a more diverse range of agricultural built form, that have extended gradually over time.

Further characteristics of these two sites have been explored in ensuing sections of this report.

The examples in the adjoining photos are drawn from existing National Grid substation and tunnel sites in the case of the ‘Standard Industrial’ and ‘Architectural Statement’ examples. These photos seek to illustrate how the first two design approaches are significantly different from the ‘Rural Architecture’ approach that aims to reflect the local rural vernacular in the vicinity of the two sites in North Wales to draw design inspiration for the tunnel head houses designs in either site based on their distinct local characteristics.

National Grid

Standard Industrial approach

National Grid

Architectural Statement

Examples of local agricultural buildings that has influenced the Rural Architecture Approach

2.0 Braint Tunnel Headhouse and CSEC

2.1 INTRODUCTION

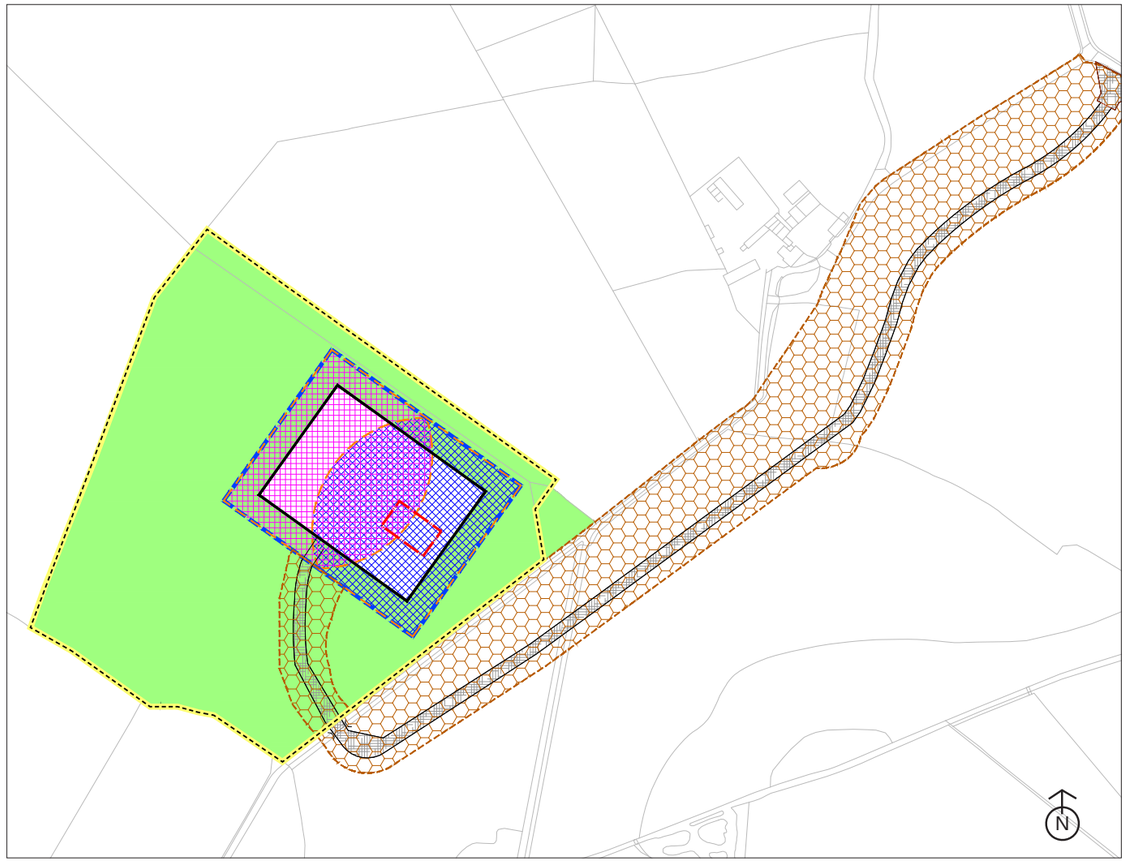
The Braint site is located within pasture land between properties known as Rhosbothan (500 m), Llwyn-ogan (200 m) and Tyddyn Fadog (340 m).

The general local character of the area is rural pasture land with agricultural plots bordered by small blocks of woodland, spinneys and coverts associated with the local estates.

Initial Stakeholder Engagement

Some of the key themes that emerged from the initial stakeholder engagement with the officers from Isle of Anglesey County Council were as follows:

- there was a general preference within the three suggested design approaches for the building design to be reflective of rural architectural character, but with due regard to the estate style architecture and character found in this part of Anglesey. The preference was for a design approach that doesn't stand out, but pays due regard to the existing, and often different styles evident in the local vernacular which are heavily influenced by the estate architecture found at the Plas Newydd and Plas Coch estates;
- whilst it has been suggested that cues might be taken from Horizon Nuclear Power's design approach to the buildings on the Wylfa Newydd site, it is considered that the lack of any visual relationship between the two sites (given the intervening distance) and their differing landscape characters would make this inappropriate;
- the landscape in this part of Anglesey differs greatly from that in Gwynedd, in that the landscape is significantly more planned and is based around and heavily influenced by estate architecture and therefore the building form, materials and colour palette for the Braint operational compound should be different to the Tŷ Fodol operational compound;
- a Local Characterisation study was suggested in order to understand the local vernacular architecture and landscape further;
- it was agreed that although the area is influenced by estate style architecture, this shouldn't be slavishly replicated for the operational compound, but it is a good design cue that needs to be developed in a contemporary manner;
- the Braint site is visible from a number of viewpoints, hence careful consideration should be given to views to and from Bryn Celli Ddu Schedule Monument, the community of Star and A4080;
- the site is visible from the community of Star, against a background of existing land form;
- a stark, modern design approach would be unlikely to be appropriate in this area. A low-key built form with natural materials that might more comfortably be accommodated within the landscape might be more appropriate;
- in terms of building materials, it was suggested that stone should be considered but rendered finishes were unlikely to be appropriate. Similarly, Corten steel was not considered appropriate;
- more traditional roof forms would be better suited in this locality rather than wavy or organic roof forms;
- extensive mounding would be alien to this landscape and would very likely be inappropriate;
- the access design should not overuse tarmac or other visually stark materials in this rural environment. A mosaic of different materials and surfaces, reinforced grass or coloured aggregate with complementary landscape treatments to screen access routes should be considered; and
- local geology and earth colours to be considered but existing built forms, both historic and new, were often imported and hence do not necessarily reflect the local geology.



Braint Tunnel Headhouse and CSEC Outline Plan for DCO application

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LEGEND

- Temporary construction compound area
- Indicative area within which possible Landscaping / Mitigation would take place
- Zone within which full Line tension gantries and cable sealing end would be located
- Zone within which tunnel Head house would be located
- Zone within which permanent access road would be located
- Area within which tunnel head house and cable sealing end compound would be located
- Illustrative size of the tunnel head house and cable sealing end compound
- Illustrative location of the tunnel head house (Maximum dimensions measured externally (H) 8 m volume 4,350 m³)
- Illustrative route of permanent access road

2.2 REGIONAL CONTEXT

Anglesey is the largest of the Welsh islands, covering some 720 square kilometres and separated from the mainland by the Menai Strait; a narrow stretch of tidal water approximately 25 km long and about 250 metres wide at its narrowest. The main towns on the island are Llangefni, Holyhead, Amlwch, Benllech, Menai Bridge and Llanfairpwll.

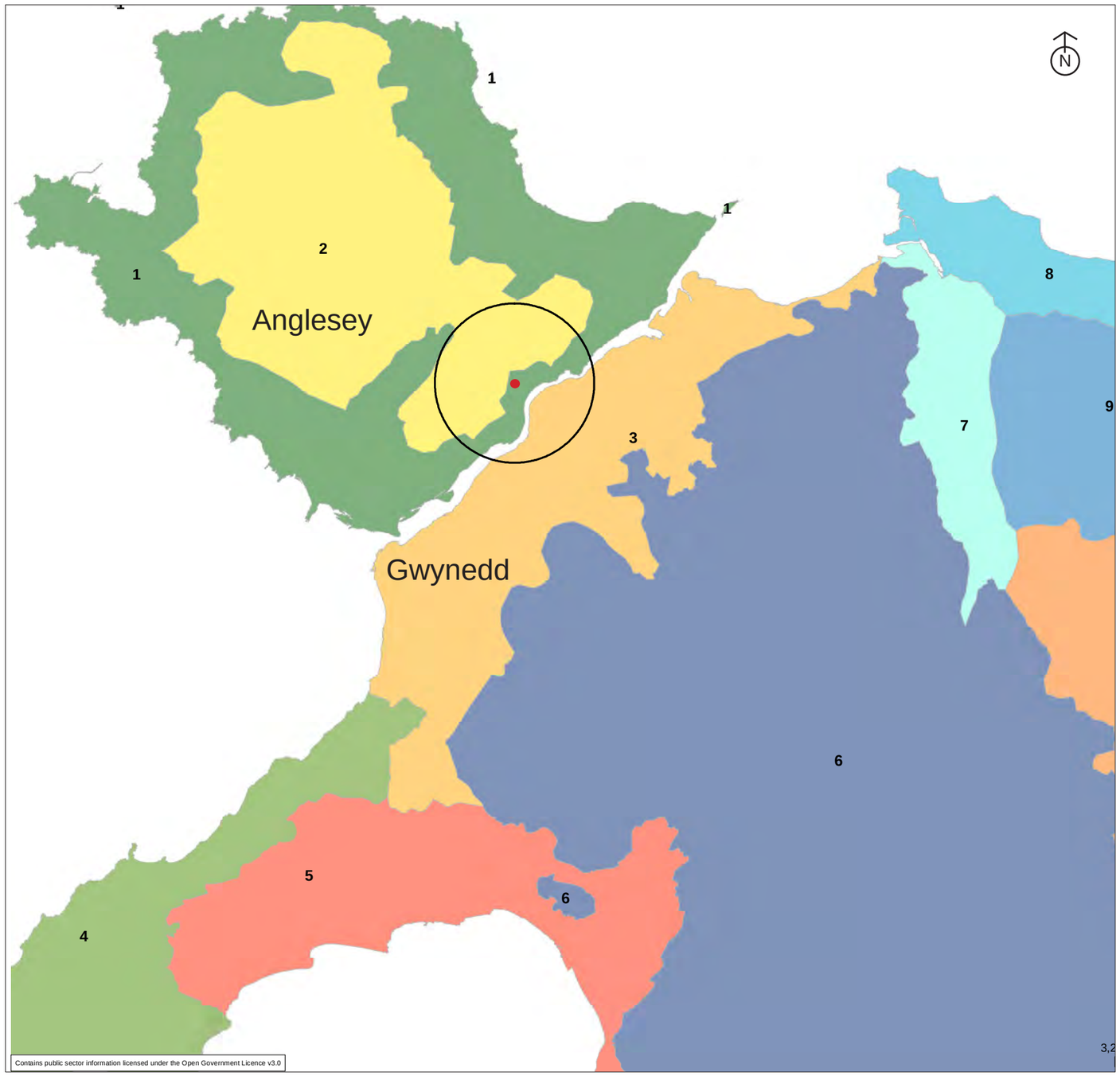
The topography of the island is generally subdued with a rolling, undulating pattern interspersed by harder, rocky outcrops such as Holy Island, Mynydd Parys, Mynydd Bodafon and Mynydd Llwydiarth. The landform generally falls east to west, with a number of low lying areas along the west coast including Aberffraw, Malltraeth Marsh and Newborough Warren. This landform pattern is reflected in the north-east – south-west alignment of water courses. This general character belies a complex, underlying geology and effects of geomorphological processes such as glaciation. The island contains some of the oldest rocks in Wales and Britain as a whole, and these are clearly illustrated in the topography of the island.

In broad terms, inland Anglesey can be described as lowland farmland with relatively sparse tree cover in the north, where there is a more open, rolling and windswept character, which becomes increasingly well treed towards the south; in particular towards the Menai Strait. There are a number of fens and extensive areas of drumlins, especially in the north and west and parkland landscapes are found to the south and east. The island's rural coastline has been designated an Area of Outstanding Natural Beauty and features many sandy beaches, especially along its eastern and western coast. The northern coastline has dramatic cliffs interspersed with small bays and the southern coast is focussed on the Menai Strait. The Anglesey Coastal Path (which forms part of the Wales Coast Path) is a 200 km path, which follows nearly the entire coastline.

Jim Linwood, Flickr

The Menai Bridge

2.3 STRATEGIC LANDSCAPE CONTEXT



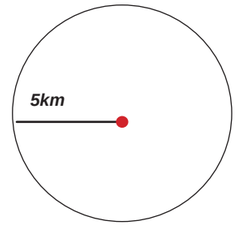
National Landscape Character Areas

Legend

- Braint site, Anglesey

National Landscape Character Areas

- 1 - Arfordir M n/Anglesey Coast
- 2 - Canolbarth Mdn/Central Anglesey
- 3 - Arfon
- 4 - Llyn
- 5 - Bae Tremadog/Tremadoc Bay
- 6 - Eryri/Snowdonia
- 7 - Dyffryn Conwy/Conway Valley
- 8 - Arfordir Colwyn ayr Gogledd/Colwyn and Coastline
- 9 - Bryniau Rhos/Rhos Hills
- 10 - Mynydd Hiraethog/Denbigh Moors
- 15 - Dyffryn Dyfrdwy a Llangollen/Llangollen Vale of Dee
- 16 - Y Berwyn/Berwyn



National Landscape Character Area: Anglesey Coast

The area encompasses all of the coastal areas of the Isle of Anglesey, including the adjacent Holy Island. The north-east to south-west trending geological faults and varying rock types influence the shape and geometry of the coast. Although much of Anglesey is low lying, the higher hills lie in the northern half of the coastal area. The prevailing winds also create a distinctly more exposed south-westerly coast, where well developed dune systems and lagoons run inland. Much of the former estuary of the Afon Cefni has been reclaimed but the resulting coastal levels remain within this character area. Though mainly farmed, the area contains numerous coastal heaths, dunes, and areas of gorse scrub. Together with the island's two largest woodland plantations, these areas help to distinguish the character from that further inland. A meandering inter-tidal strait separates mainland Anglesey from Holy Island. Arrival on Anglesey from mainland Wales is across either of two spectacular bridges at Menai Bridge, which cross the estuary-like Menai Strait around the narrowest point west of the community of Menai Bridge.

Views to the distant mountains of Snowdonia create a dramatic south eastern backdrop to much of Anglesey. Closer to, these mountains become more impressive and engaging, and when viewed across a foreground setting of the Menai Strait around Beaumaris, they engender a sense of scale and drama. At the other end of the Strait, the extent of the dunes, beaches and Caernarfon Bay provide a spectacular setting for views of the Llŷn peninsula.

The area coincides with Anglesey Coast AONB, along with a number of stretches of Heritage Coast. The island is designated as a Geopark. Beaumaris Castle in the east forms part of a World Heritage Site.

Legend

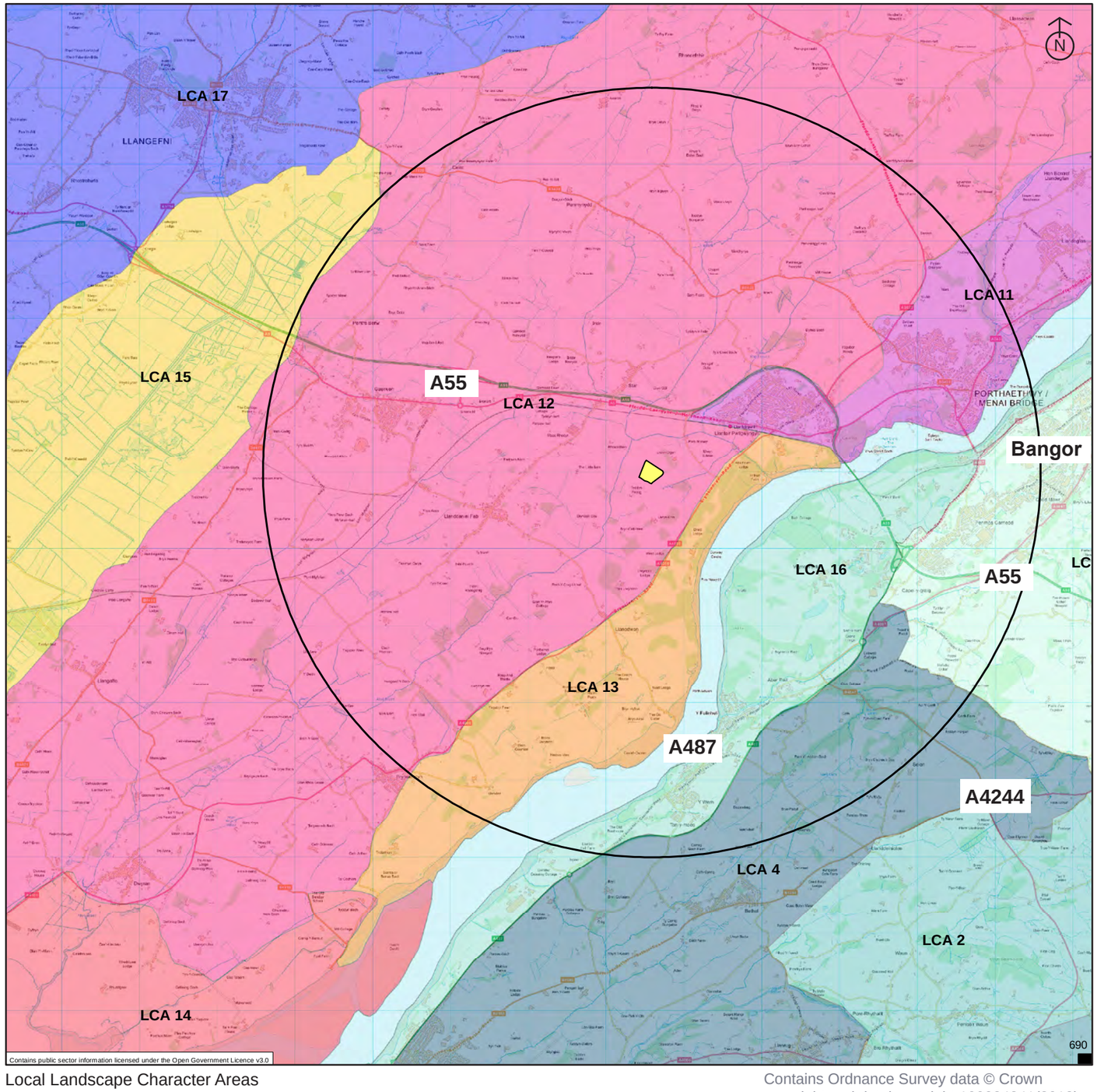
- Braint site, Anglesey

Gwynedd Landscape Character Areas

- LCA 1 - Bangor Coastal Plan
- LCA 16 - Menai Coast
- LCA 2 - Penisarwaun Plateau
- LCA 3 - Llanberies - Bethesda
- LCA 4 - Caernarfon Coast and Plateau

Anglesey Landscape Character Areas

- LCA 11 - Eastern Menai Strait
- LCA 12 - East Central Anglesey
- LCA 13 - Western Menai Strait
- LCA 14 - Niwbwrch
- LCA 15 - Afon Cefni
- LCA 17 - West Central Anglesey



Local Landscape Character Areas

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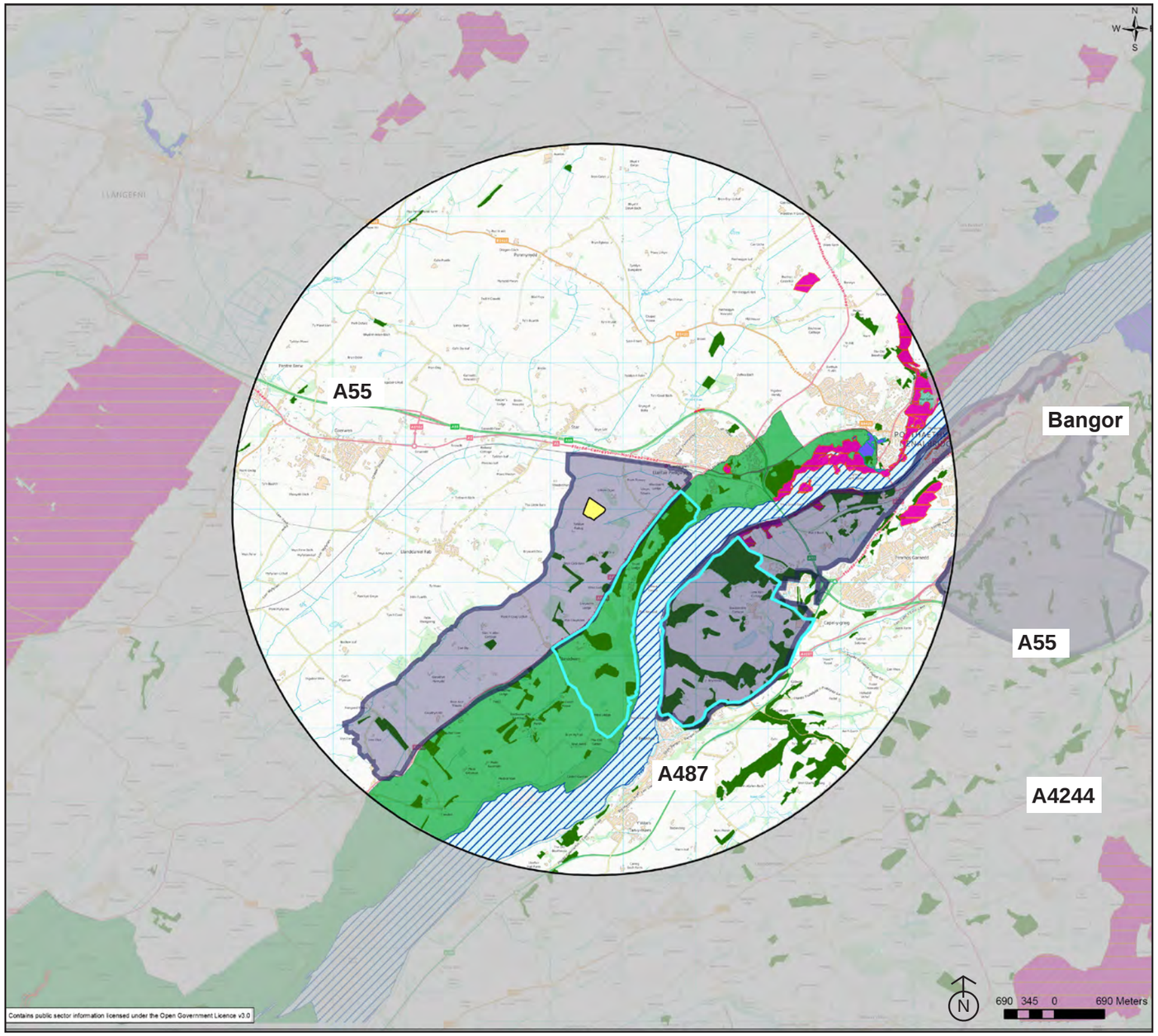
Landscape Character Area (LCA)12 : East Central Anglesey

In 2011 The Isle of Anglesey County Council published a landscape assessment study of the local landscape character areas. The Braint site area falls within the LCA 12 East Central Anglesey, which reflects much of the typical undulating landscape of Anglesey. The majority of the area consists of improved grassland interspersed with scattered areas of semi-natural habitat. In places, hedgerows and hedgebanks (and cloddiau) form field boundaries, and where rock outcrops exist, stone walls are more typically field boundaries.

The underlying geology is varied, with glacial deposits in the east and to more mixed intrusive and sedimentary features in the west. Central parts of the LCA are influenced by the A5 trunk road, now superseded by the A55 trunk road, which runs relatively parallel. Impacts of this transport corridor on the landscape are local and varied. Likewise cultural and historic influences vary, which is typical of the island. Settlements vary from nucleated to dispersed patterns.

2.4 LANDSCAPE DESIGNATIONS



Local Landscape Designation Map

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The following designated areas have been identified within 5 km of the site

Site boundary - Braint, Anglesey

Site of Special Scientific interest - The most important sites for Wales natural heritage. These are highly protected to safeguard the range,quality and variety of habitats, species and geological features in all parts of Wales. The identified sites are Sgistau Glas Ynys Mon; Cadnant Dingle; Glannau Porthaethwy.

Local Nature Reserve - Coed Cyrnol Nature Reserve is an area of mixed deciduous, broadleaved and coniferous woodland. Both sets of arborial species encourage rich bird and animal life.

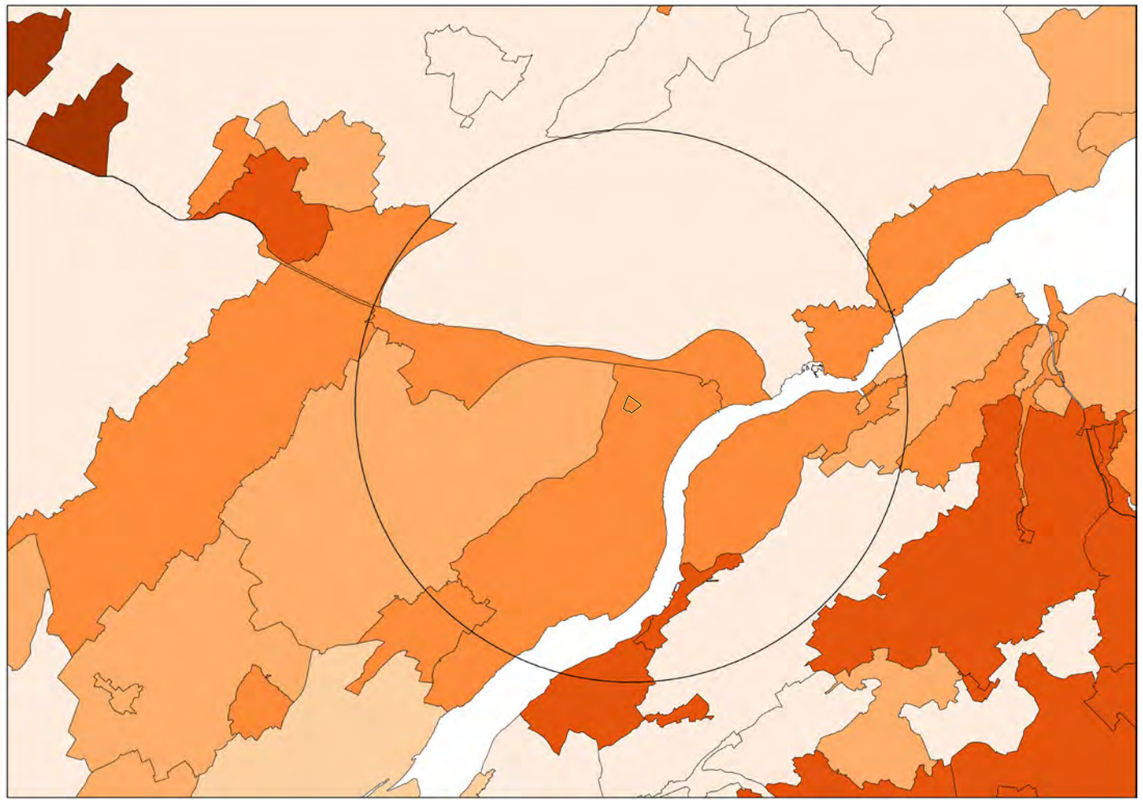
AONB - The coastal zone of Anglesey was designated as an AONB in 1966 and was confirmed in 1967. It is the largest AONB in Wales, covering one third of the island.

Special Landscape Area - Southern Anglesey Estatelands located in southern Anglesey, west of the town of Llanfairpwll. It covers part of the Marquis of Anglesey's estate, which lies immediately to the north of the AONB-designated shoreline of the Menai Strait. It is considered to provide a valued setting to Anglesey AONB and the Grade I listed parkland of Plas Newydd. Vaynol Estate and Surrounds Special Landscape Area is located on the south shore of the Menai Strait in Gwynedd.

Registered Parks and Gardens - Grade 1 Registered Parks and Gardens at Vaynol and Plas Newydd. In total 17 Registered Gardens and 17 Country House Gardens located within 5 km of the site.

Ancient Woodland - There are a total of 172 ancient woodland sites across the 5 km study area.

Special Areas of Conservation - SACs represent some of the most important sites for wildlife and the environment. The identified site which falls within the 5km area is: Menai Strait and Conwy Bay / Y Fenai a Bae Conwy.



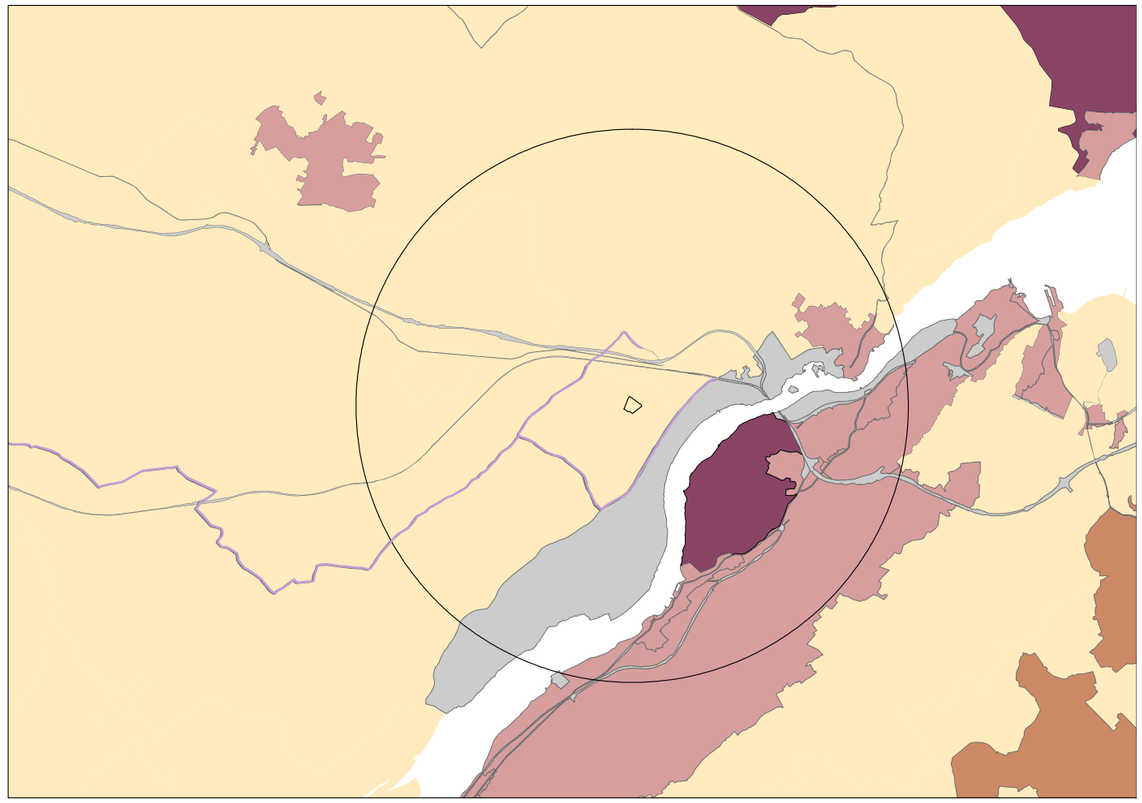
Map showing Historic Landscape Aspect Areas

- **Prehistoric**
- **Roman**
- **Medieval up to 1536**
- **Post-medieval after 1536**
- **Industrial**
- **Recent**

Historic Landscape Aspect Areas as defined by Natural Resources Wales in the LANDMAP database

There are 15 Historic Landscape Aspect Areas falling within the 5 km study area as described below.

- within Gwynedd: Roads; Llanfair Isgaer; Northern Arfon plateau; Bangor mountain; Vaynol; and Y Felinheli (Port Dinorwic).
- on Anglesey: South Anglesey parkland; Fieldscape south of Malltraeth; A5 corridor and associated villages; Coastline around Llandegfan; Fieldscape, Plas Gwyn; Fieldscape, central eastern Mon; Malltraeth Marsh; Brynsiencyn; and Menai Bridge.



Map showing Cultural Landscape Aspect Areas

- **Customs**
- **Institutions**
- **Infrastructure**
- **Urban**
- **Rural**
- **Places**

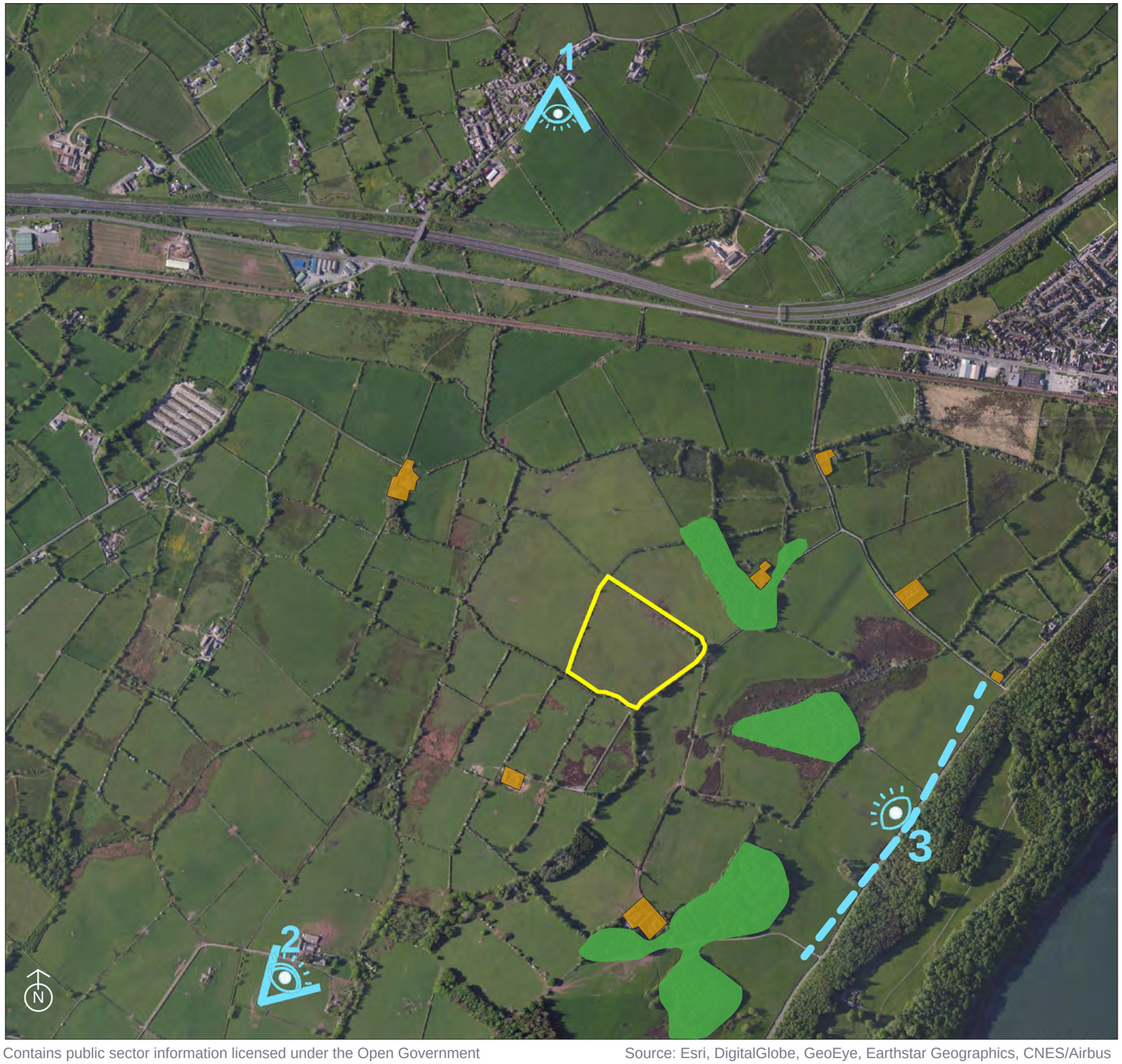
Cultural Landscape Aspect Areas as defined by Natural Resources Wales in the LANDMAP database

There are 23 Cultural Landscape Aspect Areas falling within the 5 km study area as described below.

- within Gwynedd: Bangor (Central); Bangor (University); Railway - Chester to Holyhead; Principal roads; Bryn Cegin and Parc Menai industrial estate; Bangor Mountain/Arfon plateau; Arfon Plain; Treborth; Sustrans cycle route; y Faenol; y Felinheli; Plas Menai-watersports centre; and A55.
- on Anglesey: A5 Road; A5 Road Villages; A55 road; Railway - Chester to Holyhead; Transport corridor area; Menai Bridge; Southern Anglesey Coast – Llandegfan; Sustrans Cycle Route; Central Anglesey; and Plas Newydd, Plas Llanidan.

* Customs - leisure/recreation;
* Institutions - land division, religion, educational movements;
* Infrastructure - tourism, services, communication & transport, education & welfare;
* Places - sense of place, name of places.

2.5 SENSITIVE VISUAL AND CULTURAL HERITAGE RECEPTORS



Legend

- Braint site, Anglesey
- 1 Residential properties in Star
- 2 Bryn Celli Ddu Tumulus Scheduled Monument
- 3 Filtered views from A4080
- Large blocks of mature woodland that screen and filter views from the A4080
- Nearest residential receptors

Views from Star: The small settlement of Star sits on higher ground to the north of the proposed Braint site. The mountains of Snowdonia, and more distant Llŷn Peninsula, form an impressive and distinctive back drop in panoramic views over the undulating, well treed, lowland landscape, immediately to the south. The Braint site is visible as a small part of this expansive view from Star. The existing 400 kV OHL is visible to the east crossing over the Menai Strait and a lower voltage lattice line is also visible to the south.

Views from Bryn Celli Ddu: Views to the north-east from Bryn Celli Ddu comprise small scale pastures bounded by a combination of field boundaries, with the existing 400 kV OHL visible on the horizon. A lower voltage lattice OHL is also visible in the mid ground. Views towards the Braint site are screened by the farm at Bryn Celli Ddu, including landforms associated with new dairy units, and intervening woodland blocks.

Views from the A4080: Views north-west towards the Braint Site from the A4080 are often heavily filtered by existing roadside vegetation, undulating landform and intervening woodland blocks.

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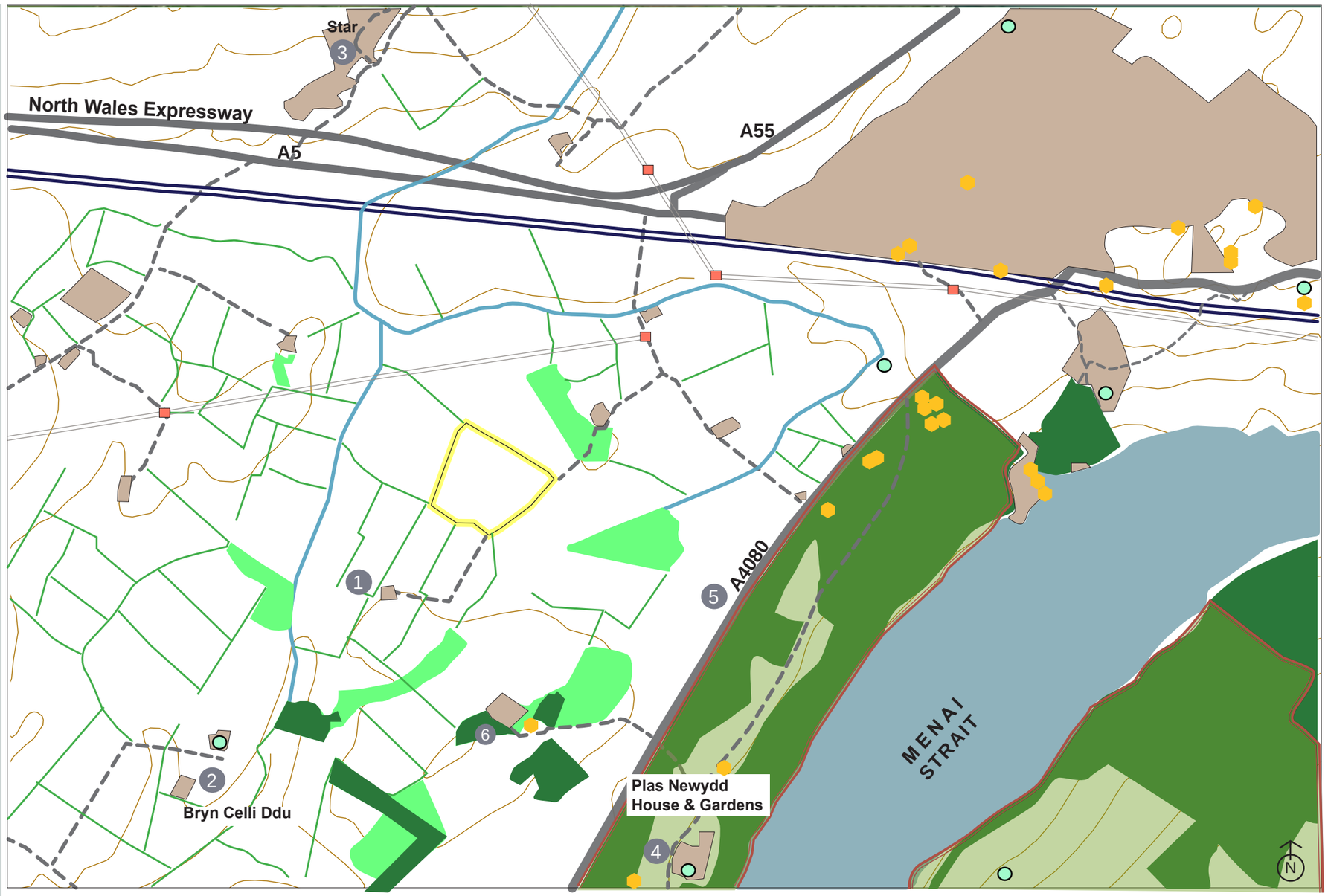
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

2.6 SITE AND WIDER CONTEXT ANALYSIS

2.6.1 Site Analysis

The Braint site is located within pasture land between properties known as Rhosbothan (500 m), Llwyn-ogan (200 m) and Tyddyn Fadog (340 m). The strong historic character of this landscape,and its sparsely settled character, results in a strong sense of place enhanced by its scenic setting. The site analysis explored the local landscape textures and character in addition to the following key features in the surrounding context:

1. **Homestead:** This is the closest residential homestead near the site. Views from this site have been considered in the study
2. **Bryn Celli Ddu Burial Chamber:** This scheduled monument is a prominent local attraction
3. **Star:** This community is located to the north-west of the site, on rising ground, and would have views into the site which have been considered in the design approaches
4. **Plas Newydd House and Gardens:** This Grade 1 listed country house set in gardens, parkland and surrounding woodland on the northern bank of the Menai Strait belongs to the National Trust and is a key landmark and tourist attraction. The grounds form part of a Grade 1 listed Registered Park and Garden. Although the Braint tunnel head house and site would not be directly visible from this area, the character of this complex has been considered in the local character assessment and design approach. The Essential Setting of the Registered Park and Garden lies to the east of the site
5. **Views from the A4080:** Views north-west towards the Braint Site from the A4080 are often heavily filtered by existing roadside vegetation, undulating landform and intervening woodland blocks
6. **Llwyn-onn Farm:** Listed Building in the area currently undergoing conversion to residential units.



Site Context Analysis Plan

2.6.2 Site and Context Images

View towards the site from the unnamed local road off A4080. The site is partially screened by existing vegetation.

View of site from access road looking west

Existing site condition

View of closest homestead to the site. The roof profile has inspired some of the design approaches

View of the site from Star. Views into the site have been considered in the design approaches.

View of site with Star in the distance

All photographs are taken by Jacobs

2.6.3 Local Landscape Colours, Materials and Details

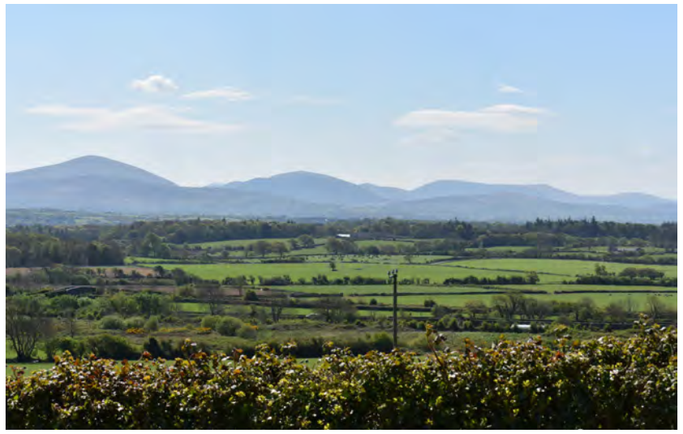
During site visits, it was identified that the key influences on the site were both the rural landscape and local estate architecture; these helped inform the design process.

Rural Landscape

Some of the key features in this character tapestry include:

- grassland fields with trees and planting;
- formal blocks of planted estate woodland;
- stone walls and Cloddiau.;
- slate roofs;
- barn architecture;
- metal and rusted sheets with a rustic feel;
- stepped roofs;
- vaulted roofs; and
- compacted stone access routes.








All photographs are taken by Jacobs

2.6.3 Local Landscape Colours, Materials and Details

National Trust

Plas Newydd

AMEC

Plas Coch

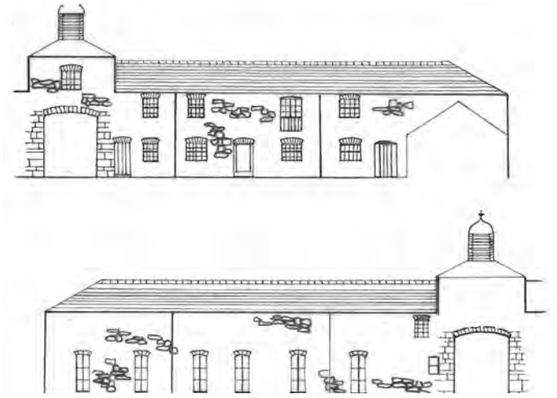
Jim Linwood, Flickr

The Menai Bridge

AMEC

Victoria Cottages

Plas Newydd Home Farm



Plas Newydd Home Farm drawings showing dressed stone walls and stone lintels

Stephen E. Roddick, geography

Plas Coch

Estate Architecture

The landscape surrounding the Braint site is significantly more planned than that around the Tŷ Fodol site in Gywnedd, and is based around and heavily influenced by estate architecture, particularly the Plas Newydd and Plas Coch estates.

Some of the key features in this character tapestry include:

- bold and iconic architecture surrounded by planting and woodlands that filters views of buildings;
- stone walls;
- stepped gable ends;
- statement architecture surrounded by plantation;
- slate roofs;
- stone lintels; and
- tower features and chimneys.

2.6.4 Sensitive Sites and Heritage

The Braint Tunnel Head House site area has a very different character to the Tŷ Fodol Site in Gwynedd, being lowland and gently rolling. The Bryn Celli Ddu complex of chambered tomb and standing stones are Scheduled Monuments (SAM AN02,AN084 and AN085) and are a prominent local tourist attraction. Bryn Celli Ddu marks the summer solstice and popular summer solstice events are held annually at the site.

The greatest influence from the historic environment comes from the Plas Newydd Estate. The Grade I Registered Park and Garden dominates the local area, with numerous estate owned buildings scattered through the adjacent farmland. The listed building descriptions for these structures reference a certain style that was incorporated into each building, such as the distinctive octagonal chimney stacks incorporated into Victoria Cottages.

On Anglesey and in Gwynedd, the traditional method of field boundary construction is a method common to many 'Celtic' field systems, the Cloddiau. These are earthen banks, embedded and faced with stone on the windward side, but more commonly on Anglesey, on both sides. A hedge of gorse was sometimes added along the top of the bank to further deter livestock.

The stones used are small and irregular and would have originally been gathered by field clearance, but later from quarried material. Originally the Cloddiau would have been about 1m high and 1m wide and, when topped by gorse or hedgerow, produced a substantial stock-proof barrier to enclose fields and lanes.


AMEC
Bryn Celli Ddu Burial Chamber


AMEC
Standing stone with Bryn Celli Ddu tomb in the background


AMEC
Llwyn-onn Farm


National Trust
Plas Newydd


AMEC
Plas Coch

2.7 VISION, DESIGN OPTIONS & PRINCIPLES - BRAINT

2.7.1 Vision and Design Approach

At the initial stakeholder engagement meeting in May 2017, it was suggested that as a general design approach, a farmstead or estate style building surrounded by trees which give glimpses of the site and Tunnel Head House would be preferred.

Officers from the Isle of Anglesey County Council also suggested that a built form that doesn't stand out, but pays due regard to the existing, and often different styles evident in the local vernacular would be preferred. The local vernacular style is heavily influenced by the localised estate architecture offered by the Plas Newydd and Plas Coch estates. However it is essential that this style isn't slavishly replicated for the Tunnel Head House and operational compound.

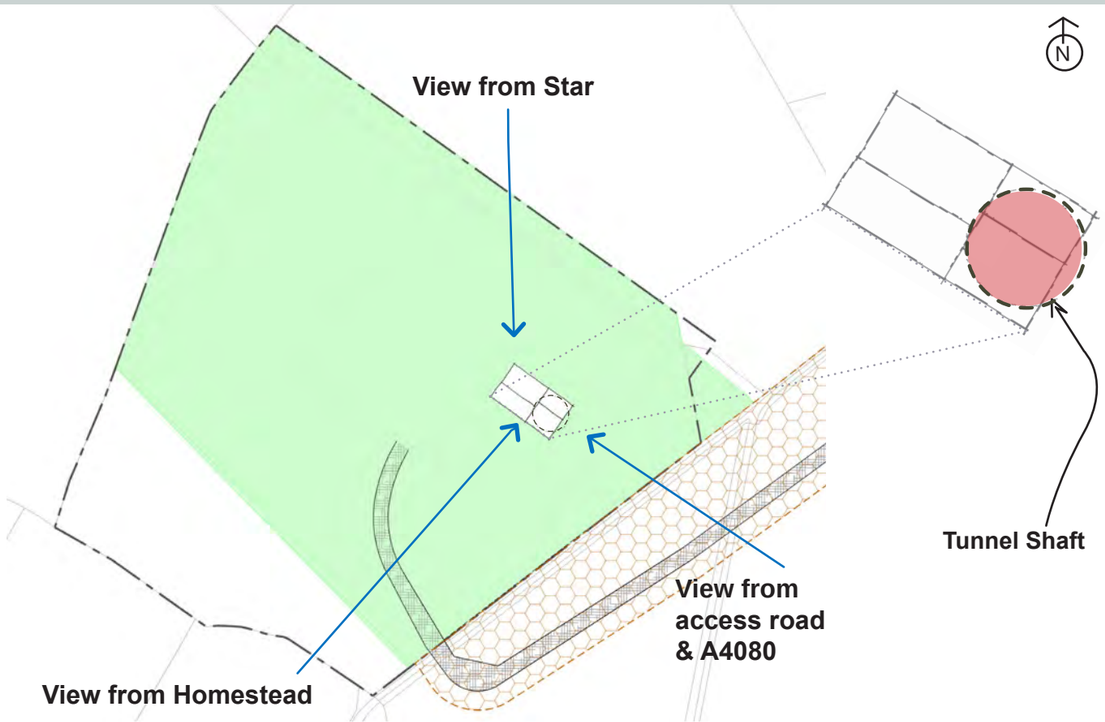
The design approaches shown in this section reflect the two key influences observed during site visits and also explore forms from the surrounding region and the local visual tapestry as key inspirations for potential materials, treatments and finishes.


AMEC


National Trust


AMEC

Design Vision
The aspiration for the Tunnel Head House at the Braint site is to create a built form which reflects influences of the local vernacular architecture but does not stand out in the context of this rural area. The built form will be largely surrounded by proposed vegetation which mitigates the direct views into the site but provides glimpses into the built form, reflecting the visual imagery of the estate style architecture.



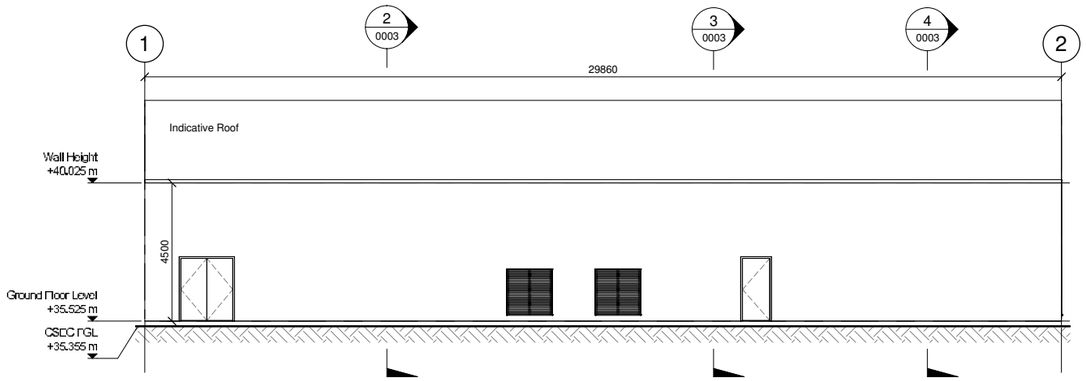
Massing and View Influences

- The key design approach to massing has been to take the operational spaces that are required and break it down into four massing blocks that could be articulated and modulated to create a more visually interesting built form; and
- The key views that have been considered include the views from the access road and A4080, Bryn Celli Ddu, the homestead and the community of Star.

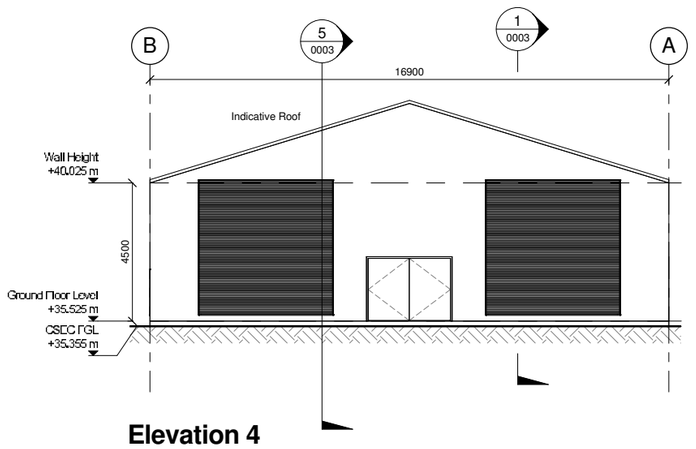

AMEC

Braint Site Building Functional Design

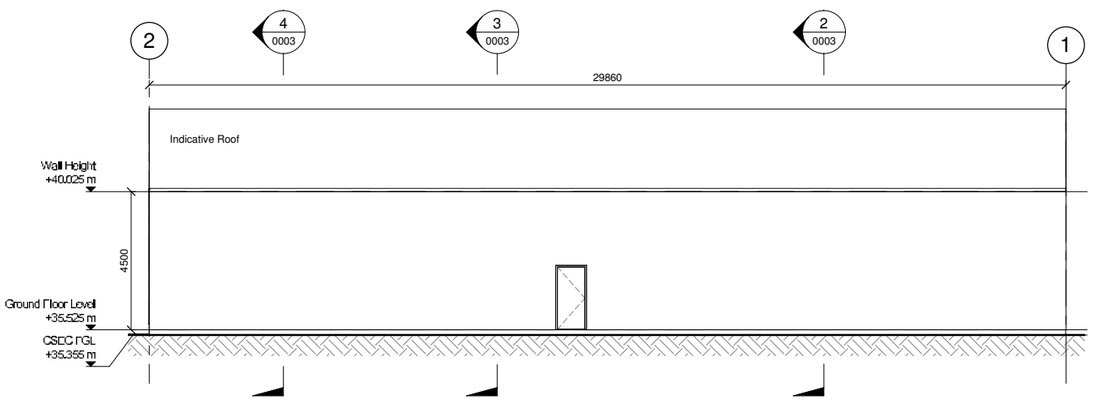
This page shows the minimum functional engineering design elevations for the Braint Head House. This would have been the basic design that would usually be used for such head houses. The preferred design attempts to articulate this massing to respond to the sensitive views and character areas around the site.



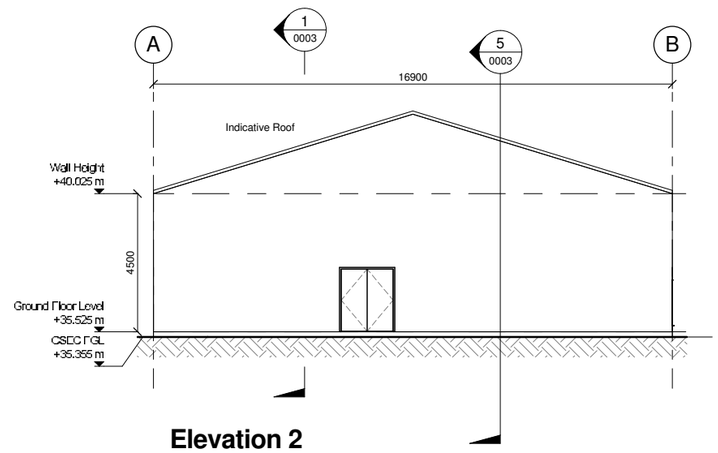
Elevation 3
1 : 100



Elevation 4
1 : 100



Elevation 1
1 : 100



Elevation 2
1 : 100

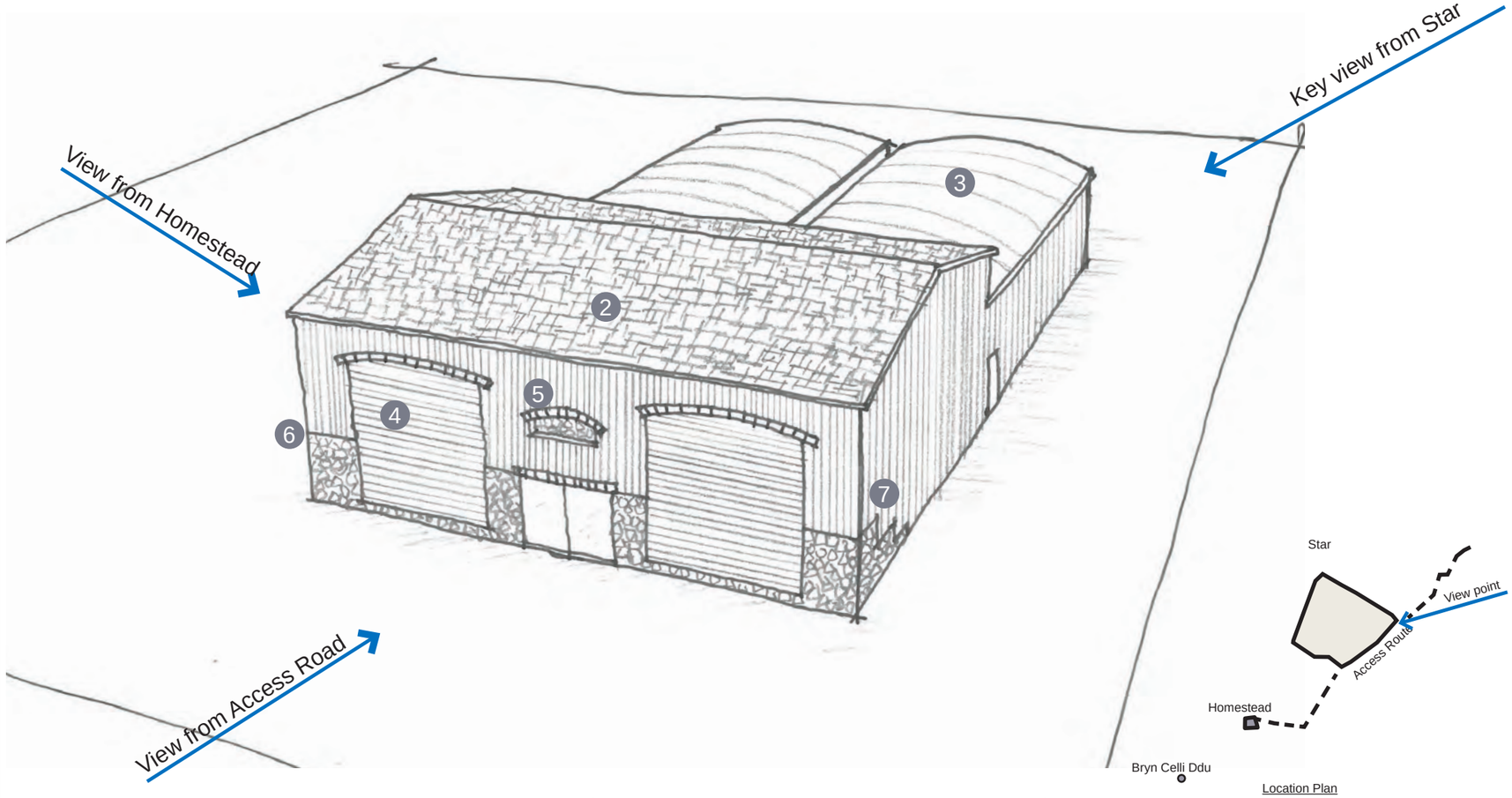
This is a conceptual design only and would have been subject to further structural design in the detailed stages.

2.7.2 Braint Site Building Form Preferred Option and Key Design Principles

In August 2017, three design options (as outlined on pages 28-30) were presented to the key stakeholder group at the Isle of Anglesey County Council. Based on the feedback from that group, a revised version of Option 3 has emerged as National Grid's preferred design approach with the following key design principles:

Key Design Principles

1. The building volume would not exceed 4350 m³ with a maximum building height of 8 m
2. Front massing to be designed as a high element with a low pitch gable roof, with slate-effect panel roofing and short overhang, reminiscent of Plas Newydd Home Farm architecture
3. Vaulted roofs with corrugated metal for rear sections to reduce the visual impact that pitched roof reflections could have for views from Star. The mass closest to Star may be lowered further to provide visual articulation depending on functional constraints
4. Louvres could be architecturally enhanced through a suitable colour palette, detailing etc. The physical dimension of the louvres would largely be dictated by operational considerations such as air flow rates and noise attenuation. Potential for stone or dark brick lintels to reflect local architecture depending on cost and functional viability
5. The use of smaller recesses would add visual interest to the façade
6. Building facade to be broken with visually heavy stone walls or cladding along the bottom half and linear metal or wood-effect, striated cladding for the top half
7. Potential to transition stone base to metal cladding on side elevations reminiscent of old farms and as a cost efficient design.



This architectural sketch provides an illustrative means of interpreting the Key Design Principles. The final Tunnel Head House is likely to differ somewhat in form and scale within the parameters of the DCO.

External safety and maintenance equipment including Fall Arrest system at roof height are likely to be provided.

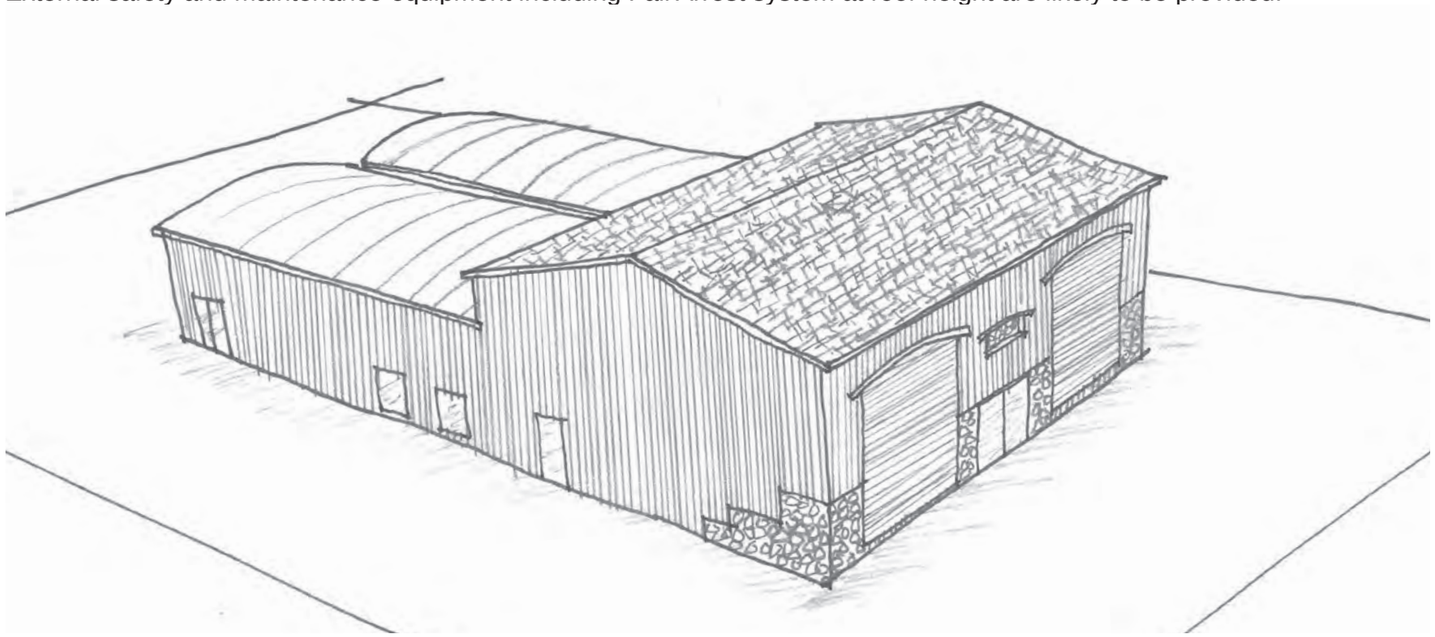

AMEC
Llwyn-onn Farm


Sketch of Plas Newydd Home Farm

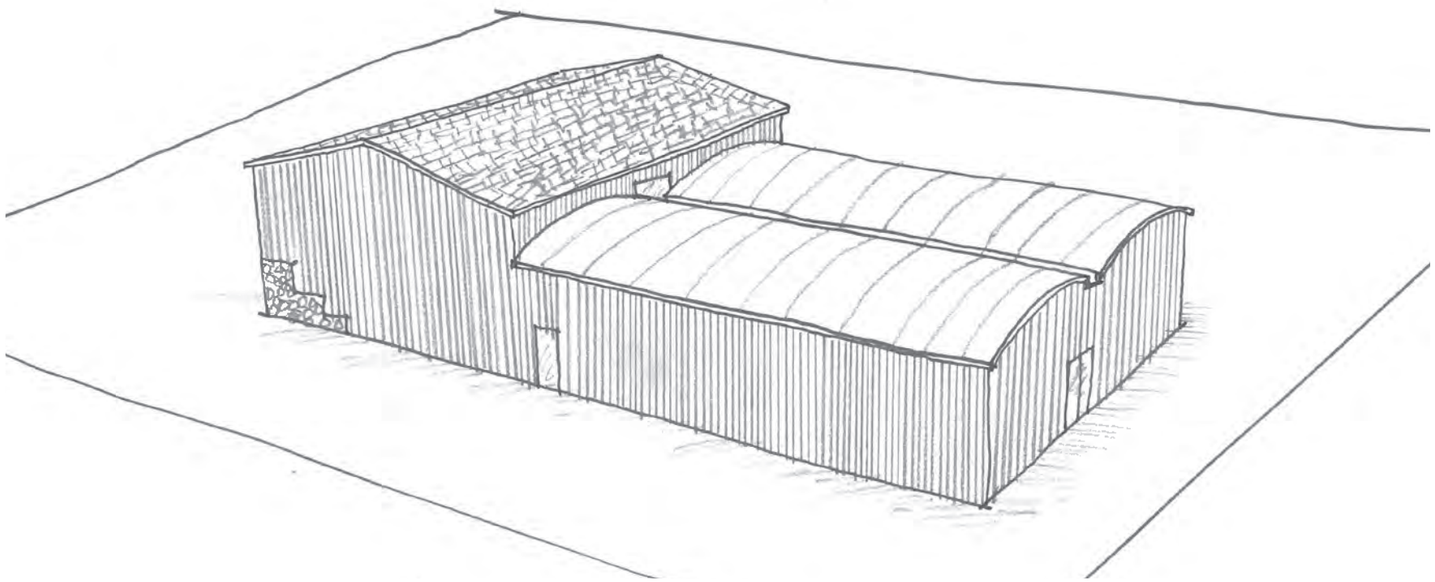

Example of vaulted rural architecture

The below architectural sketches provide an illustrative means of interpreting the Key Design Principles. The final Tunnel Head House is likely to differ somewhat in form and scale within the parameters of the DCO.

External safety and maintenance equipment including Fall Arrest system at roof height are likely to be provided.



Oblique view from the south west showing façades towards the access road and the adjacent homestead



Oblique view from the north-east showing façades towards Star

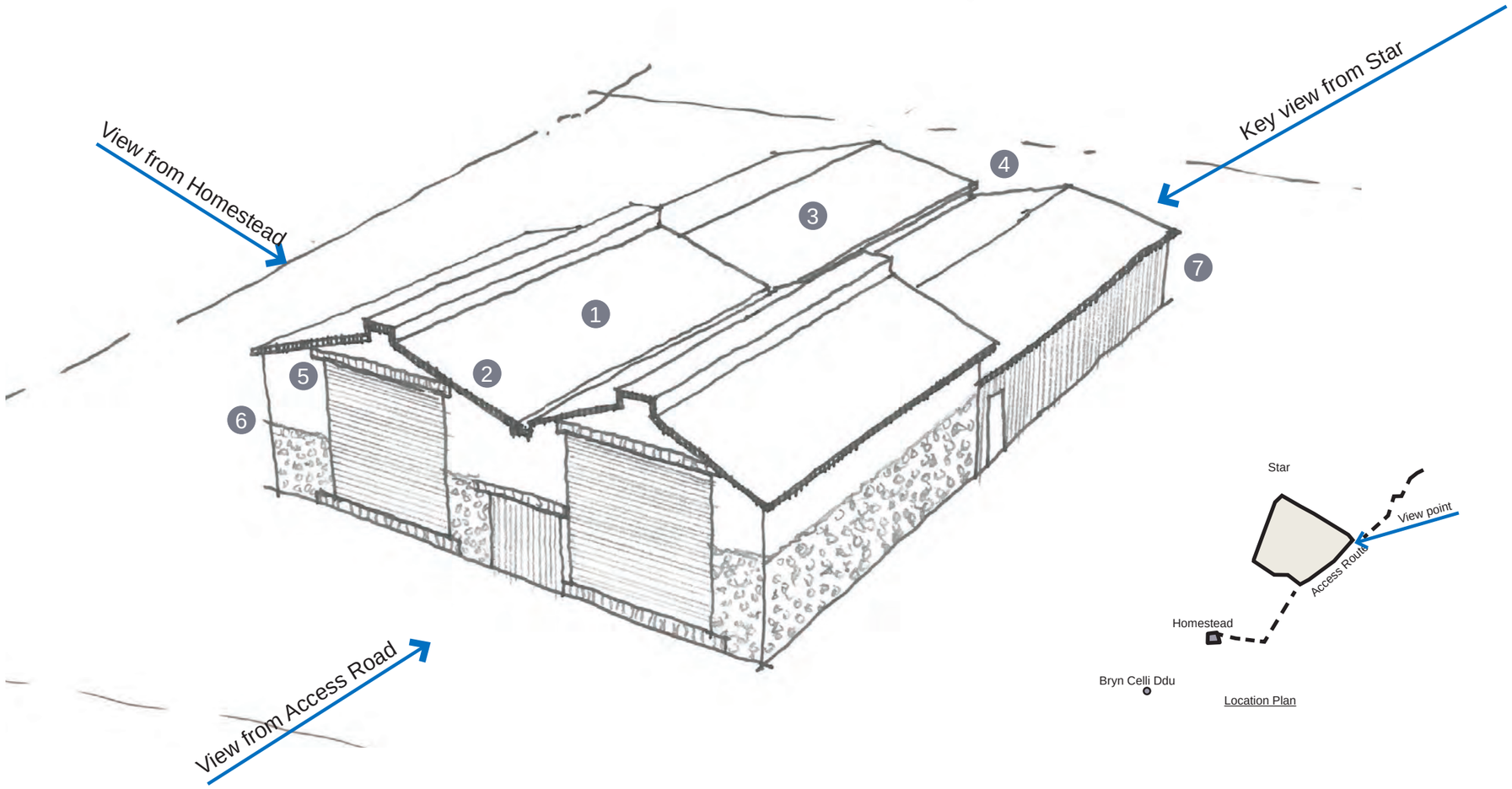
© STEADMANS

2.7.3 Braint Site Building Form Initial Option 1

The first option focused on breaking up the massing of the building into four parts with distinct roof forms while breaking up the walls with a mix of materials.

Design features

1. Higher built form to the front of the site, stepping down to the back to present a lower built form profile when viewed from Star
2. Double gable-ended roof with a barn or stock-shed style roof profile to create visual interest along the front elevation
3. Lower pitched roofs to the back
4. The mass closest to Star lowered further for visual articulation
5. Louvres could be architecturally enhanced through suitable colour palette, detailing etc. The physical dimension of the louvres will largely be dictated by operational considerations such as air flow rates and noise attenuation. Potential for stone or brick lintels to reflect local architecture
6. Wall faces broken up into two sections. The lower half to have a visually heavier material such as stone cladding or gabion wall with waste slate. The upper section could be brick or lighter patterns of stone
7. The front elevation, along the access road, would have a more enhanced material palette while the rear sections could be metal cladding with colours that blend into the landscape.



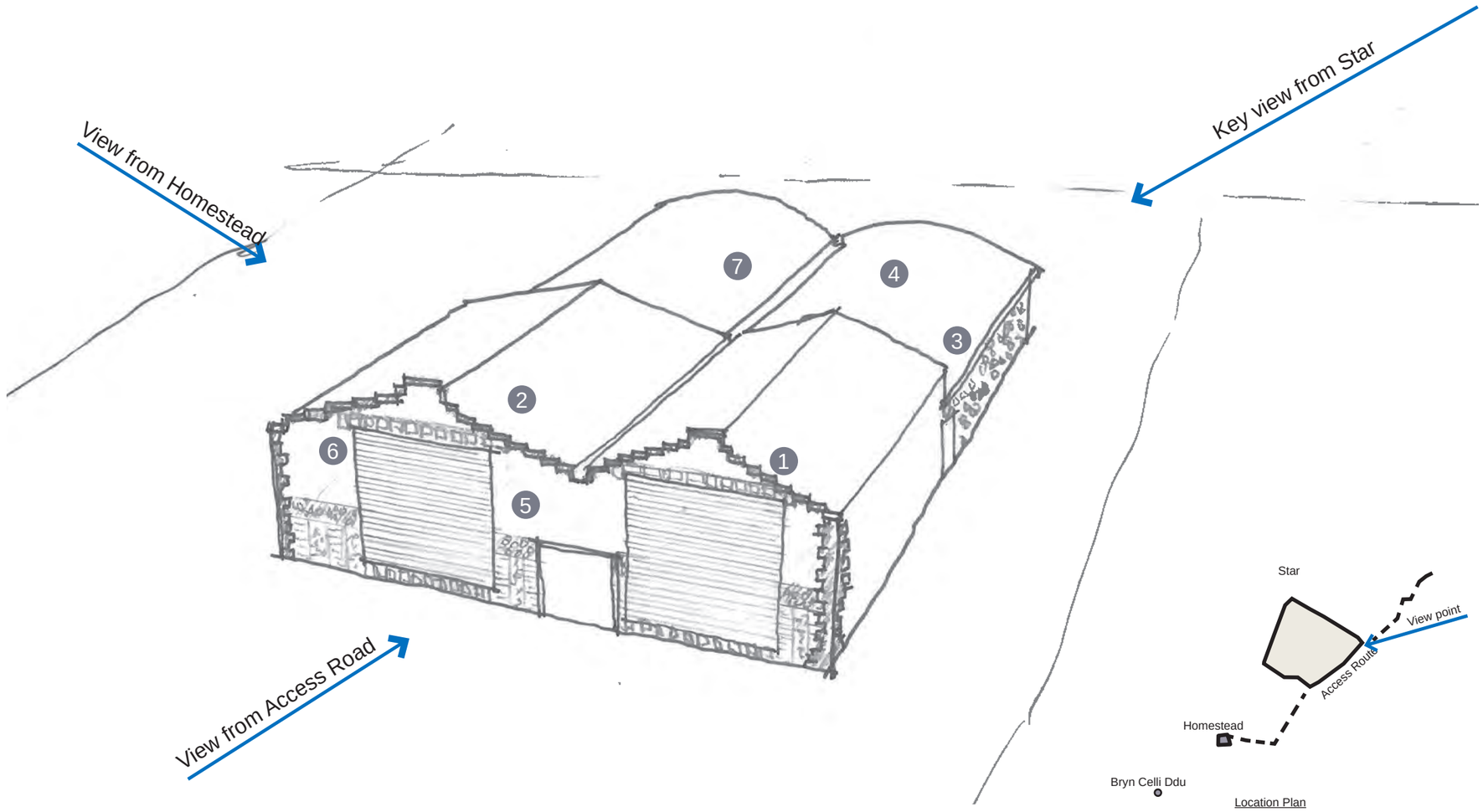
AMEC

2.7.4 Braint Site Building Form Initial Option 2

The second option explored an estate style massing, roof profile and materials, not necessarily imitating the style but reflecting the local vernacular architecture.

Design features

1. Stepped roof feature for facade wall reminiscent of Plas Coch but designed in a contemporary style creating an engaging front facade
2. Pitched roof behind facade stepped profile in slate-effect panels or muted coloured metal panels to create a low profile
3. Higher massing along front facade over the shaft stepping to minimum required heights in the mass that may be potentially visible from Star
4. Vaulted roofs for rear sections to reduce visual impact that pitched roof reflections could have for the mass potentially visible from Star
5. Front wall face broken into two sections with stone in lower section and potentially brick or muted colour metal work to the top. Alternatively, the front facade could have stone cladding for the full extent. The side walls could have muted colour metalwork
6. Louvres could be architecturally enhanced through suitable colour palette, detailing etc. The physical dimension of the louvres will largely be dictated by operational considerations such as air flow rates and noise attenuation. Potential for stone or brick lintels to reflect local architecture
7. Slate-effect panels or muted grey metal sheets could be considered for roofs.



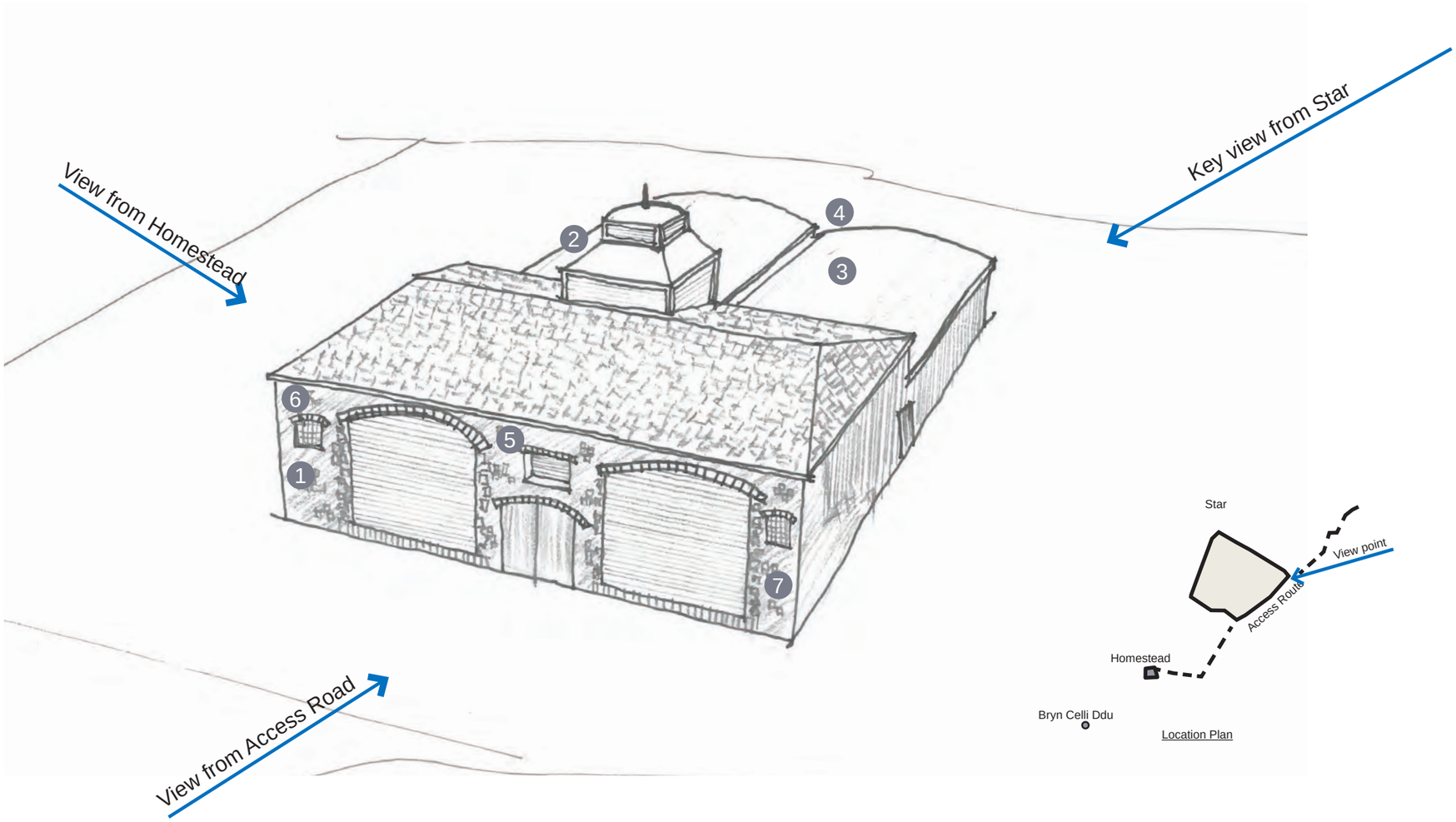
Stephen E. Roddick, geography

2.7.5 Braint Site Building Form Initial Option 3

The third option explored a style and design language inspired by Plas Newydd Home Farm. However, the intention was to reflect on the design elements and form rather than mimic them.

Design features

1. Front massing to be designed as a higher element with a low hipped roof with slate-effect panels or muted coloured metal roofing and short overhang reminiscent of Plas Newydd Home Farm architecture
2. Mid rise tower feature over the stairs and lift shaft as a design feature to enhance the front elevation. This feature could have louvres to enhance visual articulation and a rounded top, but would have increased maximum building height
3. Vaulted roofs for rear sections to reduce visual impact that pitched roof reflections could have for mass potentially visible from Star
4. The mass closest to the Star is lowered further for visual articulation
5. Louvres could be architecturally enhanced through suitable colour palette, detailing etc. The physical dimension of the louvres will largely be dictated by operational considerations such as air flow rates and noise attenuation. Potential for arched stone or dark brick lintels to reflect local architecture depending on cost and functional viability
6. The use of smaller fenestration and openings could add visual interest to the façades
7. Stone walls or cladding with feature elements would provide an interesting front elevation while the side walls could have wood-effect panels or similar vertical, striated cladding.



2.8 Landscape Design Approach

The proposed landscape setting and design approach for the Braint Tunnel Headhouse and CSEC is as follows:

- existing trees retained along the south-eastern boundary to filter views from the east from properties at Llwyn Ogan (500 m);
- proposed planting and mounding around the northern and southern boundaries to help filter views from Star and Tyddyn Fadog;
- the shape of proposed woodland blocks mimic the surrounding woodlands to integrate the site with the characteristics of the Southern Anglesey Estatelands Special Landscape Area within which the site lies;
- the attenuation pond would be designed as a part of the landscape setting of the site and to offer bio-diversity benefits;
- land to the south and west of the site to be raised and returned to agricultural use;
- planting mixes to comprise largely indigenous species with both deciduous and evergreen components to provide year round screening and bio-diversity benefits;
- locally appropriate wild flower seeding mixes to be used to provide interest and bio-diversity benefits for invertebrates; and
- potential opportunities for other wildlife enhancements to be incorporated including bird nesting boxes and establishing wider movement corridors.

Landscape Masterplan

Imagery ©2018 Getmapping plc, Map data ©2018 Google

2.9 Photomontages

The adjoining photomontages show the existing and proposed view of the Braint Tunnel Headhouse and CSEC within the surrounding site context.

As shown in these images, the built form is set back from the boundaries and surrounded by landscape treatments which mitigate any visual impacts on sensitive views from the surrounding context.

The articulation of the built form and the use of materials and colours as discussed in the Design Guide would present a visually appropriate built form within a landscape setting in this context.

Aerial Imagery provided by National Grid

View of existing Site

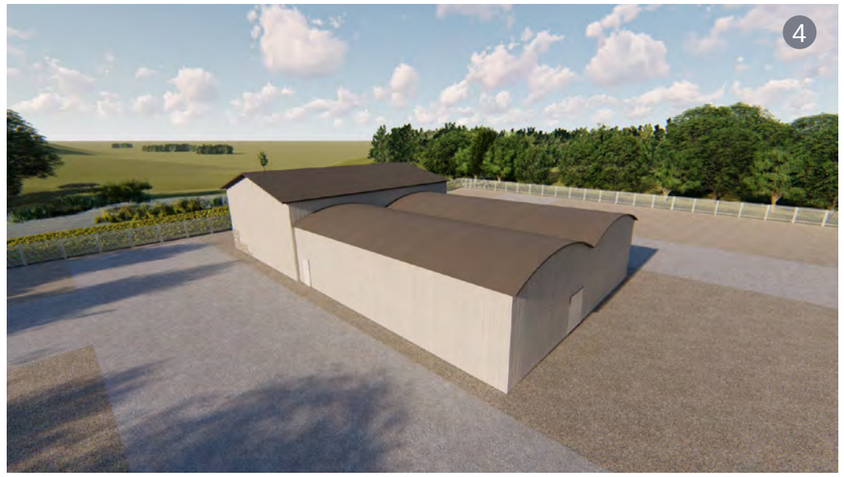
Aerial Imagery provided by National Grid

View of proposed built form and landscape treatments

Photomontages

1. View from the east of the site showing the building in the landscape setting
2. View from the south showing the pitched and vaulted roofs and the stepped stone feature
3. View from the east
4. View from the north east showing the step down of the built form to reduce the mass as seen from views from the Star community
5. View from south
6. Front facade showing variation in materials and the louvres treatment
7. View from the east showing the slate-effect roof and step down of the massing

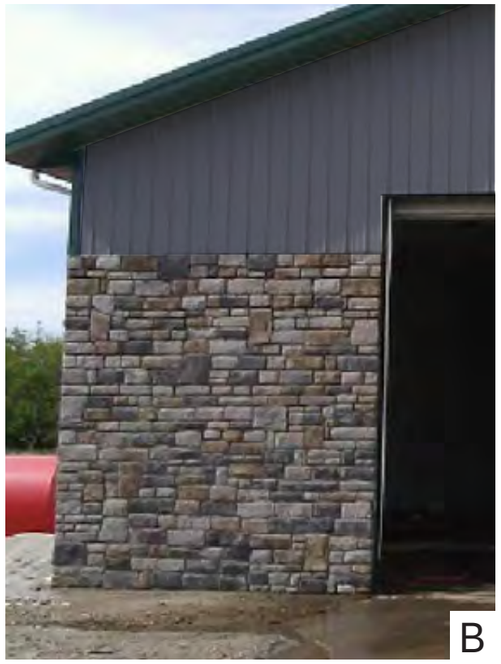
The landscaping is shown at year 15. Electrical plant and equipment omitted for clarity.

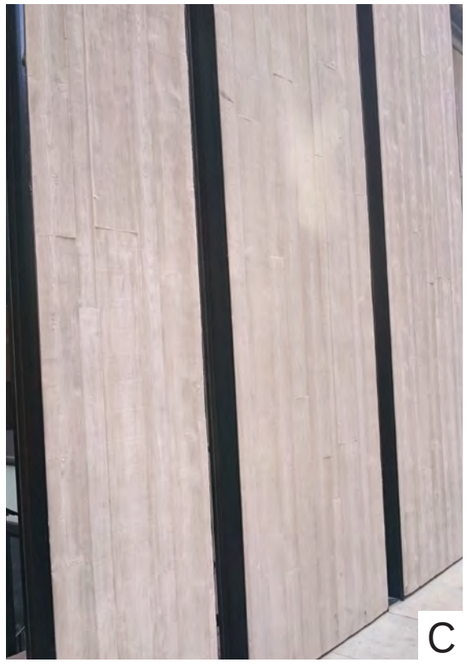


2.10 MATERIALS PALLET

2.10.1 Built Form


A


B


C


D


H


H


E


F


G


I

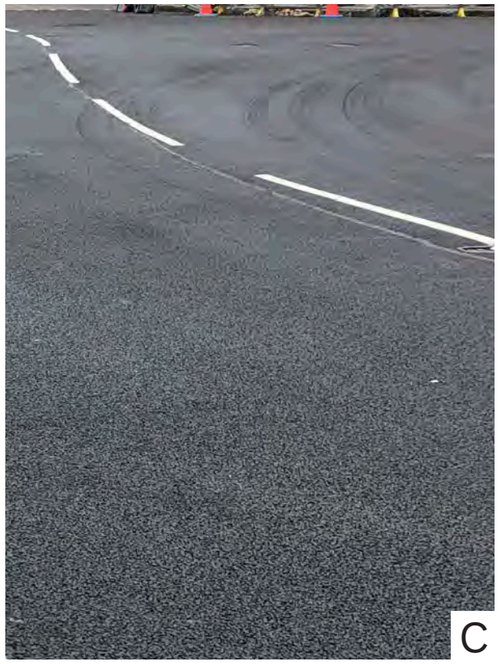
A FIBREGLASS SLATE TILE ROOFING © SHAPES GRP
B EXAMPLE OF STONE BASE AND STRIATED METAL CLADDING WALL
C FORMED CONCRETE PANELLING
D FLINT AND BRICK FACADE © FLINTWALL CO
E VAULTED ROOF EXAMPLE
F METAL ROOF © ERIC HANDS, FLICKR
G SLATE EFFECT, META-SLATE ROOFING SYSTEM © STEADMANS
H FINE GRAIN LOUVRES © COLT INT. LTD
I DARK COLOURED BRICK

Indicative colour palette

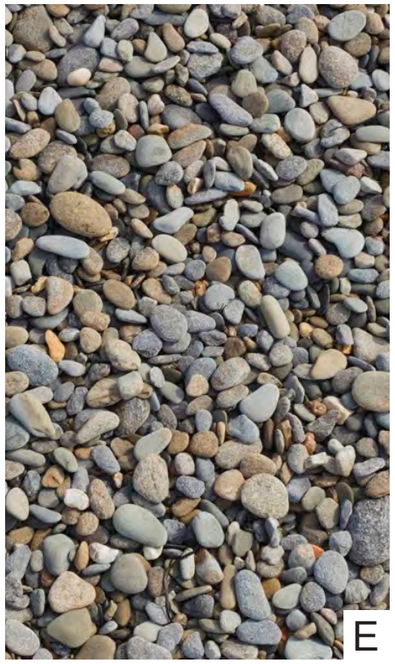
2.10.2 Access and Surface Treatments


A


B


C


D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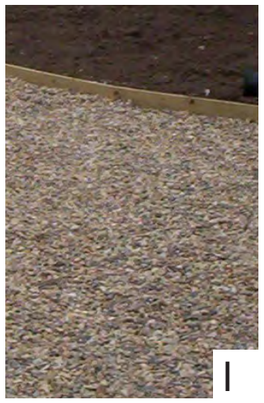
H


I


F

G


K


J

A GRASSCRETE
B BODPAVE 85 © TERRAM.COM
C TAR-MACADAM SURFACE
D BLUE-GREY SLATE CHIPPINGS © SUTTLES.CO.UK
E PEBBLES STONES
F GRAVEL
G COLOURED ASPHALT © AGGREGATE.COM
H COLOURED ASPHALT WITH GREEN CHIPPINGS © PAVINGEXPERT.COM
I GRAVEL AND TAR SPRAY AND CHIP
J GABION WALL WITH WASTE SLATE © SMALLWOOD-GABION.CO.UK
K BUFF-GREY SELF-BINDING GRAVEL

2.10.3 Traditional Fencing & Secure Fencing


A


C


B


D

A / B CLODDIAU STYLE BOUNDARY FEATURE
C GALVANISED PALISADE FENCE FOR SECURE COMPOUNDS
D STOCK FENCING © JONRICHARDSCONTRACTING.CO.UK

3.0 Tŷ Fodol Tunnel Headhouse and CSEC

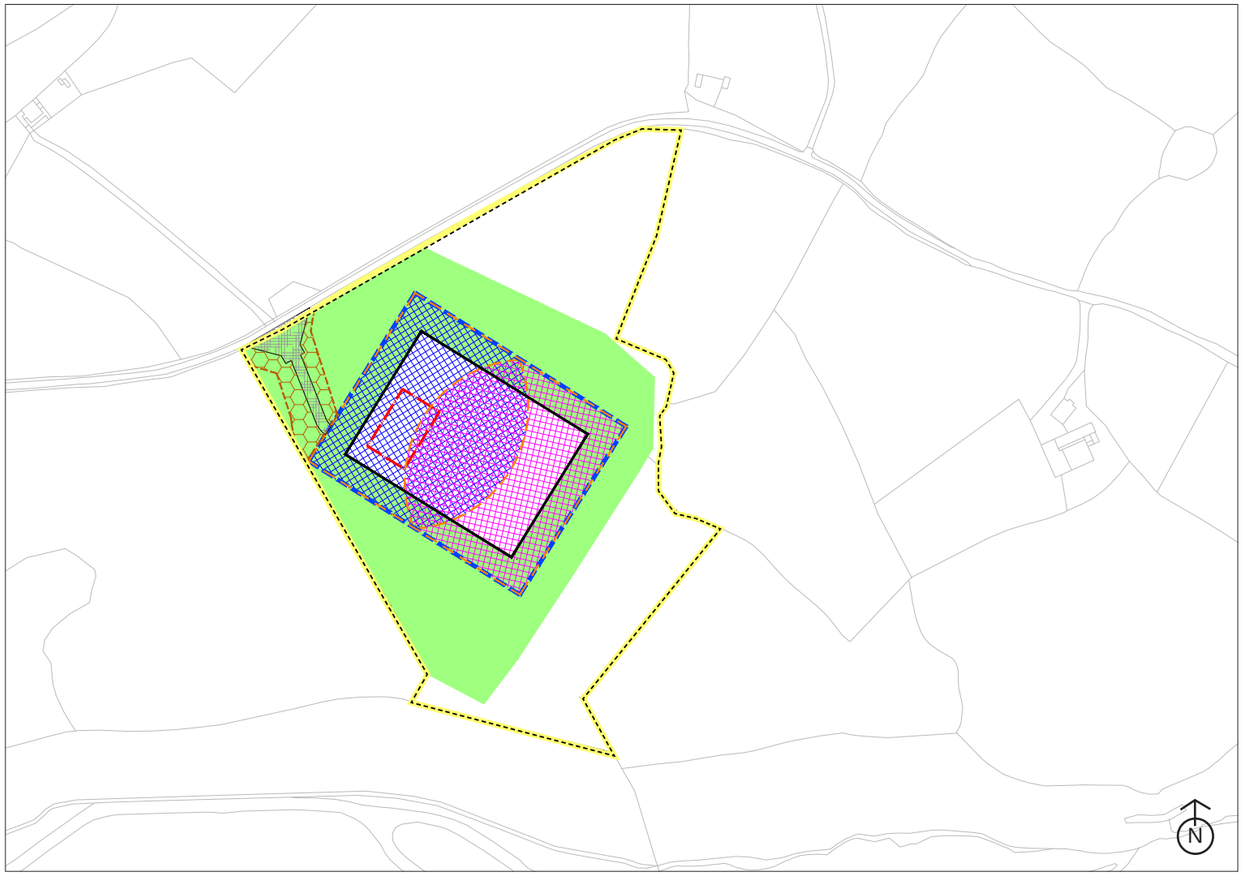
3.1 INTRODUCTION

Within two existing agricultural fields, the proposed Tŷ Fodol Tunnel Headhouse and CSEC would be located to the north-west of Pentir Substation, south of Fodolydd Lane.

Initial Stakeholder Engagement

Some of the key themes that emerged from the initial stakeholder engagement in May 2017 with officers from Gwynedd Council were as follows:

- it was considered that a design approach reflecting the local vernacular and rural architecture, which is predominantly agricultural in style, would be more in keeping with this site. The predominant materials in the area are stone, timber and metal. A design which is relatively low key and able to blend into the landscape is preferred;
- the Welsh Water treatment works at Garndolbenmaen was stated as a good local example of where good design has been implemented in a rural landscape for a utilities infrastructure scheme. The different use of materials and colours to break up mass, a good site positioning and use of landscaping were considered good design approaches;
- reflections from roofs is considered an issue in the area. However, designing the roofs to align with the background mountain slopes should be considered;
- there are several farmsteads in the locality which typically use juniper (and similar) green and grey or slate colours. A mass use of localised stone material would probably not be practical and would not be preferred. However gabion walls with waste slate may be considered. Corrugated iron/corten steel could be used for parts of the built form but should not be the main feature. The use of slate is very prevalent in this location;
- large agricultural silos (between 15 and 20m high) are not uncommon in this area and these design principles could be replicated, especially for the taller ventilation-related elements where louvres could be considered;
- use of hedgerows and Crawiau (a typical landscape feature of the immediate area) is important to ensure the site can be integrated as successfully as possible into the wider landscape, including screening access tracks. It was suggested that a mix/mosaic of different materials and landscape treatments be used on both the built form and the ground plane, in order to reduce the dominance of a large-scale built form in the landscape, and to minimise the prominence of direct changes to the landscape itself, such as access tracks;
- generally in the local environment, agricultural buildings have extended gradually over time. The result is that buildings have a variety of forms, styles and a wide variety of materials. It would be a good idea to use a mix of forms as a design approach to reflect this type of design narrative. For instance, the taller ventilation unit could be designed as a barn whereas the welfare rooms could look like a smaller agricultural unit; and
- the operational compound is going in a location which could affect the view of the mountains from the Standing Stone Schedule Monument, hence the built form and landscape treatment impact on the setting of the Scheduled Monument would be a critical consideration.



Tŷ Fodol Tunnel Headhouse and CSEC Outline Plan for DCO application

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LEGEND

- Temporary construction compound area
- Indicative area within which possible landscaping / Mitigation would take place
- Zone within which full line tension gantries and cable sealing end would be located
- Zone within which tunnel head house would be located
- Area within which tunnel head house and cable sealing end compound would be located
- Illustrative size of the tunnel head house and cable sealing end compound
- Illustrative location of the tunnel head house (Maximum dimensions measured externally (H) 11 m volume 9,300 m³)
- Illustrative route of permanent access road
- Zone within which permanent access road would be located

3.2 REGIONAL CONTEXT

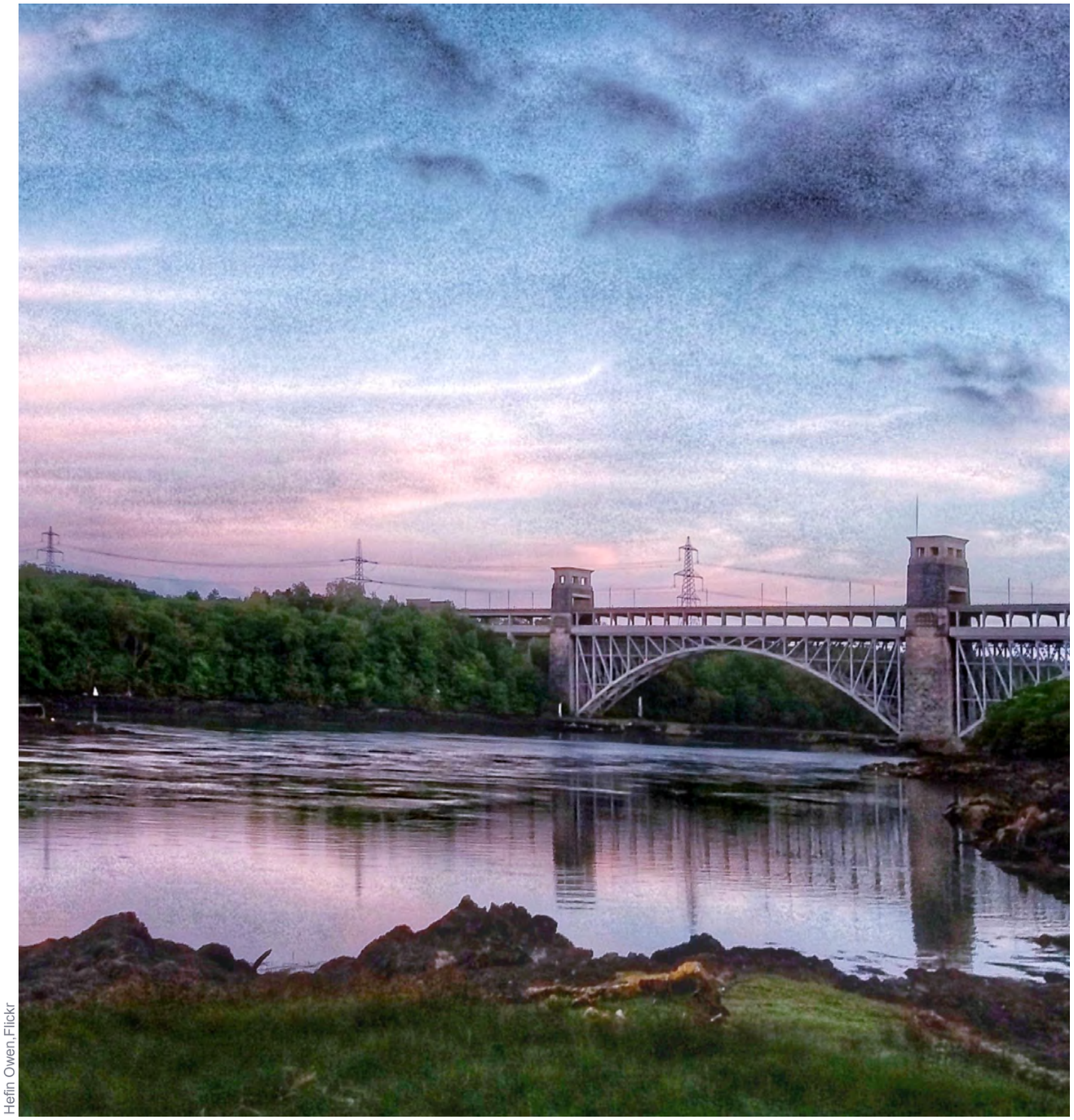
Gwynedd is located on the most westerly part of mainland North Wales. Main towns in the county are Bangor, Caernarfon; Ffestiniog; Llanddeiniolen and Bethesda.

The landscape and habitats, together with the species dependent upon them, are recognised as being of local, national and international value. A substantial part of the County, 174,200 ha (63%) has been designated as the Snowdonia National Park. The north west of Gwynedd incorporates the Llŷn Area of Outstanding Natural Beauty, which also has large sections of Heritage Coast.

Geographically, the area consists mainly of mountains and coasts. Mountainous areas are the most distinct landscapes found in Gwynedd. At 1085m height Snowdon is the highest mountain in Wales and England. The area encompasses many spectacular uplands including all 15 mountain peaks in Wales over 3000 feet. There are numerous glacial features including sharp ridges, cirques, cliffs, lakes, bogs, rivers and waterfalls.

The landscape pattern and cover is varied comprising planned, formal parkland, estate farms and settlements including hill sheep grazing, forestry, heather dominated moorland and upland grassland. Rock outcrops and slate/shale ridges and screes are frequently apparent.

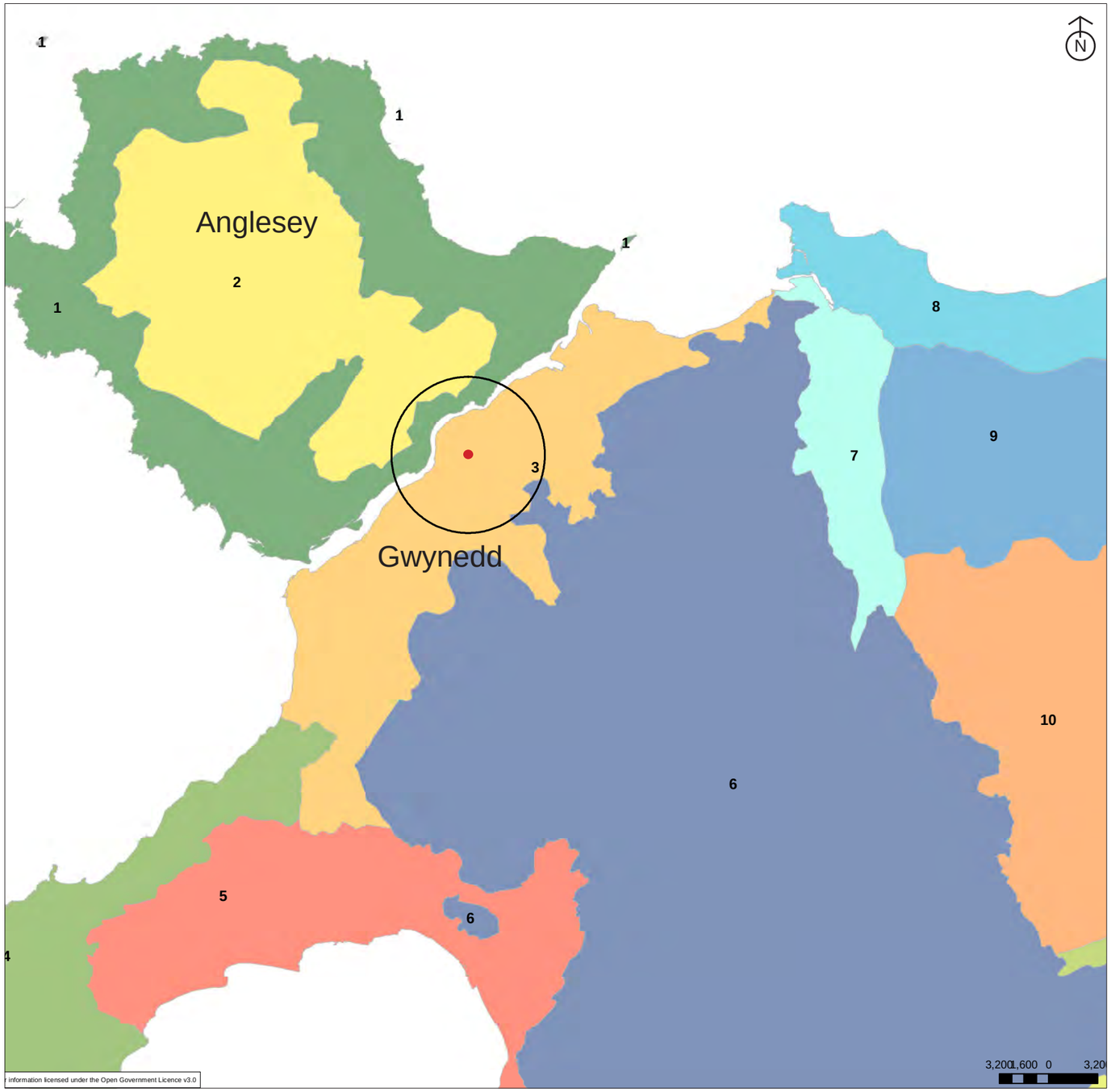
Agriculture is the main land use with villages and small towns found inland and most of the larger towns focussed along the coast.



Hefin Owen,Flickr

Britannia Bridge

3.3 STRATEGIC LANDSCAPE CONTEXT



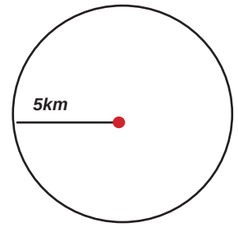
National Landscape Character Areas

Legend

- Tŷ Fodol site, Gwynedd

National Landscape Character Areas

- 1 - Arfordir M n/Anglesey Coast
- 2 - Canolbarth Mdn/Central Anglesey
- 3 - Arfon
- 4 - Llyn
- 5 - Bae Tremadog/Tremadoc Bay
- 6 - Eryri/Snowdonia
- 7 - Dyffryn Conwy/Conway Valley
- 8 - Arfordir Colwyn ayr Gogledd/Colwyn and Northern Coastline
- 9 - Bryniau Rhos/Rhos Hills
- 10 - Mynydd Hiraethog/Denbigh Moors
- 15 - Dyffryn Dyfrdwy a Llangollen/Llangollen and the Vale of Dee
- 16 - Y Berwyn/Berwyn



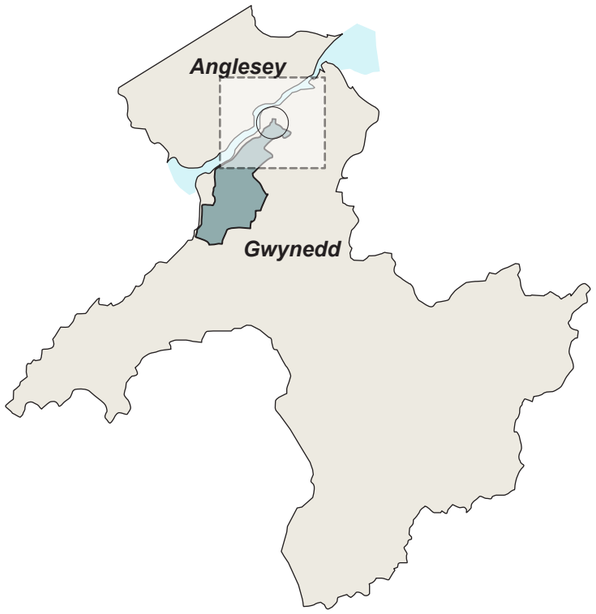
National Landscape Character Area: Arfon

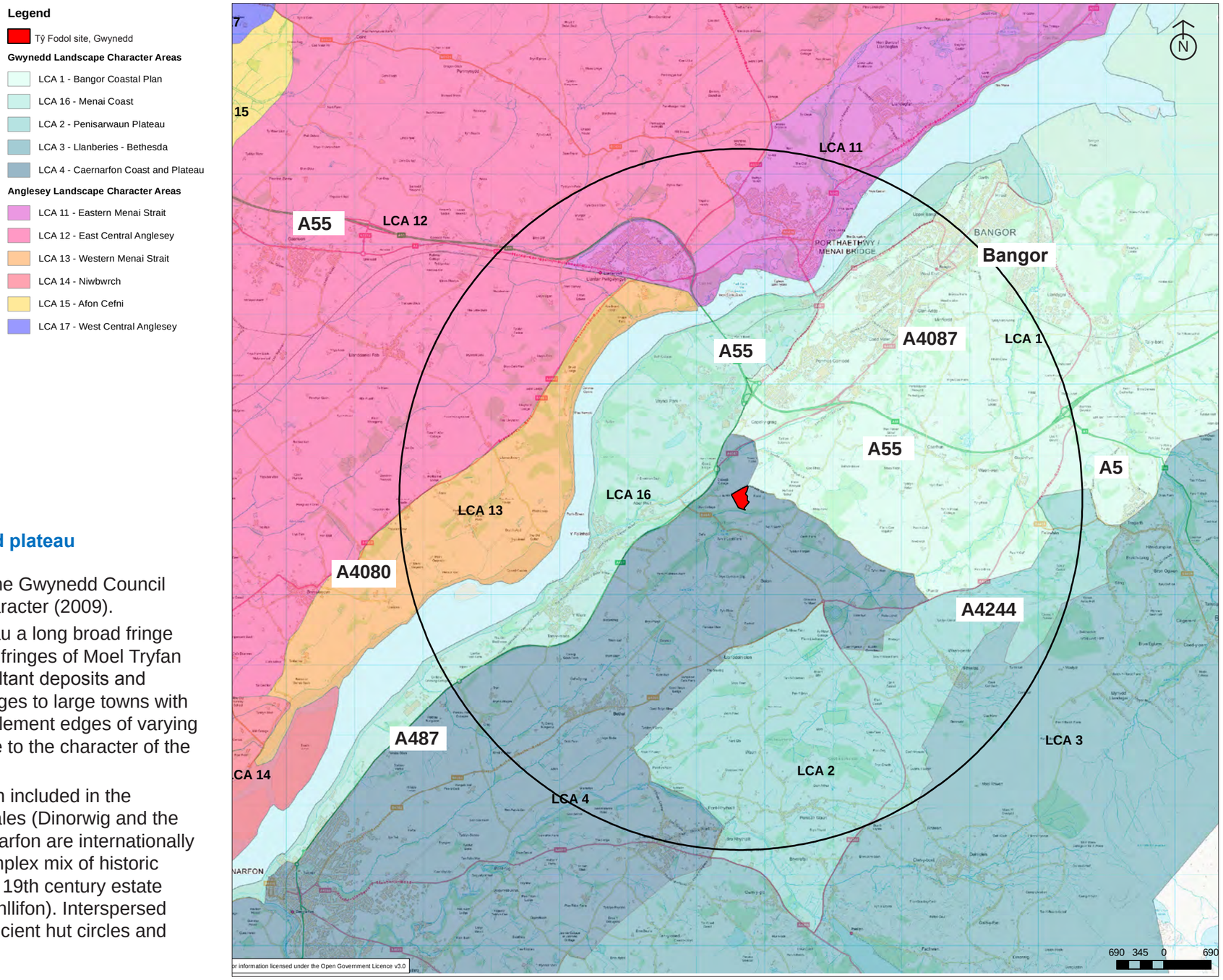
Arfon is literally the land which is ar-fon, ‘against Anglesey’, being the lowland area bounded on the one side by the Menai Strait and on the other by the Snowdonia foothills and the adjacent glaciated valleys that open into it. Extending from Penmaen-bach Point in the north east to Bryncir in the south, it includes the Anglo-Norman boroughs of Caernarfon (with its World Heritage Site castle and town walls) and the cathedral and university city of Bangor.

This coastal plateau area also includes the 19th century neo Norman Penrhyn Castle, which dominates the view and whose estate extends for many miles around, as well as the less apparent, gentry houses and parklands at Faenol (or Vaynol) and Glynllifon.

As well as the dwellings of the once-wealthy and powerful, this is also pre-eminently the landscape of the Welsh gwerin, the industrious, progressive and cultured population of the farm, the small-holding, the cottage and the quarry. Their way of life, brought into being by the tremendous industrial slate quarrying workings of the late 18th and the 19th centuries, has far from vanished, and the Welsh language remains particularly strong. The landscape of the gwerin is everywhere, in the form of settlements, chapels, field-boundaries and in the unique environments of the great slate quarries, whose working faces and tips dominate the Ogwen and Nantlle valleys and the Llanberis-Llanddeiniolen area.

3.3 STRATEGIC LANDSCAPE CONTEXT





Local Landscape Character Areas

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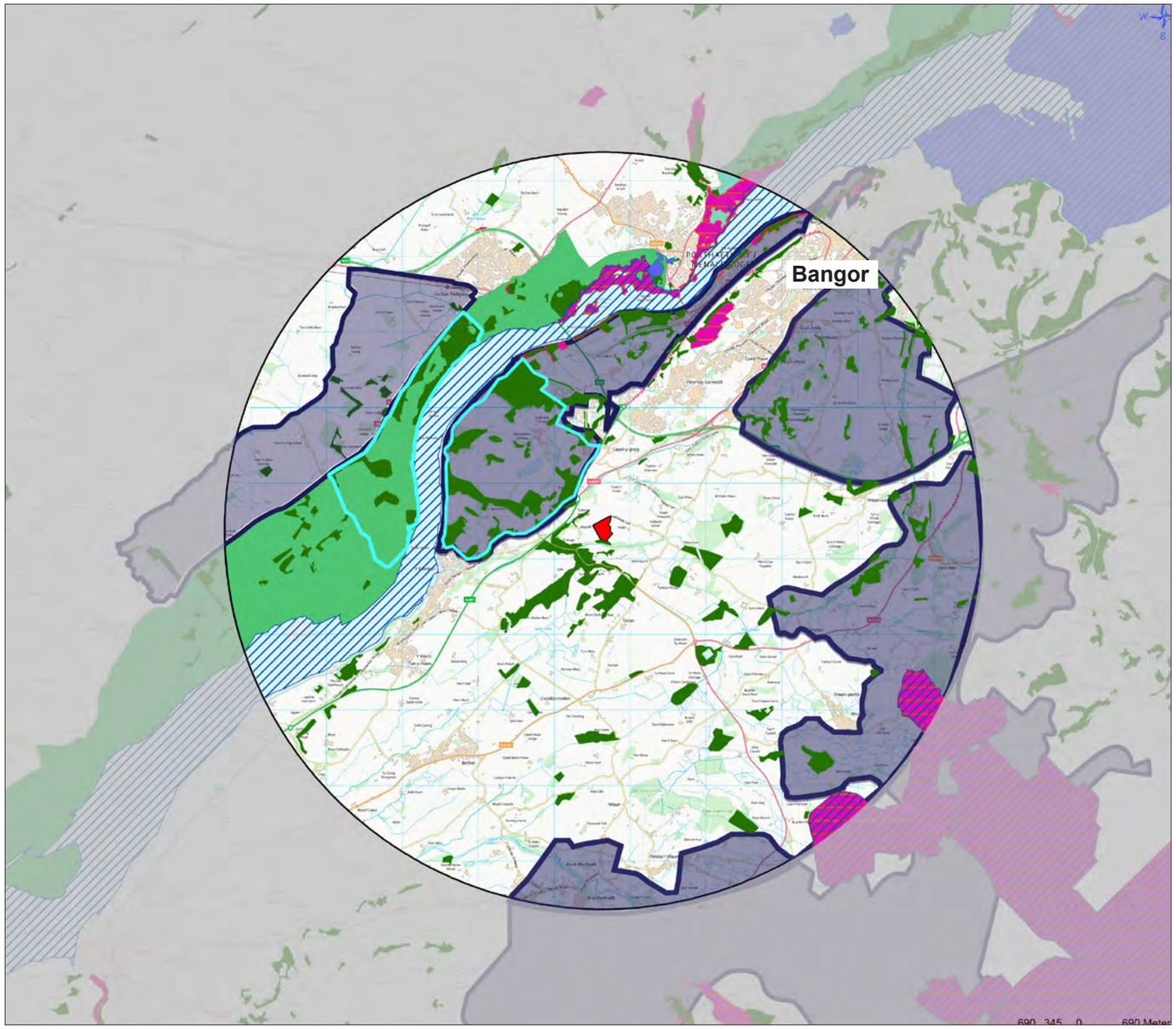
Landscape Character Area (LCA) 4: Caernarfon-coast and plateau

Landscape Character is assessed at a county level through the Gwynedd Council Supplementary Planning Guidance (SPG) for Landscape Character (2009).

The site area falls within LCA 4, Caernarfon Coast and Plateau a long broad fringe adjacent to the Menai Coast LCA 16, extending to the upland fringes of Moel Tryfan and Mynydd y Cillgwyn influenced by glacial actions and resultant deposits and landforms. There is a mixture of settlement types – small villages to large towns with Caernarfon being an important historic core, with modern settlement edges of varying quality. A range of coastal habitats and landscapes, contribute to the character of the area.

Some of the eastern and northern parts of the area have been included in the Register of Landscapes of Outstanding Historic Interest in Wales (Dinorwig and the Nantle Valley). In addition, the castle and town walls of Caernarfon are internationally recognised as a World Heritage Site. The area displays a complex mix of historic landscapes of different characters and periods, dominated by 19th century estate farmland with valued areas of parkland remaining (e.g. at Glynllifon). Interspersed amongst the estate lands are prehistoric remains including ancient hut circles and hillforts.

3.4 LANDSCAPE DESIGNATIONS



Local landscape designation map

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The following designated areas have been identified within 5 km of the site

Tŷ Fodol site, Gwynedd

Site of Special Scientific interest - Safeguard the range,quality and variety of habitats, species and geological features in all parts of Wales. The identified sites are: Eithinog; Coedydd Afon Menai; Eryri.

Local Nature Reserve - Coed Cyrnol Nature Reserve is an area of mixed deciduous, broadleaved and coniferous woodland. Both sets of arborial species encourage rich bird and animal life.

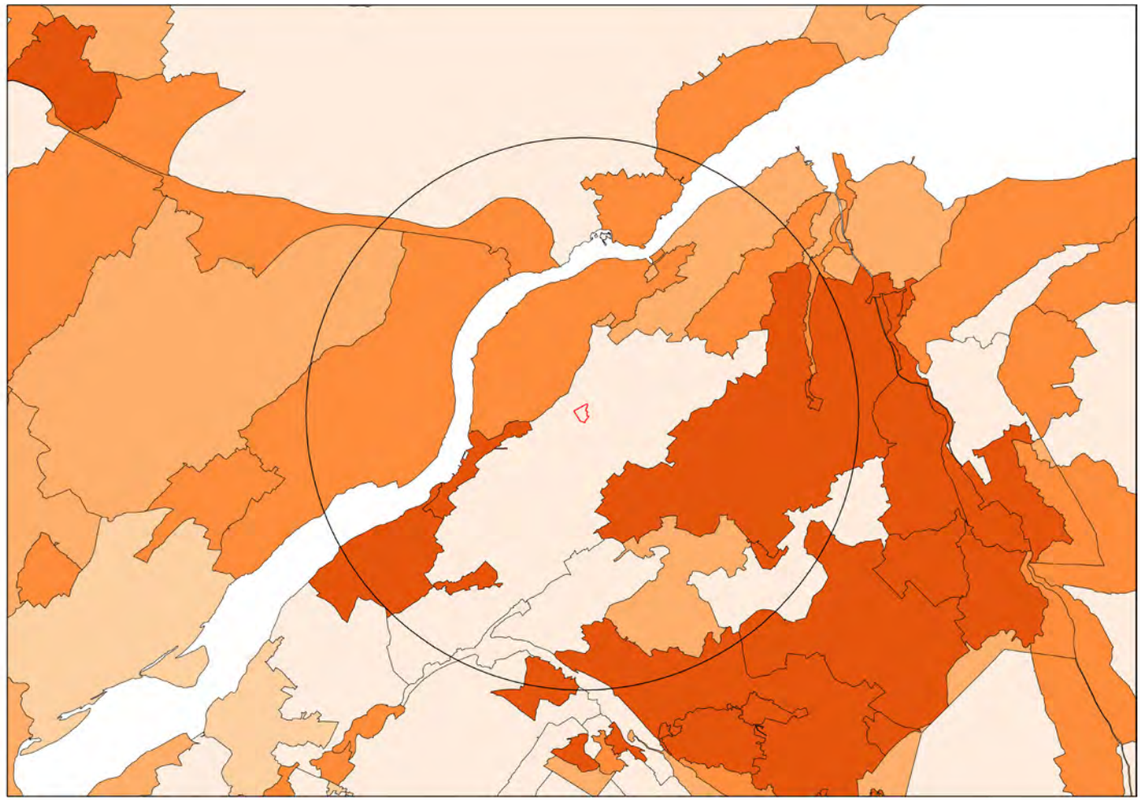
AONB - The coastal zone of Anglesey was designated as an AONB in 1966 and was confirmed in 1967. It is the largest AONB in Wales, covering one third of the island.

Special Landscape Area (SLA) - The site lies in proximity to four SLA. The Vaynol Estate and Surrounds Special Landscape Area, is located on the southern bank of the Menai Strait, covering the Faynol Estate and the wooded grounds surrounding part of the Bangor University campus. Bangor Mountain and Minfford SLA encompasses the undulating farmland around Minffordd to the south and is bounded to the west and north by the city of Bangor, the south by the A55 and the east by an industrial estate and the A5. The North Western Fringes of Snowdonia SLA forms a ‘collar’ around the north and western edges of Snowdonia National Park and stretches from Nasareth in the south-west to Llanllechid in the north-east. On Anglesey the Southern Estatelands SLA adjoins the boundary of the AONB.

Registered Parks and Gardens - 2 Registered Parks - Vaynol Park, Bangor and Plas Newydd; 5 Registered Gardens and 11 Country House Gardens located within the 5 km study area (see page 44)

Ancient Woodland - There are a total of 237 ancient woodland sites spread across the 5 km study area.

Special Areas of Conservation - SACs are internationally important and protected and represent some of the most important sites for wildlife and the environment. The identified sites which fall within the 5 km area are: Eryri/ Snowdonia and the Menai Strait and Conwy Bay / Y Fenai a Bae Conwy.



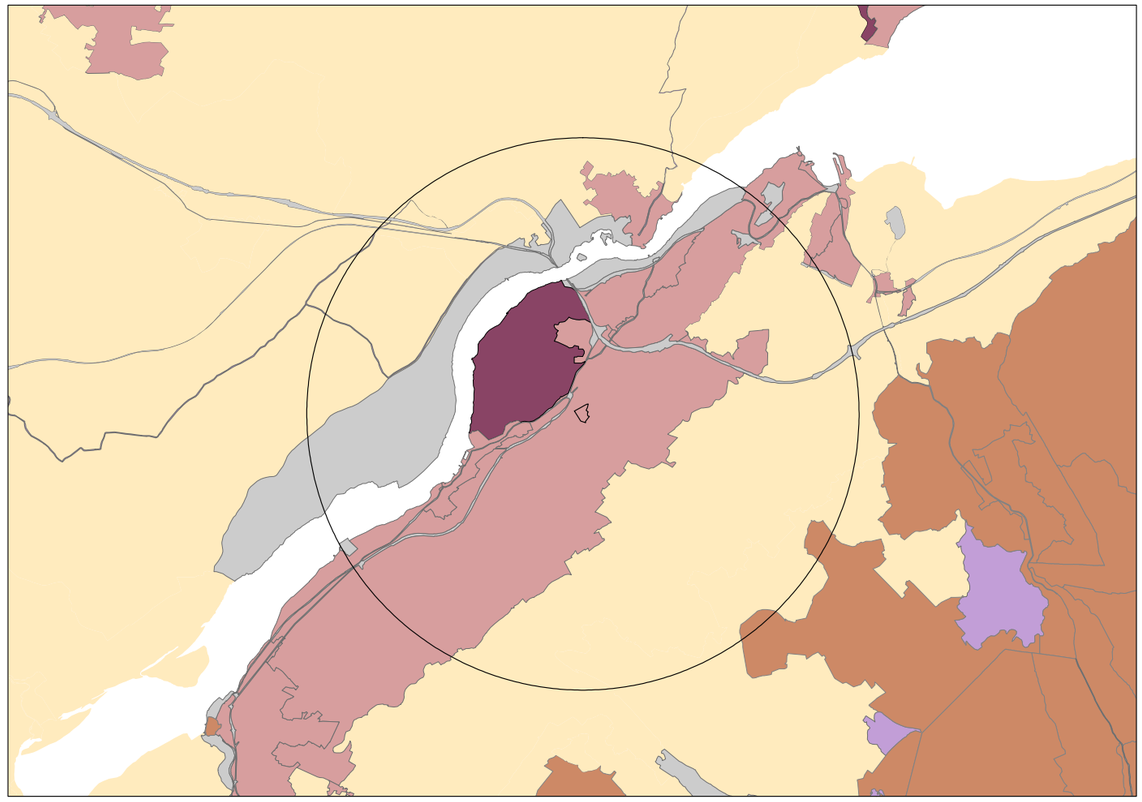
Map showing Historic Landscape Aspect Areas

- **Prehistoric**
- **Roman**
- **Medieval up to 1536**
- **Post-medieval after 1536**
- **Industrial**
- **Recent**

Historic Landscape Aspect Areas as defined by Natural Resources Wales in the LANDMAP database

There are 23 Historic Landscape Aspect Areas falling within the 5 km study area as described below.

- Within Gwynedd: Nantile slate quarries; Llanfair Isgaer; Gwaen Gynfi enclosed area; Bethel & Saron; Northern Arfon plateau; Afon Rhythallt; Roads; Rhiwlas; Bangor mountain; Moel y Ci/Gwaen Gynfi unenclosed uplands; Vaynol; Y Felinheli (Port Dinorwic); Llanrug; Hillslopes below Moel y Ci/Rhiwen; Llanddeiniolen/ Dinorwic; Gwaun; and Cegin valley.
- On Anglesey: South Anglesey parkland; Fieldscape south of Malltraeth; A5 corridor and associated villages; Coastline around Llandegfan; Fieldscape, central eastern Mon; and Menai Bridge.



Map showing Cultural Landscape Aspect Areas

- **Industrial**
- **Institutions**
- **Infrastructure**
- **Urban**
- **Rural**
- **Places**

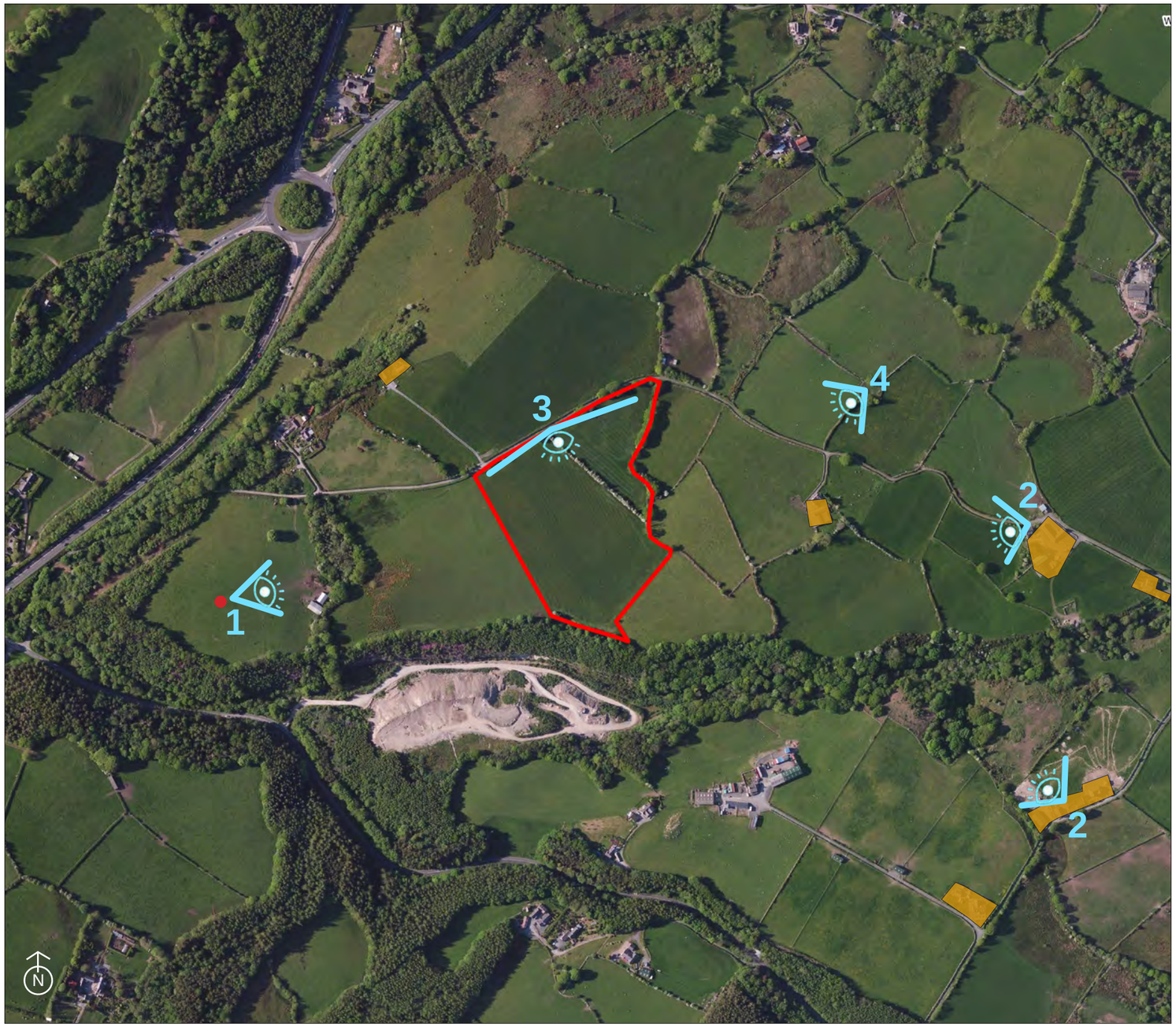
Cultural Landscape Aspect Areas as defined by Natural Resources Wales in the LANDMAP database

There are 25 Cultural Landscape Aspect Areas falling within the 5 km study area as described below.

- Within Gwynedd: Bangor (Central); Bangor (University); Railway - Chester to Holyhead; Principal roads; Bryn Cegin and Parc Menai industrial estate; Bangor Mountain/Arfon plateau; Arfon plain; Treborth; Sustrans cycle route; y Faenol; y Felinheli; Plas Menai-watersports centre; Quarry settlement areas; Unenclosed mountain; and A55.
- On Anglesey: A5 Road; A5 Road Villages; A55 road; Railway - Chester to Holyhead; Transport corridor area; Menai Bridge; Southern Anglesey Coast – Llandegfan; Sustrans cycle route; Central Anglesey; Plas Newydd, Plas Llanidan.

* Industrial - minerals & mining, power generation & distribution, heavy industry;
* Institutions - land division, religion, educational movements;
* Infrastructure - tourism, services, communication & transport, education & welfare;
* Places - sense of place, name of places.

3.5 SENSITIVE VISUAL AND CULTURAL HERITAGE RECEPTORS



Legend

- Tŷ Fodol Site, Gwynedd
- 1 Standing Stone Scheduled Monument
- 2 Holiday Lets
- 3 Road users along Fodolydd Lane
- 4 Fodol Ganol Hut Circle Scheduled Monument
- Nearest residential receptors
- Approximate location of standing stone

Views from Standing Stone: Whilst not publicly accessible, views from and effects upon the setting of the Standing Stone have been considered. Views to the east towards the Tŷ Fodol site are generally open, with the field within which the site is located being visible over the top of woodland that is located at the base of a small incised valley. The tops of pylons of the existing 400 kV OHL are visible on the horizon beyond and the mountains of Snowdonia form a backdrop in the view.

Views from holiday homes: Long distance views are afforded towards lower lying areas, including Anglesey, to the north. The foreground comprises pastures with hedgerows and individual trees. Landform falls away to the west with views towards the Tŷ Fodol site filtered by existing vegetation.

Views from Fodolydd Lane: Views to the Tŷ Fodol site are filtered by vegetation along field boundaries along the narrow lane.

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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

3.6 SITE & WIDER CONTEXT ANALYSIS

3.6.1 Site Analysis

The Tŷ Fodol site is located within pastoral fields between properties known as Fodol (200 m), Vodol-isaf/Vodol Cottage (200 m) and Garth Fawr (380 m). To the south of the site is Nant-y-garth, a wooded ravine which contains a landfill site. Views of the proposals from Vodol-isaf/Vodol Cottage would be screened by land form. Views from properties at Fodol and Garth Fawr of the proposal benefit from some screening from landform. A tributary of the Nant Cefn flows in a westerly direction, approximately 170 m south of the site. The site is located at approximately 80m AOD, on ground which rises to the south-east to approximately 90 m AOD.

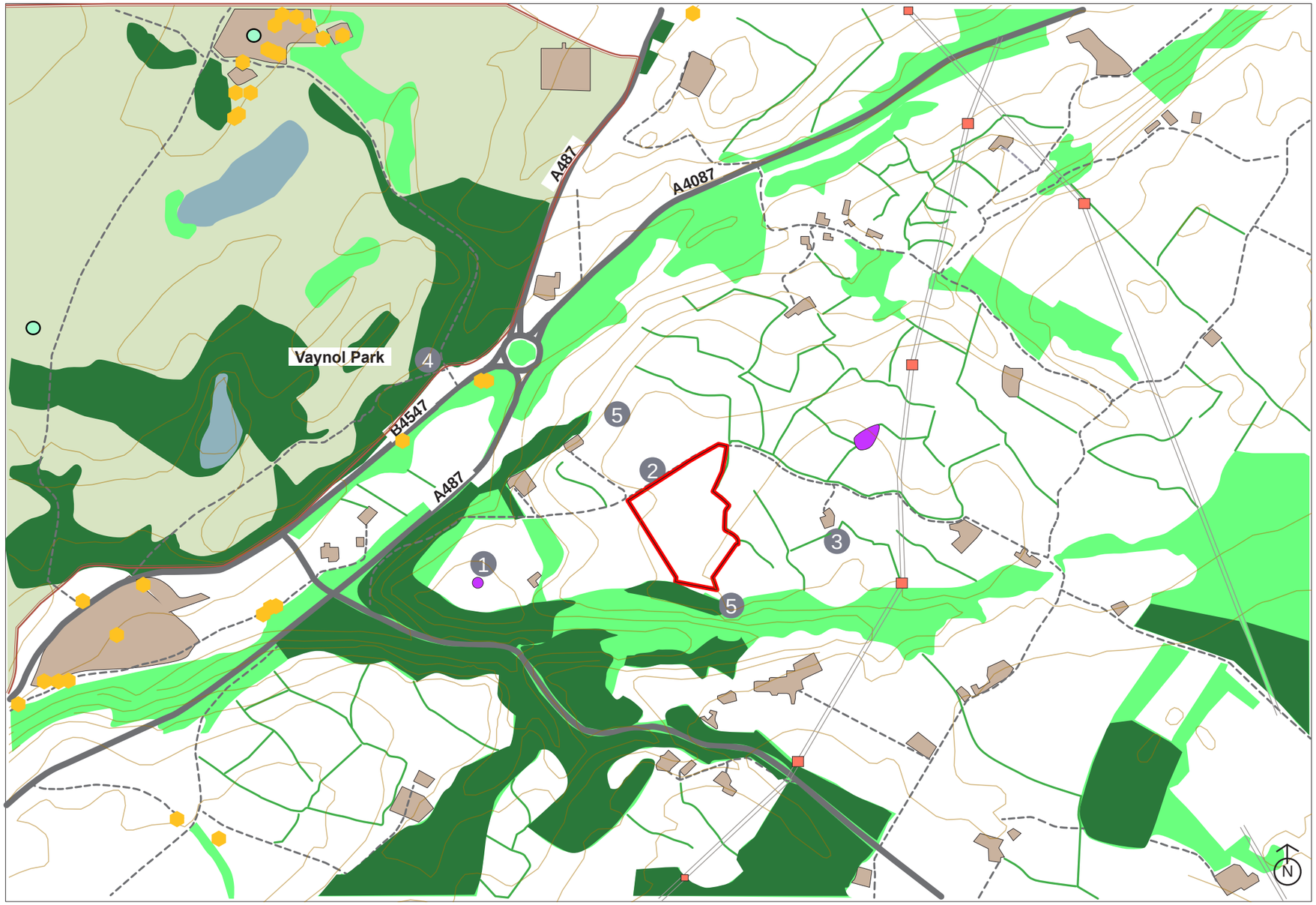
1. **Scheduled Monument - Standing Stone (SAMCN375):** is located west of the site. Views from this stone have been an important consideration in the design approach

2. **Access road:** The site is bordered by a rural access road called Fodolydd Lane to the north of the site. Views from this road have been considered in the built form articulation and landscape treatments

3. **Homestead:** Views from this area have been considered in the built form and landscape treatment

4. **Vaynol Historic Park and Gardens:** is a country estate originating from the Tudor period. There are no direct views into the site from this estate

5. **Slopes:** The site is elevated, but even so, due to the topography and woodlands, the head house would not be directly visible from much of the surrounding context.



Site Context Analysis Plan

3.6.2 Site and Context Images

Existing site condition

View of access road with site to the right

View towards Standing Stone from access road

View of fields to the south of the site

The standing stone Scheduled Monument to the west of the site

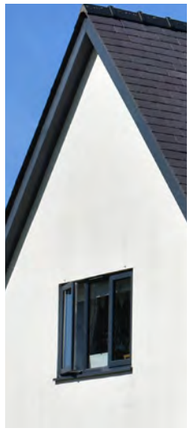
Homestead east of the site

AMEC

3.6.3 Local Landscape Colours, Materials and Details








All photographs are taken by Jacobs

During site visits, it was identified that the key influences on the site were both the rural landscape and local estate architecture; these helped inform the design process.

Some of the key features in this character tapestry include:

- green fields with border trees and planting;
- narrow access roads;
- stone fencing;
- slate roofs;
- barn architecture;
- rural pathways;
- pitched roofs;
- timber fencing;
- metal sheet clad walls; and
- compacted mud access routes.

3.6.3 Local Landscape Colours, Materials and Details

Vaynol Home Farm Complex

Vaynol Home Farm Complex

Vaynol Home Farm Complex

Vaynol Park Wall

All photographs are taken by Jacobs

Some of the key features in this character tapestry that have been reflected in the design approaches include:

- the standing stone Scheduled Monument denotes the historic significance of this area;
- the rustic complex of Vaynol Home Farm;
- the grand gateway statement and iconic stone wall of Vaynol Park;
- stone walls;
- rural and agricultural character; and
- woodlands adjoining the Menai Strait.

3.6.4 Sensitive Sites and Heritage

There has been little archaeological field investigation in the vicinity, however a geophysical survey has been undertaken of the Tunnel Head House site and adjacent land, but little significant evidence for settlement was revealed.

400m to the west of the proposed Head House compound there is a scheduled standing stone (SAM CN375). This is a relatively squat stone, probably erected during the Bronze Age. The adjoining photograph shows the monument with the proposed site beyond.

There is also at least one prehistoric/Roman enclosed hut circle sentiments. Fodol Ganol Enclosed Hut Group is a scheduled monument (CN175) which is located approximately 400m to the east of the proposed Tunnel Head House, with a further potential example 130 m to the west. These were sub-circular enclosures, built of stone rubble, each of which would have enclosed a small settlement of 3 to 4 roundhouses, and connected into a local landscape of small enclosed fields.

To the north and west of the Tŷ Fodol site lies the Historic Landscape Aspect Area (HLAA) of Vaynol (GWNDDHL750), comprising the Vaynol estate, which originated in the medieval period and was the second largest estate in Caernarvonshire by the middle of the 19th century. Enclosing this area to the south is the higher ground of the Northern Arfon Plateau HLAA (GWNDDHL024), much of which is former Vaynol land and includes a series of substantial 19th century farmhouses. The area also contains a number of prehistoric settlement sites including hut groups and small forts.

The area also includes land within the Dinorwig Landscape of Outstanding Historical Interest. This is focused around the Dinorwig valley, or Nant Peris which is located on the north-west side of Snowdonia and is marked on the southern edge by the Snowdon summit before opening to the gently undulating Arfon plateau to the north-west. The massive 19th and 20th century slate quarries and their associated settlement and transport infrastructure are a defining characteristic of this historic landscape, but there is also surviving evidence for late-prehistoric as well as medieval land use and settlement.

On Anglesey and in Gwynedd, the traditional method of field boundary construction is common to many ‘Celtic’ field systems, the Cloddiau. These are the earth banks, embedded with and faced with stone on the windward side. The stones used are small and irregular and would have originally been gathered by field clearance, but later from quarried material. Originally the Cloddiau would have been about 1m high and 1m wide, and when topped by gorse or hedgerow, produced a substantial stock-proof barrier to enclose fields and lanes. Crawiau fencing is also used in this part of Gwynedd, which is characterised by vertical slate slabs which are usually bound together with twisted wire, and may also have a base with irregular stones at the bottom. These typically stand 1 - 1.25 m in height.

As for the built historic environment, the traditional buildings around Fodol typically incorporate the use of locally available materials such as slate roofing and stone rubble. Many of the buildings were connected to the Vaynol Estate.


AMEC
The standing stone Scheduled Monument to the west of the site


Vaynol Home Farm

3.6.5 The Welsh Water Treatment Plant, Garndolbenmaen Case Study

During the stakeholder engagement, officers at Gwynedd Council identified the Water Treatment Plant recently constructed at Garndolbenmaen as an example of how large utility facilities can be designed in a sympathetic way, so as to better accommodate them within the local landscape of Gwynedd. Although the water treatment plant is a significant infrastructure site, the built form articulation and material treatments create a visually appealing campus that does not stand out in a rural, agricultural context.

The stepped pitched roof profiles create visual interest and articulation while also being simple forms that would lend themselves to efficient internal operational areas. The shades of green in the wall and roofing materials helps blend the massing into the surrounding agricultural landscape. The wall face is broken up with a visually heavier stone base with a panelled wood finish on the top which creates further visual articulation and helps break up the massing. The surrounding landscape and earth mounding help blend the built form further into the landscape. The massing broken up into parts creates a less monolithic building, creating an agricultural campus style master plan.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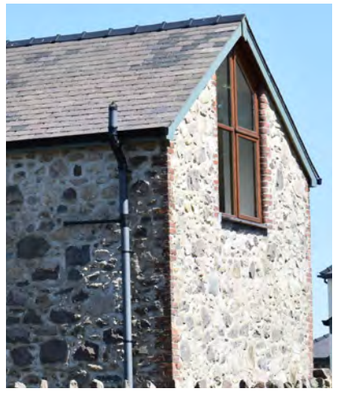
3.7 VISION, DESIGN OPTIONS & PRINCIPLES - TŶ FODOL

3.7.1 Vision and Design Approach

At the initial stakeholder engagement meeting in May 2017, the main design theme that emerged is that a design approach reflecting the local vernacular and rural architecture, which is predominantly agricultural in style, would be more in keeping with this site area.

The design narrative of an agricultural farmstead that has extended gradually over time, formed through various extensions, hence varied massing, materials and roof profiles, was considered an interesting narrative to take forward.

The use of a mix of forms, materials and roof profiles to create a more broken up massing, while being mindful of the internal operational requirements, was considered a key design approach.



© Welsh Water

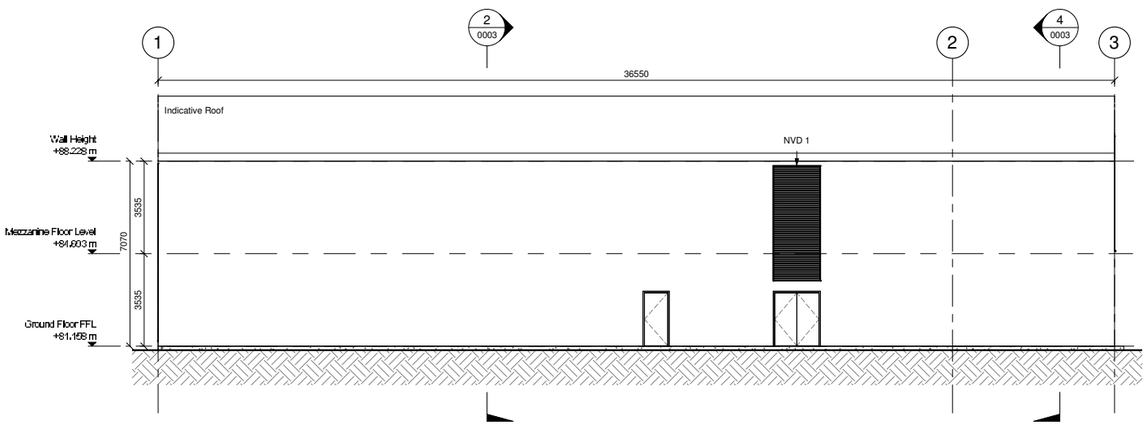
Design Vision
The aspiration for the Tunnel Head House at the Tŷ Fodol site is to create a built form which reflects influences of the local agricultural architecture and blends into the landscape through appropriate massing, materials, colours and treatments. The building must reflect a narrative of having grown over time through a series of massing, a mosaic of treatments and articulation.

Massing and View Influences

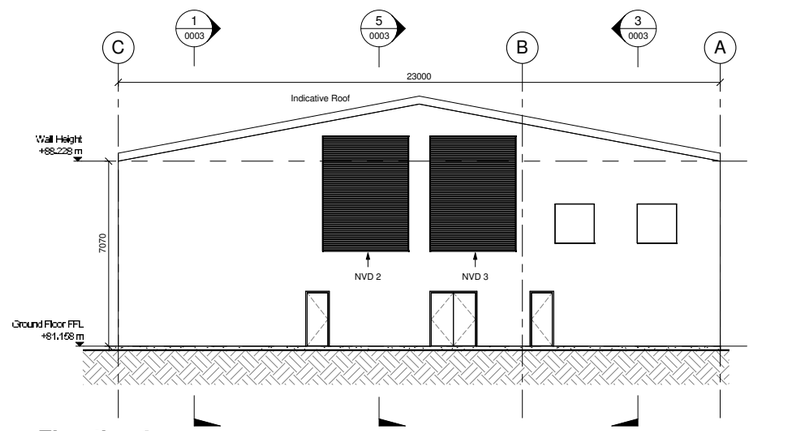
- The key massing design approach was to move ancillary and welfare units to the front of the site to achieve lower built form to the front elevation, and step the higher ventilation unit to the back; and
- Views from the Standing Stone, nearby residences and holiday lets have been a key consideration. The massing and roof profiles step down towards these views to achieve further articulation and to break up the massing.

Tŷ Fodol Site Building Functional Design

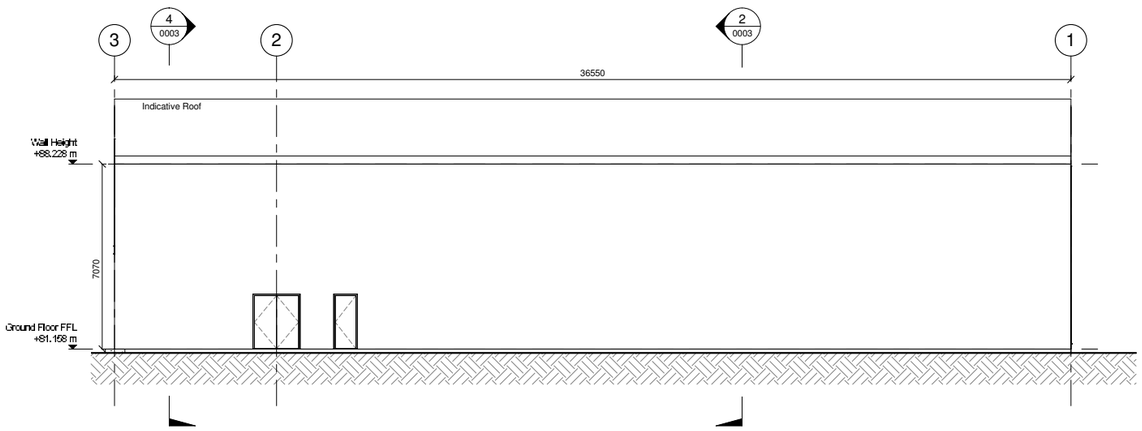
This page shows the minimum functional engineering design elevations for the Tŷ Fodol Head House. This would have been the basic design that would usually be used for such head houses. The preferred design attempts to articulate this massing to respond to the sensitive views and character areas around the site.



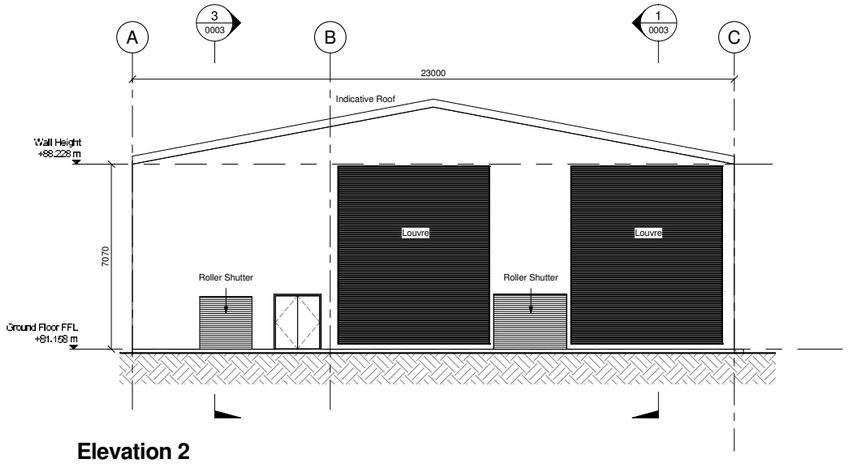
Elevation 3
1 : 100



Elevation 4
1 : 100



Elevation 1
1 : 100



Elevation 2
1 : 100

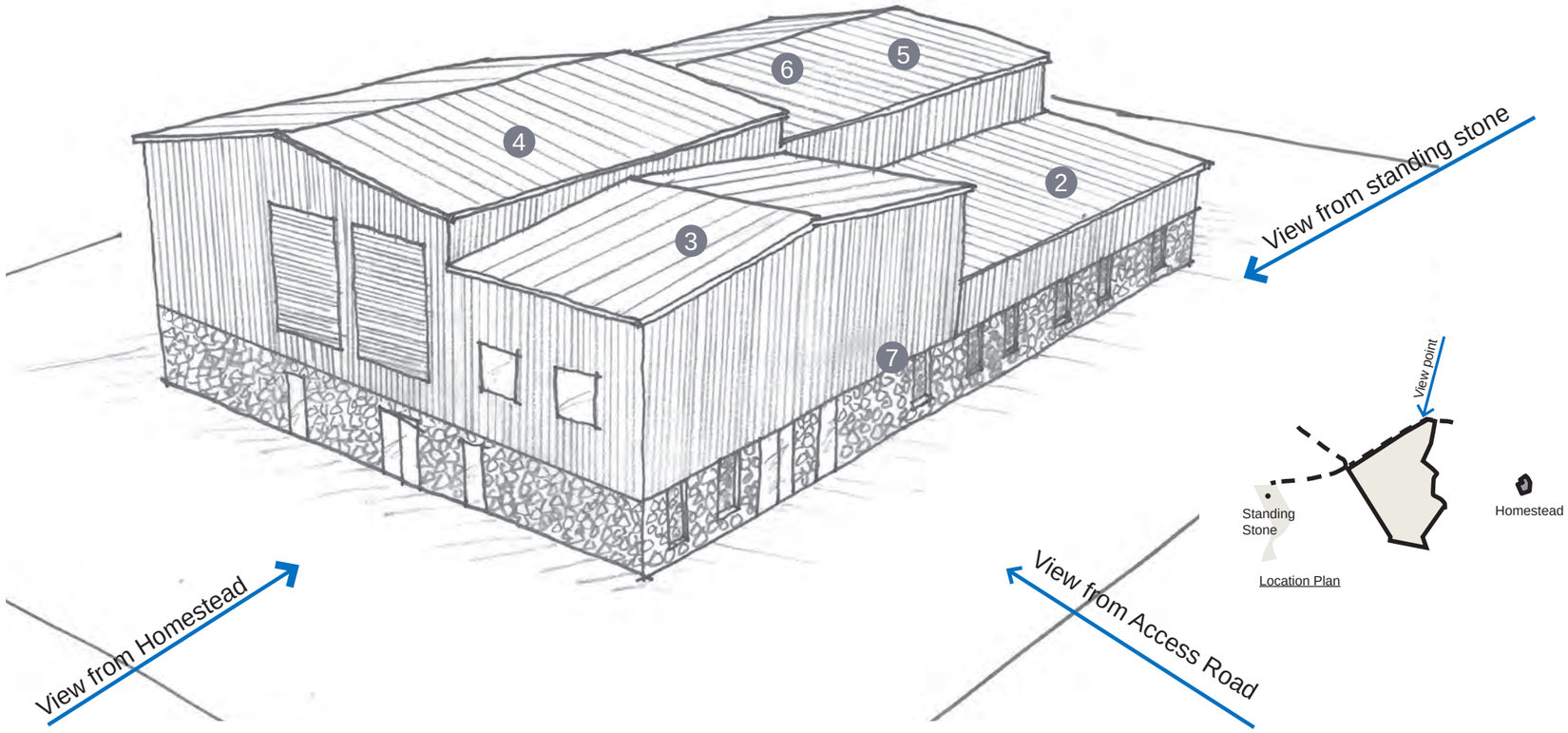
This is a conceptual design only and would have been subject to further structural design in the detailed stages.

3.7.2 Tŷ Fodol Site Building Form Preferred Option and Key Design Principles

In August 2017, four design options (as outlined on pages 54-57) were presented to officers from Gwynedd Council. Based on the feedback, a revised version of Options 1 & 3 has emerged as National Grid's preferred design approach with the following key design principles:

Key Design Principles

1. The building volume would not exceed 9,300 m³ with a maximum building height of 11 m
2. Ancillary and welfare rooms placed to the front of the site to create a lower built form towards the front facade
3. Access rooms and smaller ventilation units may be placed on a mezzanine level to create a higher built form. There are potential opportunities to further reduce massing by removing or reducing the mezzanine level and increasing the footprint within the constraints imposed by the DCO parameters
4. The fan room placed at the back of the site as the taller mass
5. The higher elements have pitched roofs that step down towards the Standing Stone
6. Metal standing seam roof with muted grey or green colour suggested
7. Wall massing broken into sections where the lower section could be in visually heavy stone finishes or concrete, while the upper section could be corrugated metal, concrete panels, wood-effect panels or striated cladding in muted green or grey tones. Additional recesses could be provided to enhance visual articulation.

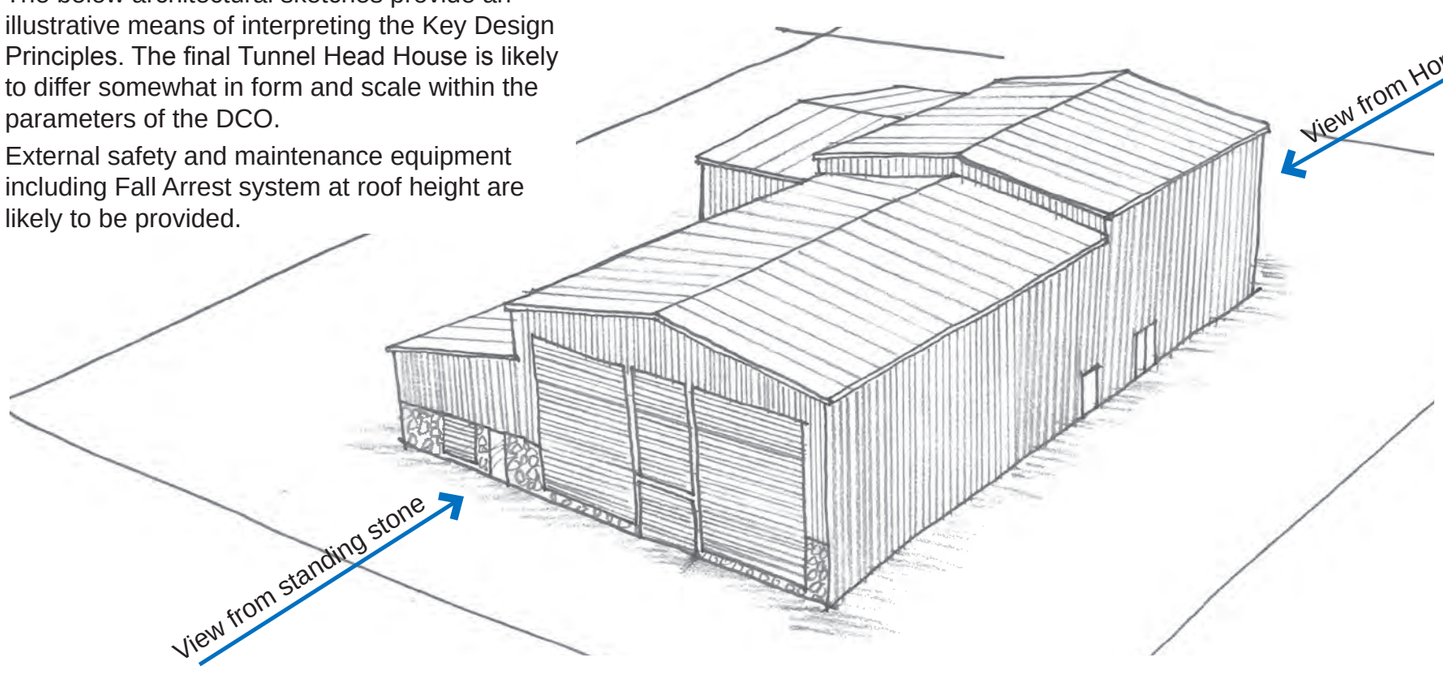


This architectural sketch provides an illustrative means of interpreting the Key Design Principles. The final Tunnel Head House is likely to differ somewhat in form and scale within the parameters of the DCO.

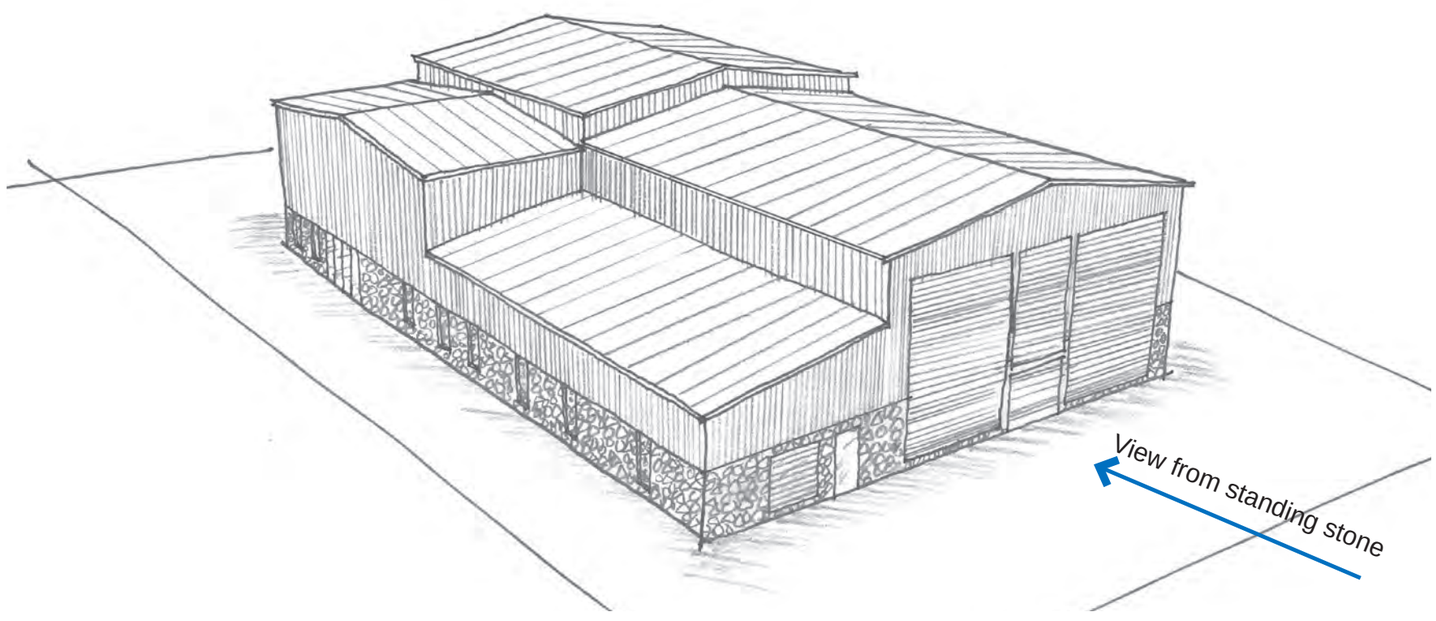
External safety and maintenance equipment including Fall Arrest system at roof height are likely to be provided.

The below architectural sketches provide an illustrative means of interpreting the Key Design Principles. The final Tunnel Head House is likely to differ somewhat in form and scale within the parameters of the DCO.

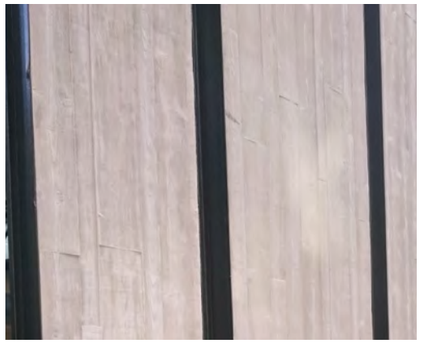
External safety and maintenance equipment including Fall Arrest system at roof height are likely to be provided.

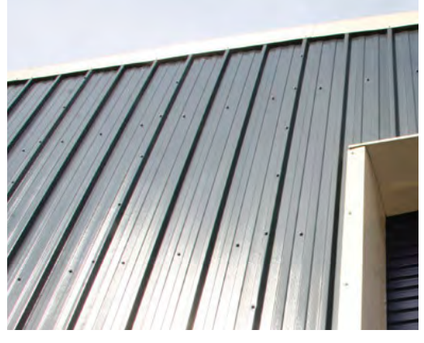


Oblique view from the south west showing façades towards the standing stone and Coed Nant Y Garth.



Oblique view from the north west showing façades towards the standing stone and Fodolydd Lane operational access



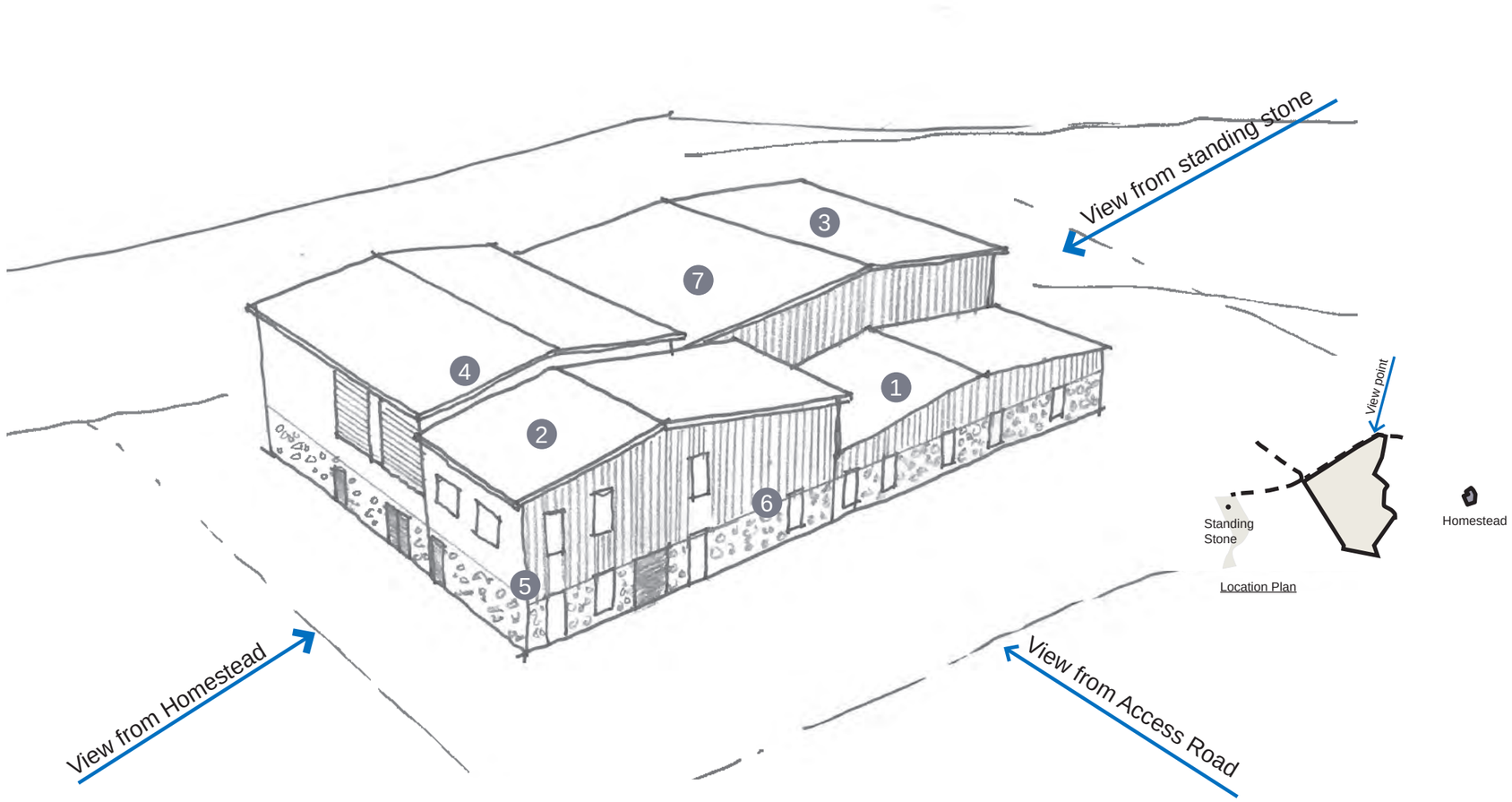


3.7.3 Tŷ Fodol Site Building Form Initial Option 1

The first option focused on breaking up the massing of the building into four parts with distinct roof forms while breaking up the walls with a mix of materials.

Design features

1. Ancillary and welfare rooms placed to the front of the site to create a lower built form
2. Access rooms and smaller ventilation units placed in a higher built form, creating a step up
3. The fan room placed at the back of the site as the biggest mass, but steps down towards the Standing Stone
4. Stepped, pitched roofs reflect the slope of mountains to use backgrounding and to reduce light reflection
5. Wall massing broken into sections with lower section with visually heavy stone finishes while the upper section could be wood panelling (subject to fire safety design) or metal cladding in muted green or grey tones
6. Additional fenestration, over what is required for operational purposes to enhance visual articulation
7. The front roofs could be of slate-effect panels while higher roofs could be metal sheets with muted grey or green colour.



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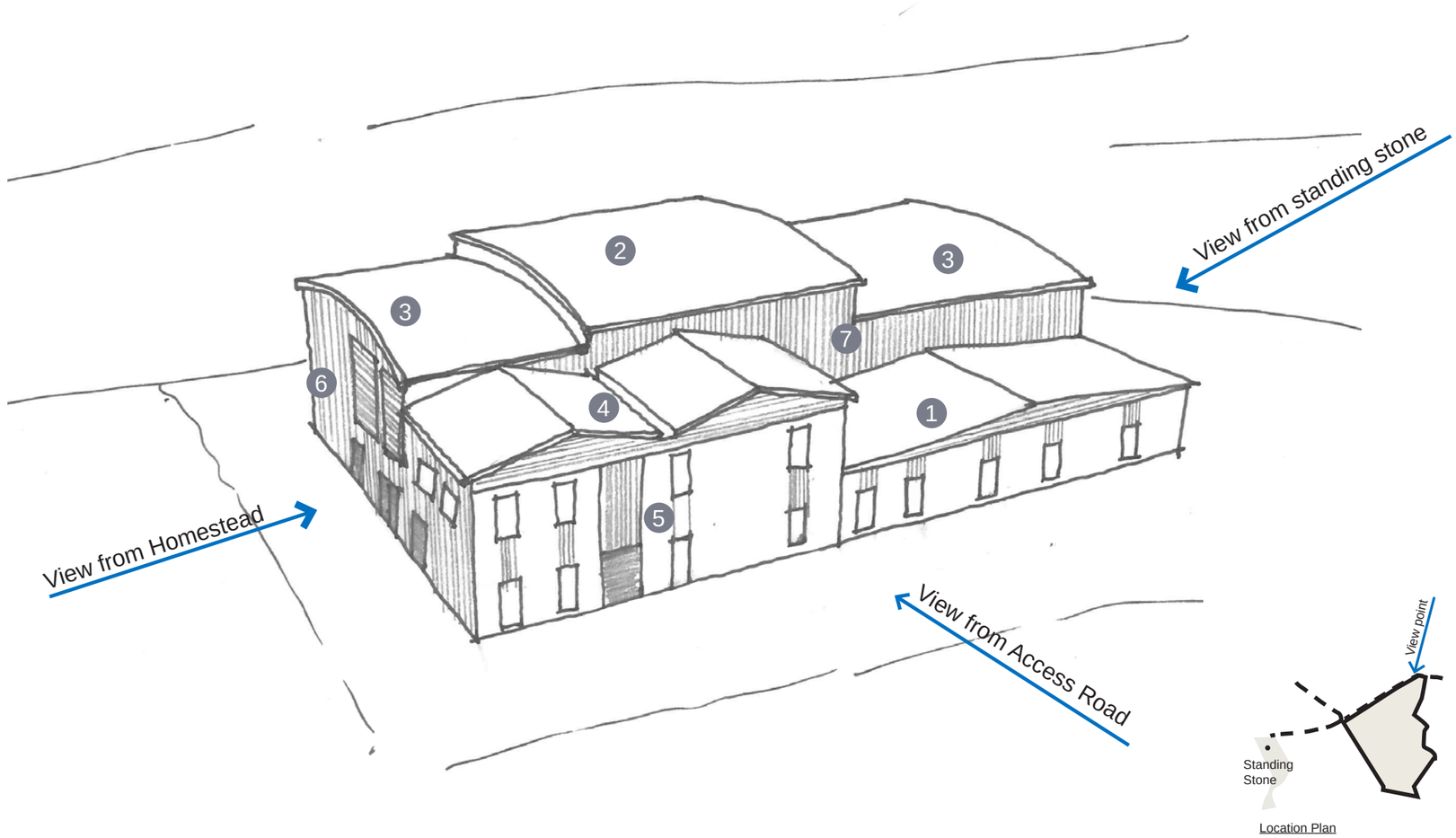
3.7.4 Tŷ Fodol Site Building Form Initial Option 2

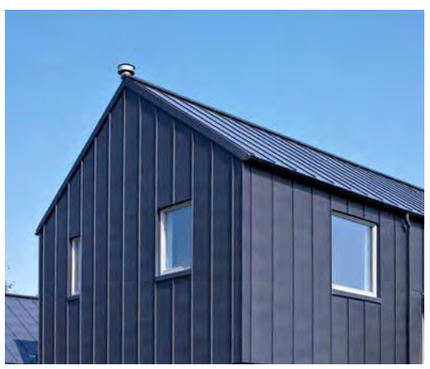
This option explored varying the roof forms with pitched and vaulted roofs with stepped articulation towards sensitive sites.

Design features

1. Ancillary and welfare rooms placed to the front of the site to create a lower built form
2. Vaulted roofs for the back elements containing the ventilation units to create further massing distinction and suggest a barn like architecture
3. Roofs stepped and lowered towards the Standing Stone and homestead with holiday homes to create visual articulation
4. Pitched roofs with a channel feature in the middle and panelling along the gable end with wood-effect panels or metal sheets
5. Wall massing broken with fenestration and panelling in wood-effect panels, formed concrete, metal, brick or slate waste
6. Louvres and panels along facade visible from homestead to suggest a barn style façade
7. Panelling with wood-effect panels, formed concrete or metal with muted tones to break up massing and suggest barn style architecture.





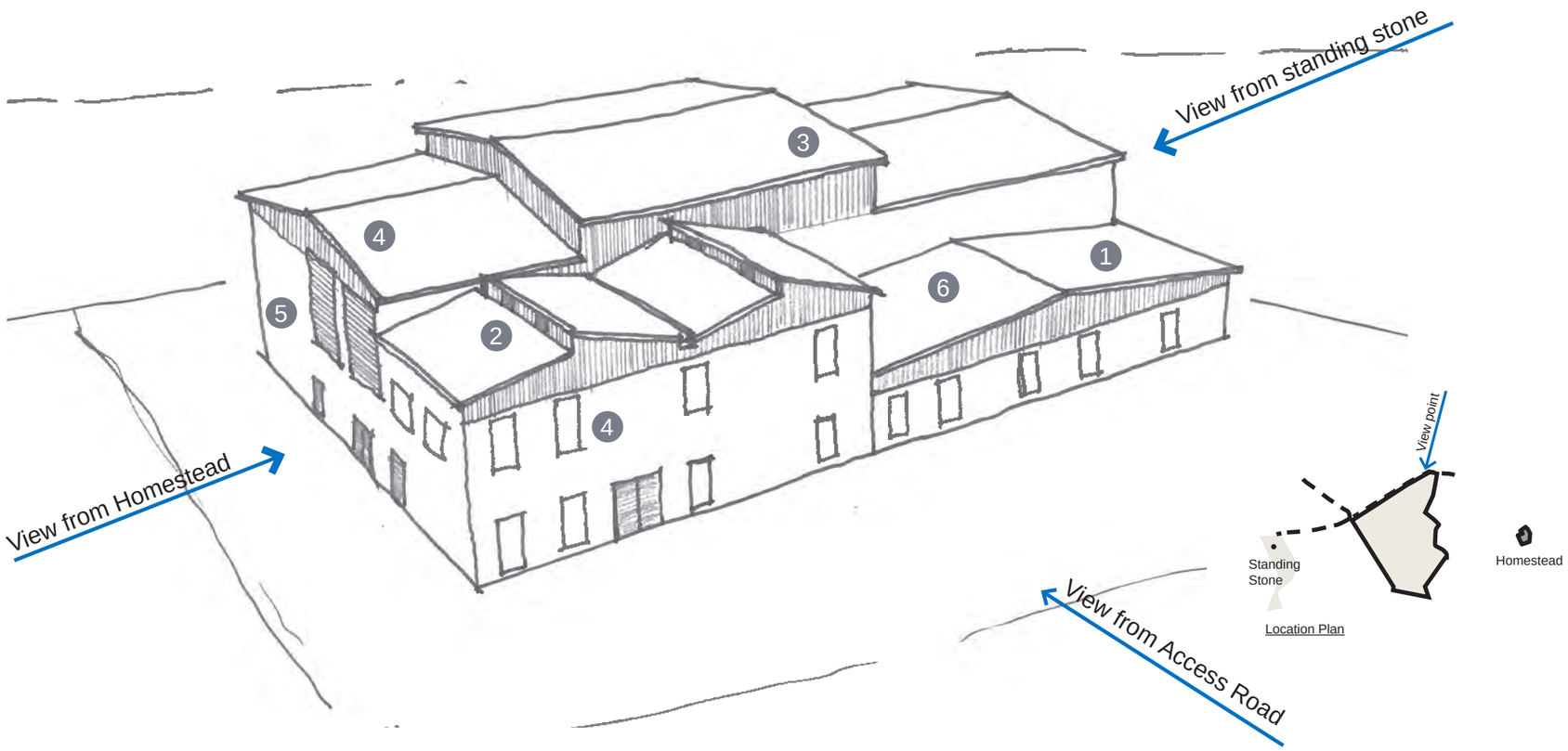



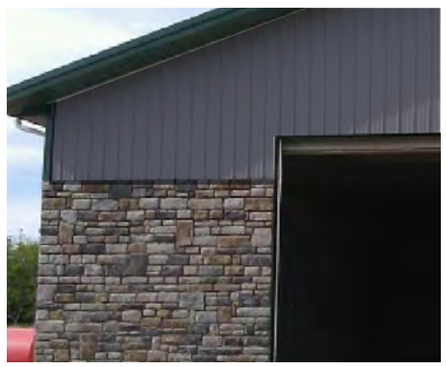
3.7.5 Tŷ Fodol Site Building Form Initial Option 3

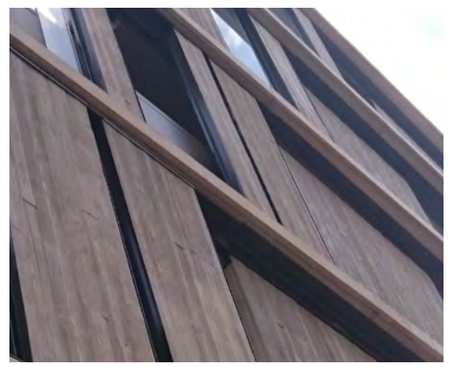
This option explored further articulation of varied roof forms and massing.

Design features

1. Ancillary and welfare rooms placed to the front of the site to create a lower built form. Potential for a more domestic homestead style facade treatment with wood-effect panels and slate-effect roofs
2. Smaller fan unit room stepped higher with clerestory windows along the roof to give a distinct identity and more natural light internally. Panelling with wood-effect panels or metal along roof line
3. The fan room as the highest mass with roofs stepping down towards the Standing Stone and homestead
4. Low rise pitched roofs along the back elements, stepped for additional articulation
5. Additional fenestration and architecturally enhanced louvres to break up the façades
6. The front roofs could be of slate-effect panels while higher roofs could be metal sheets with muted grey or green colour.





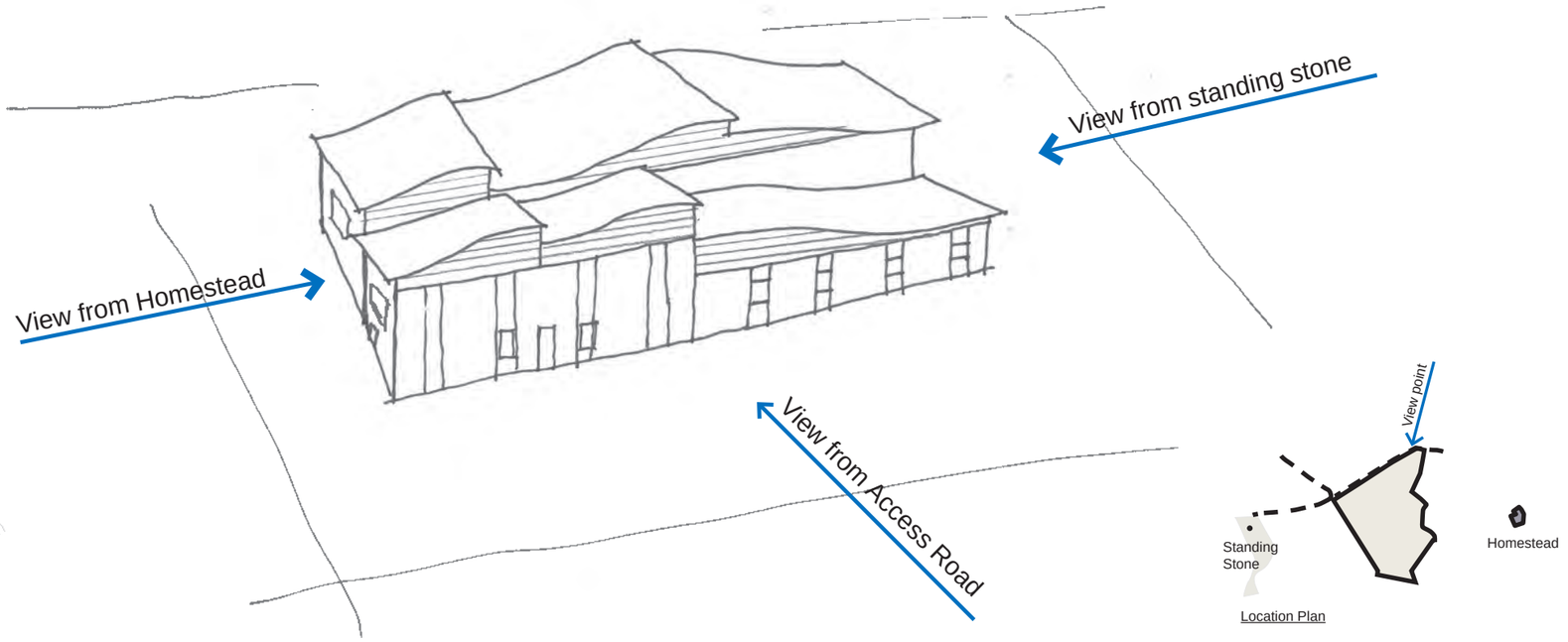


3.7.6 Tŷ Fodol Site Building Form Initial Option 4

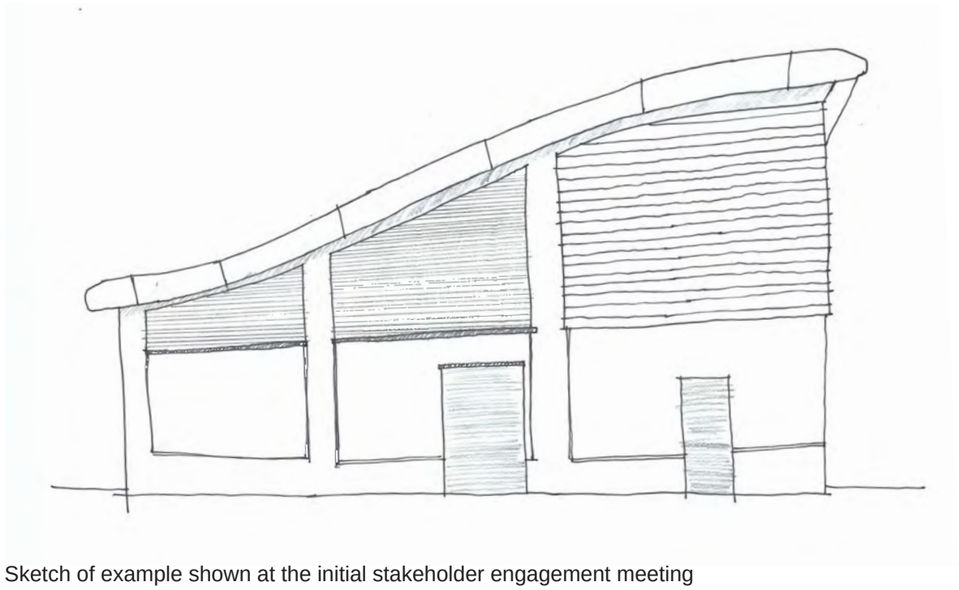
At the initial stakeholder engagement meeting it was suggested that curved roofs are not common in the agricultural context of this area.

However, there was an interest in a curved roof example that was tabled as it seemed to be an interesting profile and blended into the mountainous background. Hence this has been included as a sketch option.

This is a not a preferred option for National Grid due to cost and maintenance concerns. It is likely to also appear incongruous in the local context, presenting a very modern form of roof design.



Sketch showing potential to use curved roofs



Sketch of example shown at the initial stakeholder engagement meeting

3.8 Landscape Design Approach

The landscape setting and design approach to the Tŷ Fodol Tunnel Head House and Cable Sealing End Compound is as follows:

- the site is located within pastoral fields between properties known as Fodol (200 m), Vodol-isaf/ Vodol Cottage (200 m) and Garth Fawr (380 m);
- to the south of the site is Nant-y-garth, a wooded ravine which contains a landfill site;
- views of the proposals from Vodol-isaf/Vodol Cottage screened by land form;
- views from properties at Fodol and Garth Fawr of the proposal benefit from some screening from landform;
- proposed planting and mounding will provide additional screening from properties at Fodol and Garth Fawr of the site;
- proposed new hedgerow, crawiau and slate pillar fencing to reinstate northern boundary edge;
- the attenuation pond would be designed as a part of the landscape setting of the site;
- land boundary fronting Fodolydd Lane could be reinstated with Crawiau to reinforce local landscape character;
- planting mixes to comprise largely indigenous species with both deciduous and evergreen components to provide year round screening and bio-diversity benefits; and
- locally appropriate wild flower seeding mixes to be used to provide interest and bio-diversity benefits for invertebrates.

Landscape Masterplan

Imagery ©2018, Map data ©2018 Google

3.9 Photomontages

The adjoining photomontages show the existing and proposed view of the Tŷ Fodol Tunnel Headhouse and CSEC within the surrounding site context.

As shown in these images, the built form is set back from the boundaries and surrounded by landscape treatments which mitigate any visual impacts on sensitive views from the surrounding context.

The articulation of the built form and the use of materials and colours as discussed in the Design Guide would present a visually appropriate built form within a landscape setting in this context.

Aerial Imagery provided by National Grid

View of existing Site

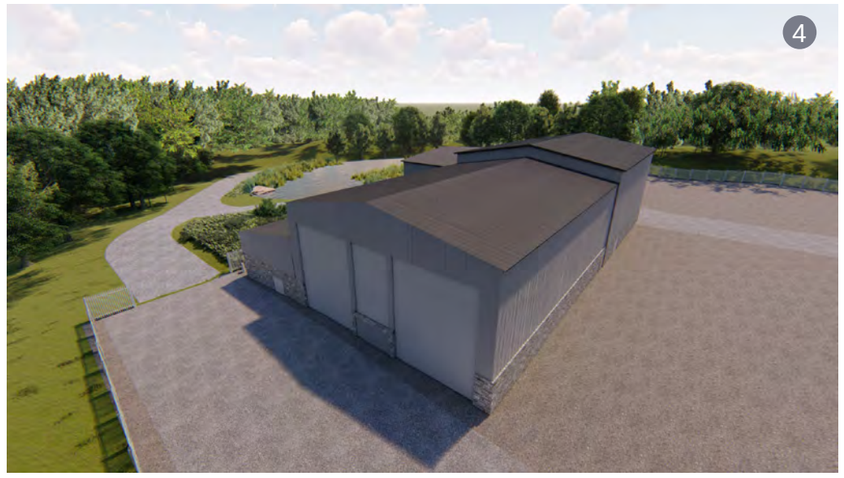
Aerial Imagery provided by National Grid

View of proposed built form and landscape treatments

Photomontages

1. View from the north of the site showing the building in the landscape setting.
2. View from the north showing the head house and the attenuation pond.
3. View from the north east showing the variation in massing and materials as well as the landscape setting.
4. View from the west showing how the built form steps down towards the standing stone.
5. View from the north showing the variation in massing and materials.
6. View of the front facade showing the lower form of the ancillary and welfare rooms.
7. View showing head house from the north with a variation in roof colour. The Juniper Green roof colour may help blend the built form into the landscape from distant views.

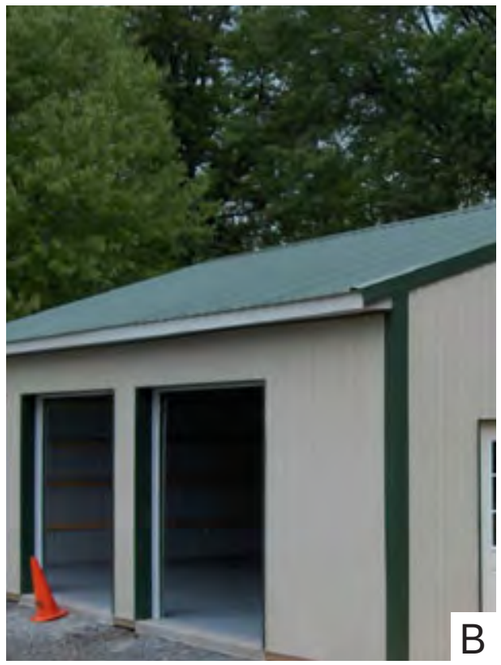
The landscaping is shown at year 15. Electrical plant and equipment omitted for clarity.



3.10 MATERIALS PALLET

3.10.1 Built Form


A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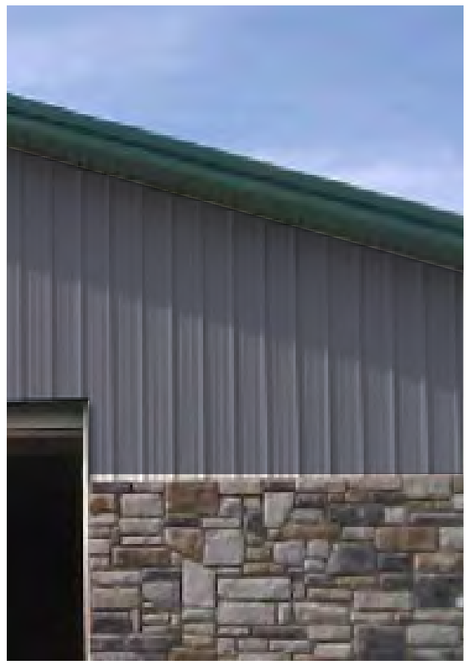
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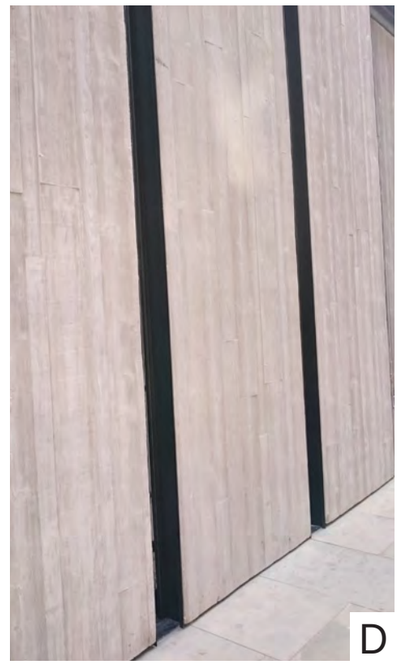
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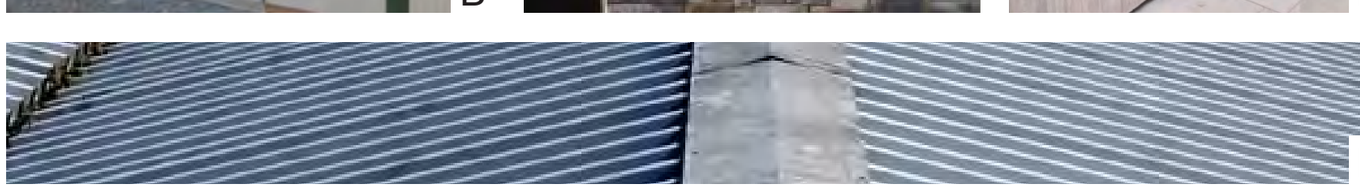
H


E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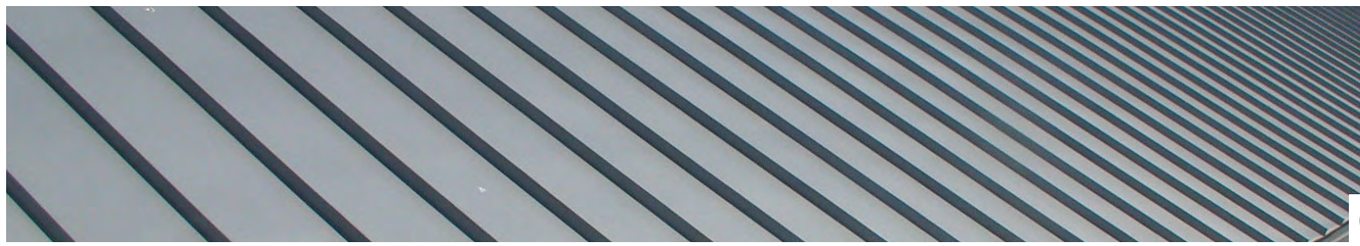

G

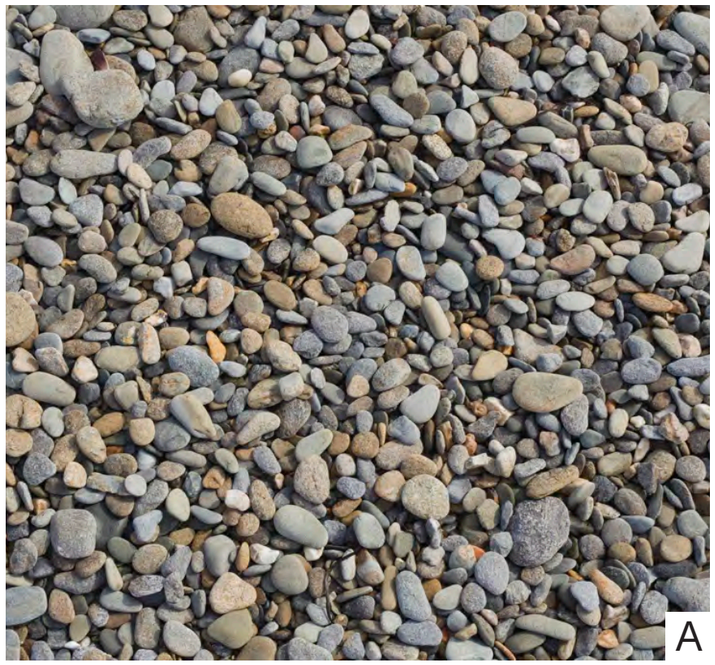

I

© Welsh Water

A WOOD-EFFECT CLADDING AND STONE FACADE
B STEEL FACADE
C STONE BASE WITH METAL PANELLING ABOVE © DUCH MILL SUPPLY
D FORMED CONCRETE PANELLING
E EXAMPLE OF HOW STEPPED ROOFS, MIX OF MATERIALS, PANELLING AND GREEN TONES HELP IMPROVE VISUAL IMPACT OF BUILDINGS
F METAL ROOF © ERIC HANDS, FLICKR
G METAL STANDING SEAM ROOF © RHEINZINK
H FINE GRAIN LOUVRES © COLT INT. LTD
I EXAMPLE OF DARK COLOURED BRICK BASE AND METAL PANELS ABOVE © COLT INT.LTD

Indicative colour palette

3.10.2 Access and Surface Treatments


A


B


C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I

A PEBBLE STONES
B BUFF-GREY SELF-BINDING GRAVEL
C SLATE CHIPPINGS
D GRASS CRETE
E TAR-MACADAM SURFACE
F BODPAVE85 POROUS PAVERS © TERRAM.COM
G COLOURED ASPHALT WITH GREEN CHIPPINGS © PAVINGEXPERT.COM
H BLUE GREY SLATE CHIPPINGS
I GABION WALL WITH WASTE SLATE © SMALLWOOD-GABION.CO.UK
J COLOURED ASPHALT © AGGREGATE.COM

3.10.3 Traditional Fencing & Secure Fencing


A


C


B


D

A CRAWIAU STYLE BOUNDARY
B CLODDIAU STYLE BOUNDARY FENCE
C GALVANISED PALISADE FENCE FOR SECURE COMPOUNDS
D STOCK FENCING © JONRICHARDSCONTRACTING.CO.UK

4.0 Pentir, Gwynedd

4.1 SITE ANALYSIS

Pentir 400kV substation is an existing high voltage transmission network substation owned and operated by National Grid.

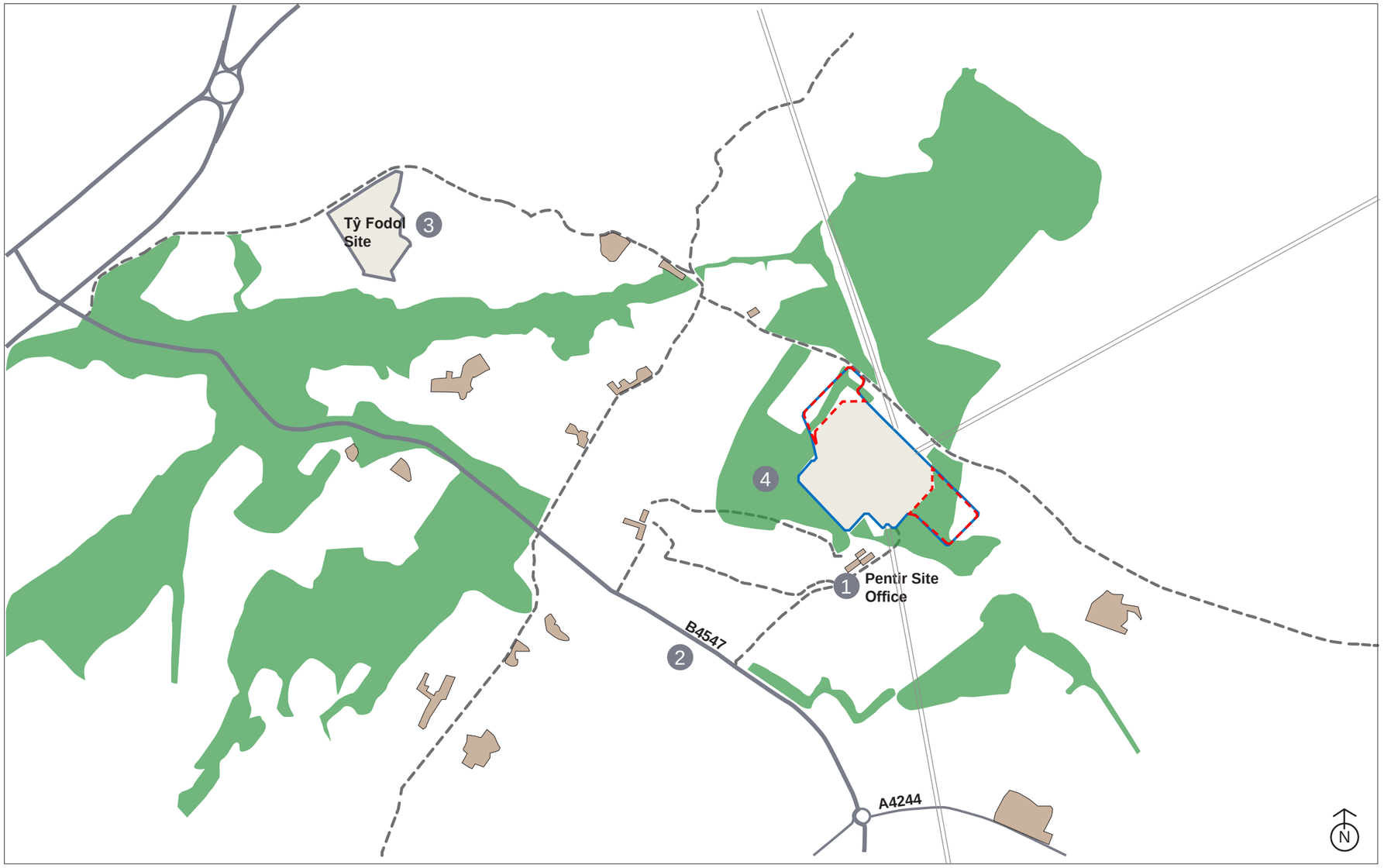
The site analysis explored the following key features in the surrounding context:

1. Pentir Site Office: is located west of the site and is a current site office for National Grid

2. Key access road: An access road off the B4547 is the key access into the site

3. Tŷ Fodol Site: is located north west of the site

4. Woodland cover: The site is currently enclosed by woodland cover which provides visual screening.



Site Context Analysis Plan

Legend

- Pentir site area, Gwynedd
- Existing settlements
- Proposed extension
- Overhead lines
- Main roads
- Secondary roads
- Woodland cover

4.2 PENTIR 400 KV SUBSTATION TECHNICAL DESIGN

Pentir 400kV substation is an existing high voltage transmission network substation owned and operated by National Grid. Substations are a method of controlling power flows and voltages across the transmission system and between the transmission and distribution systems.

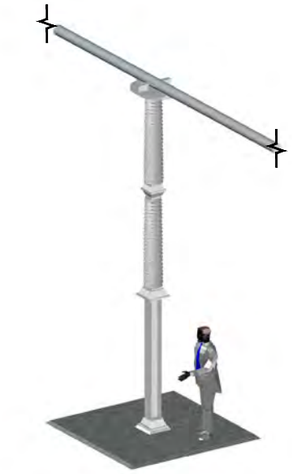
As part of the Works, the existing substation is to be extended to the north west and south east to facilitate the transmission of additional generation over the high voltage transmission network. The design of the extension is largely driven by functional requirements. The proposed electrical equipment is largely installed outdoors, on a levelled development site. Opportunities to vary the siting and spacing of equipment across the site are extremely limited. The live equipment needs to be enclosed by effective security fencing, which also encloses internal access roads.

The following is a list of additional equipment types being installed as part of the extension:

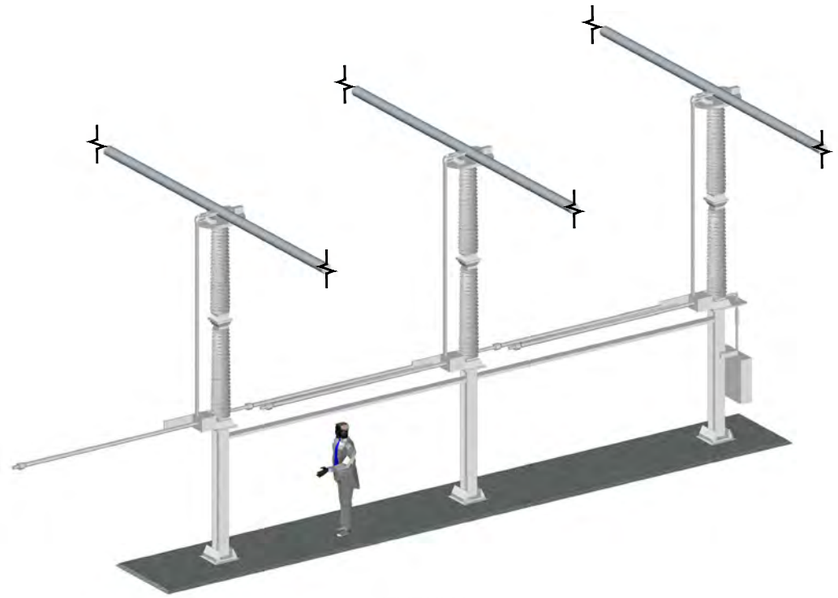
1. Circuit Breaker: interrupts power flow. Materials: mixture of metal body and silicone/ porcelain insulators
2. Post Insulators: Support HV conductors to keep them away from the earth. Typically porcelain insulators above a steel structure
3. Cable Sealing Ends (400kV): interface between air insulated conductor (busbar / OHL conductor) and underground cables, one required per cable. Typically a silicone insulator above a steel structure
4. Disconnector (400kV): Capable of disconnecting the line from the substation (safety precautions). Materials: mixture of metal body and silicone or porcelain insulators
5. Earth Switch/Post Insulator (400kV): To apply safety precautions for work on this equipment and supports HV conductor to keep it away from earth. Typically porcelain insulator above a steel structure
6. Current and Voltage Transformers (400kV): Provide measurements of voltage and current for use in the protection and control of the Transmission Network. Material: mixture of metal body and silicone or porcelain insulators
7. Full Line Tension Gantry and Line Landing Gantry (400kV): The overhead line conductors terminate on this structure. Materials: Steel
8. Shunt Reactor (400kV): Shunt Reactors are used to control the voltage on the Transmission Network within licence limits. Materials: Steel
9. Security Fencing: The security fencing is a 2.4 metre high galvanised steel palisade fence with a 4m high (from ground level) electric fence backing
10. Substation roads: Tarmac / asphalt surface. Required to move plant and persons around the site and to access equipment
11. Substation surfacing: The substation surfacing is stone chippings
12. Ancillary plant rooms / relay rooms: These house the protection and control, low voltage power and signalling equipment required to operate the substation. Material: prefabricated steel or brick.

Palisade fence

Existing relay room

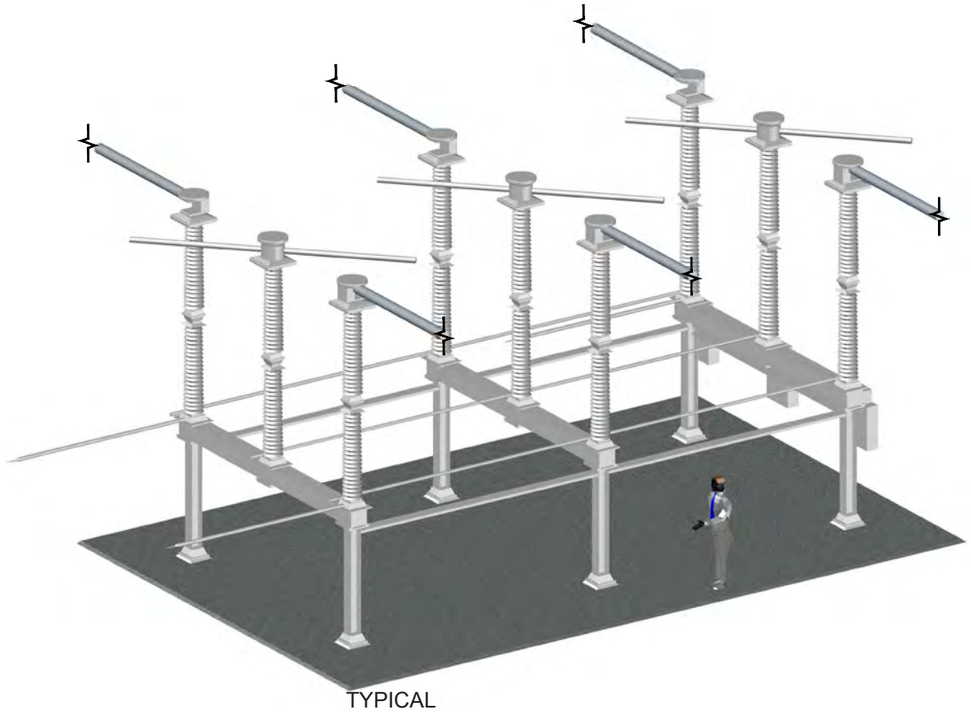


TYPICAL
SINGLE POLE POST INSULATOR



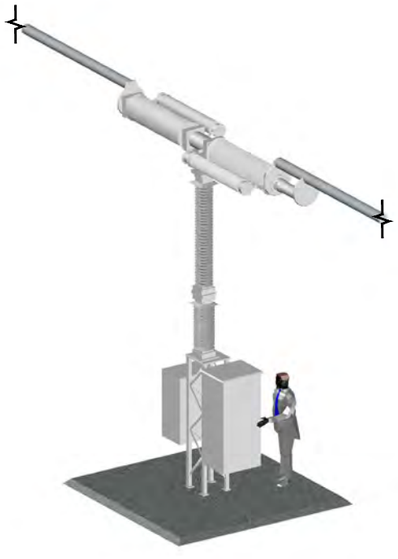
TYPICAL
EARTH SWITCH

TYPICAL
SINGLE VOLTAGE TRANSFORMER



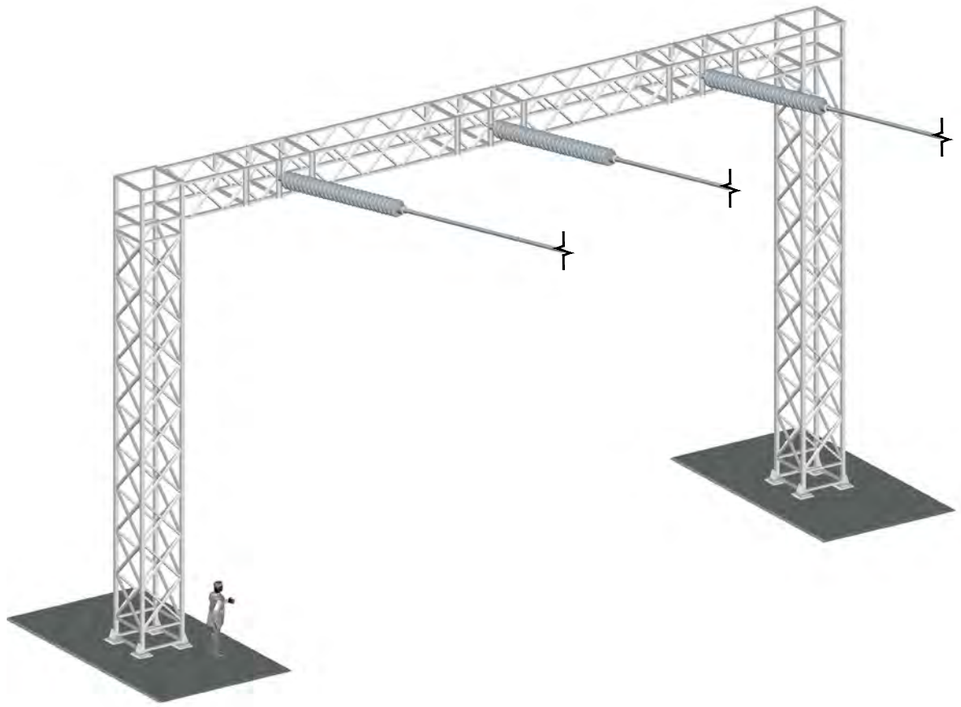
TYPICAL
DISCONNECTOR WITH EARTH SWITCH

TYPICAL
SINGLE CURRENT TRANSFORMER

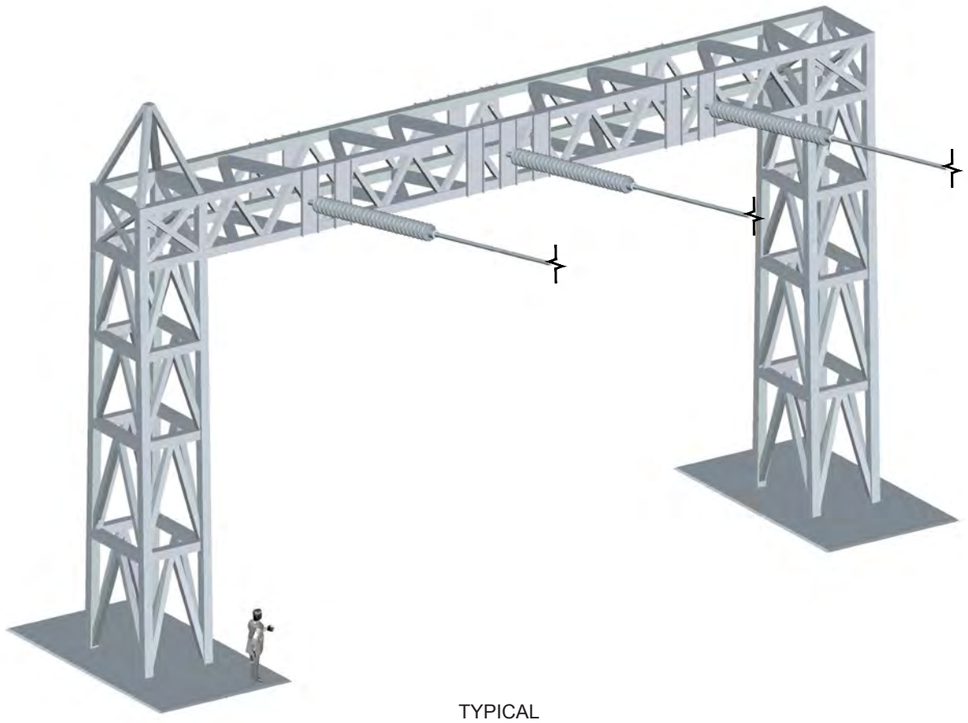


TYPICAL
SINGLE CIRCUIT BREAKER

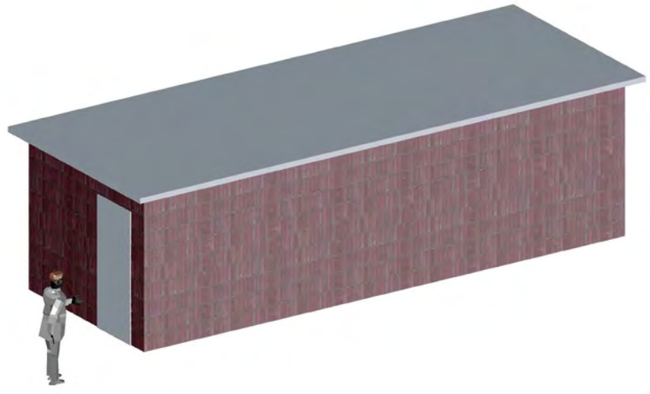
Examples of typical equipment



TYPICAL
GANTRY

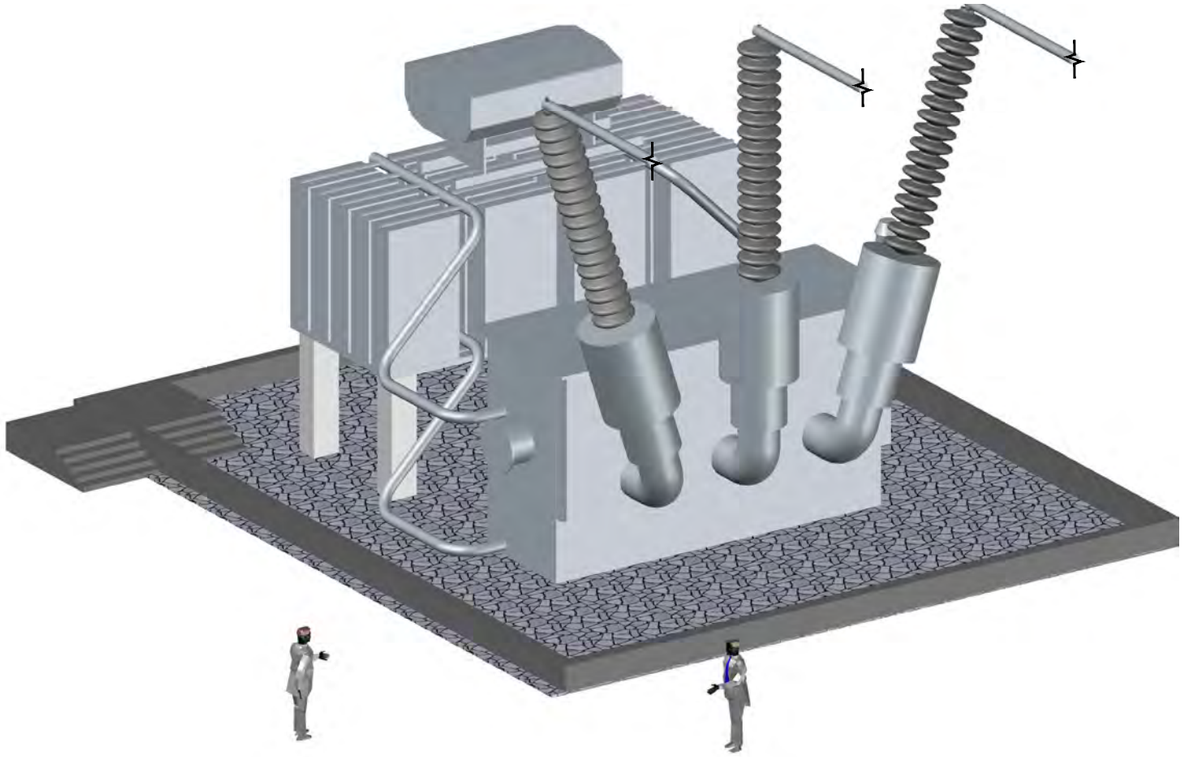


TYPICAL
FULL TENSION GANTRY



TYPICAL
PORTABLE RELAY ROOM

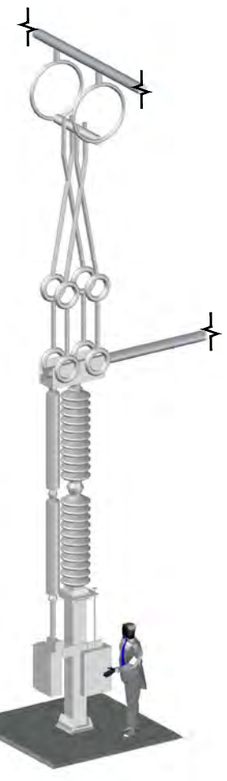
Examples of typical equipment



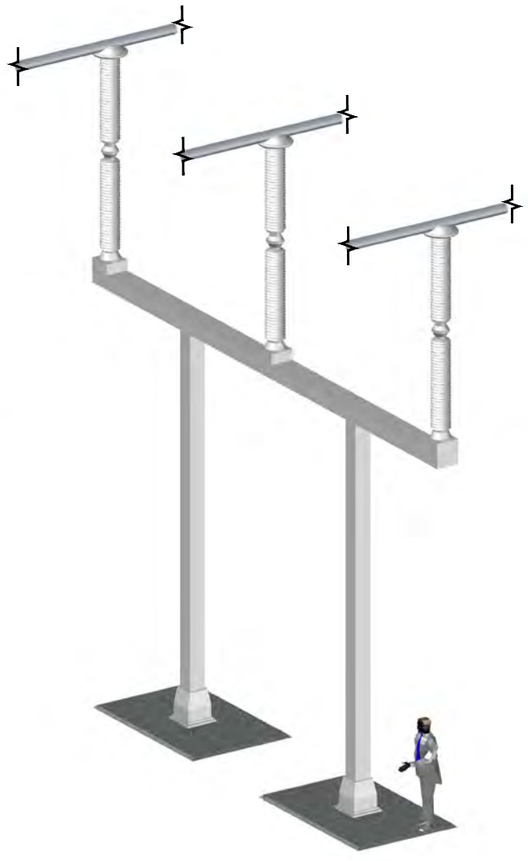
TYPICAL
SHUNT REACTOR

TYPICAL
SINGLE SURGE ARRESTOR

TYPICAL
SINGLE CABLE SEALING END



TYPICAL
SINGLE PANTOGRAPH DISCONNECTOR



THREE PHASE POST INSULATOR

Examples of typical equipment

4.3 LANDSCAPE DESIGN APPROACH

As part of the proposed development, an extension is required at Pentir Substation. The extension is predominantly to the south where there is currently an area of woodland which screens the existing substation.

After completion of the works at the substation, a landscape mitigation scheme would be implemented which includes the following:

- land to the east of the southern extension would be raised to provide partial screening of the site when viewed from the minor public road and property to the south east;
- areas of woodland retained around the substation would be brought into National Grid ownership to secure the existing screening these afford;
- woodland areas removed to facilitate construction (e.g. construction accesses) would be reinstated;
- new woodland planting to the southeast to replace the vegetation lost and restore the screening of the substation, particularly important for those more elevated residential areas to the south which have views towards the substation;
- new woodland planting to the north to reinforce the existing screening belt and provide replacement of vegetation removed during construction of the proposed 400 kV overhead line; and
- new boundary treatments along the minor road to the north including the introduction of hedgerow planting and fencing treatments such as slate pillar fencing.

Landscape Masterplan

Imagery ©2018, Map data ©2018 Google

5.0 Conclusion

5.1 DCO REQUIREMENTS AND APPROVAL PROCESS

The development of the Braint and Tŷ Fodol Tunnel Head Houses, and the extension of the Pentir Substation would be authorised through the confirmation of a Development Consent Order for the North Wales Connection, which includes these elements of work. The final design of the buildings and landscaping works would therefore be controlled through mechanisms and Requirements contained within any final Order.

Schedule 3 of the draft Development Consent Order **(Document 2.1)** sets out 19 draft Requirements corresponding to conditions which could have been imposed on the grant of planning permission for the works had they fallen within the ambit of normal local development control. The requirements have a similar purpose to planning conditions. There are six draft Requirements that are relevant to the Design approach to be taken.

Design and Parameters

DCO Requirement 3 provides that the authorised development shall be carried out in general accordance with the design drawings, so as to allow a necessary but proportionate degree of flexibility in the construction of the important and nationally significant infrastructure project. The exception to this is where any departure from the design drawings gives rise to any materially new or different environmental effects from those assessed in the environmental statement.

The design drawings are a mixture of parameters, indicative detail, and illustrative detail, as appropriate, therefore, the construction can only be in general accordance with the information shown on them.

Tunnel Head House Design

DCO Requirement 4 provides that the above ground elements of the authorised development within Work No. 8 (Braint and Tŷ Fodol Tunnel Head Houses) shall be carried out in general accordance with the key design principles of the Tunnel Head House Design Guide, unless otherwise agreed with the relevant planning authority. Such an approach accommodates necessary but proportionate flexibility in the construction of these elements. The flexibility to have the relevant planning authority approve a variation to the key design principles is necessary to allow for any departure from the key design principles subject to such approval.

Mitigation planting scheme

DCO Requirement 9 confirms arrangements for necessary planting, including preparation of a planting scheme for each stage of the authorised development unless otherwise agreed with the relevant planning authority.

Implementation of mitigation planting scheme

DCO Requirement 10 is concerned with the implementation of the mitigation planting scheme and defines timescales.

Maintenance of implemented mitigation planting scheme

DCO Requirement 11 concerns the period over which planting associated with the mitigation planting scheme is maintained. Planting of damaged or diseased trees are to be replaced by trees of the same size and species, unless otherwise agreed with the relevant planning authority.

Retention and protection of existing trees and hedgerows

DCO Requirement 12 ensures the preparation of a Tree and Hedgerow Protection Strategy for each stage, with relevant works not to commence until the approved protection measures are in place.

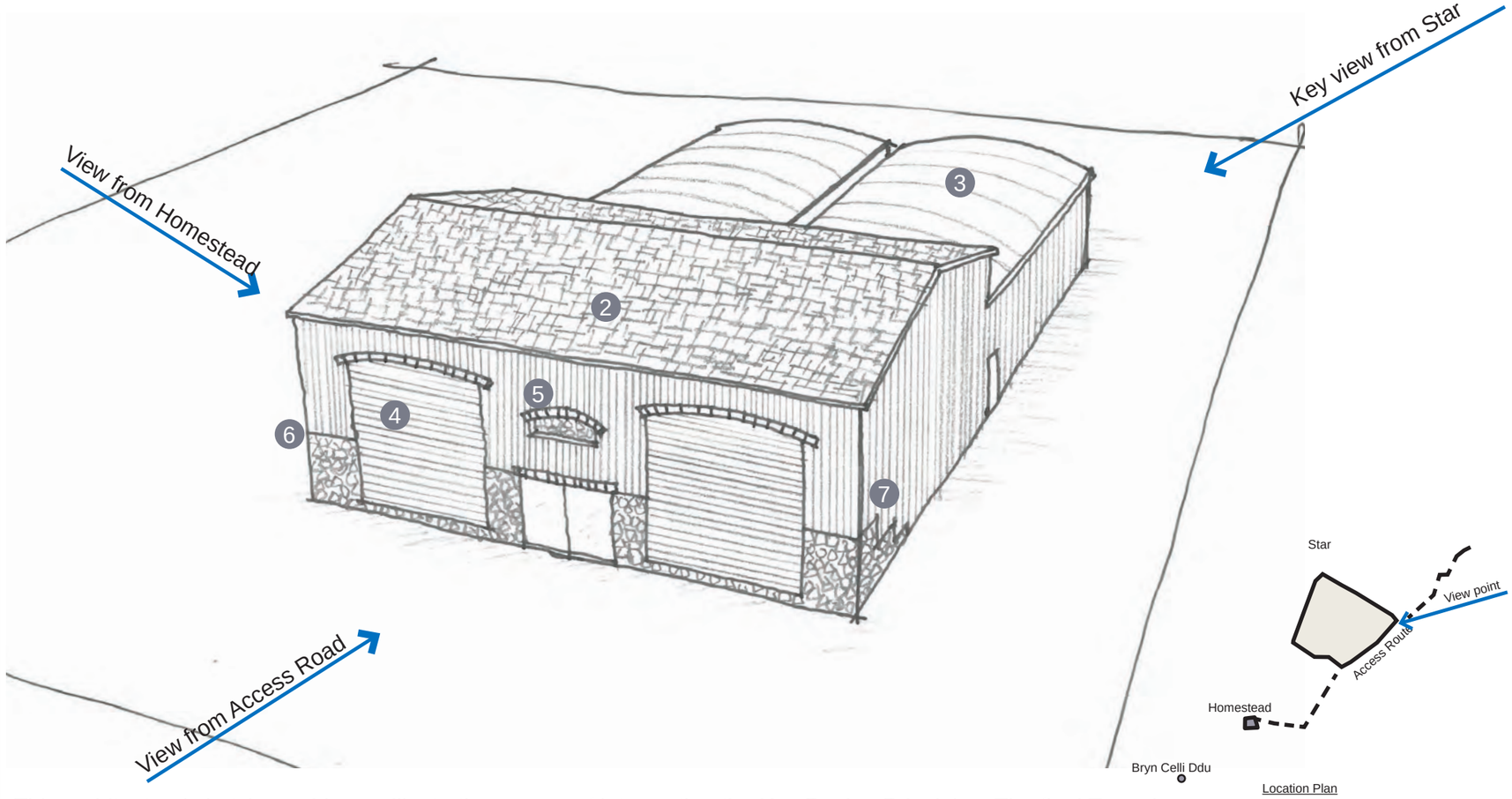
In summary, the following pages presents the key design principles for the Braint and Tŷ Fodol Tunnel Head Houses, as referenced in draft DCO Requirement 4.

5.2 BRAINT SITE BUILDING FORM PREFERRED OPTION AND KEY DESIGN PRINCIPLES

In August 2017, three design options (as outlined on pages 28-30) were presented to the key stakeholder group at the Isle of Anglesey County Council. Based on the feedback from that group, a revised version of Option 3 has emerged as National Grid's preferred design approach with the following key design principles:

Key Design Principles

1. The building volume would not exceed 4350 m³ with a maximum building height of 8 m
2. Front massing to be designed as a high element with a low pitch gable roof, with slate-effect panel roofing and short overhang, reminiscent of Plas Newydd Home Farm architecture
3. Vaulted roofs with corrugated metal for rear sections to reduce the visual impact that pitched roof reflections could have for views from Star. The mass closest to Star may be lowered further to provide visual articulation depending on functional constraints
4. Louvres could be architecturally enhanced through a suitable colour palette, detailing etc. The physical dimension of the louvres would largely be dictated by operational considerations such as air flow rates and noise attenuation. Potential for stone or dark brick lintels to reflect local architecture depending on cost and functional viability
5. The use of smaller recesses would add visual interest to the façade
6. Building facade to be broken with visually heavy stone walls or cladding along the bottom half and linear metal or wood-effect, striated cladding for the top half
7. Potential to transition stone base to metal cladding on side elevations reminiscent of old farms and as a cost efficient design.



This architectural sketch provides an illustrative means of interpreting the Key Design Principles. The final Tunnel Head House is likely to differ somewhat in form and scale within the parameters of the DCO.

External safety and maintenance equipment including Fall Arrest system at roof height are likely to be provided.


AMEC
Llwyn-onn Farm


Sketch of Plas Newydd Home Farm

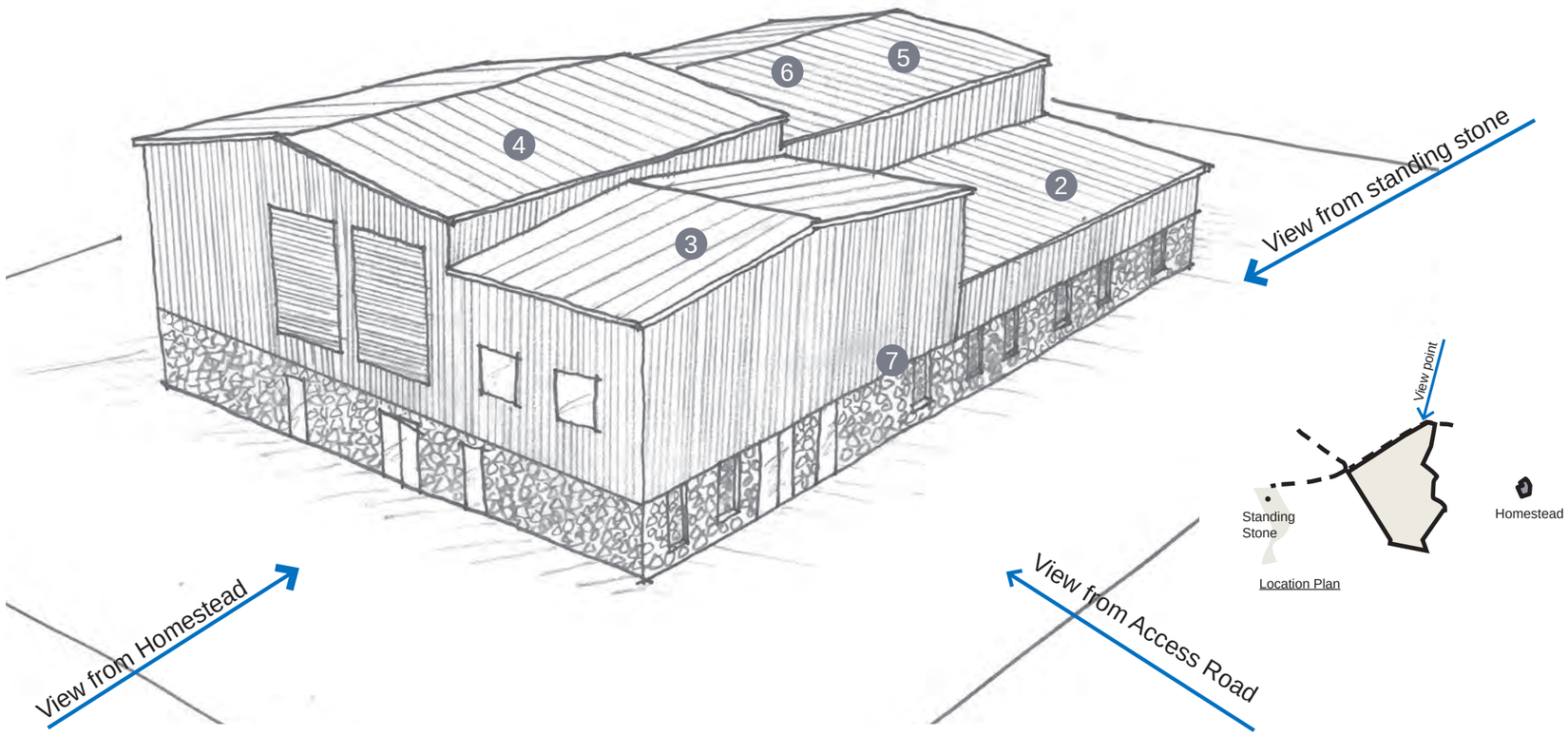

Example of vaulted rural architecture

5.3 TŶ FODOL SITE BUILDING FORM PREFERRED OPTION AND KEY DESIGN PRINCIPLES

In August 2017, four design options (as outlined on pages 54-57) were presented to officers from Gwynedd Council. Based on the feedback, a revised version of Options 1 & 3 has emerged as National Grid's preferred design approach with the following key design principles:

Key Design Principles

1. The building volume would not exceed 9,300 m³ with a maximum building height of 11 m
2. Ancillary and welfare rooms placed to the front of the site to create a lower built form towards the front facade
3. Access rooms and smaller ventilation units may be placed on a mezzanine level to create a higher built form. There are potential opportunities to further reduce massing by removing or reducing the mezzanine level and increasing the footprint within the constraints imposed by the DCO parameters
4. The fan room placed at the back of the site as the taller mass
5. The higher elements have pitched roofs that step down towards the Standing Stone
6. Metal standing seam roof with muted grey or green colour suggested
7. Wall massing broken into sections where the lower section could be in visually heavy stone finishes or concrete, while the upper section could be corrugated metal, concrete panels, wood-effect panels or striated cladding in muted green or grey tones. Additional recesses could be provided to enhance visual articulation.



This architectural sketch provides an illustrative means of interpreting the Key Design Principles. The final Tunnel Head House is likely to differ somewhat in form and scale within the parameters of the DCO.

External safety and maintenance equipment including Fall Arrest system at roof height are likely to be provided.

nationalgrid