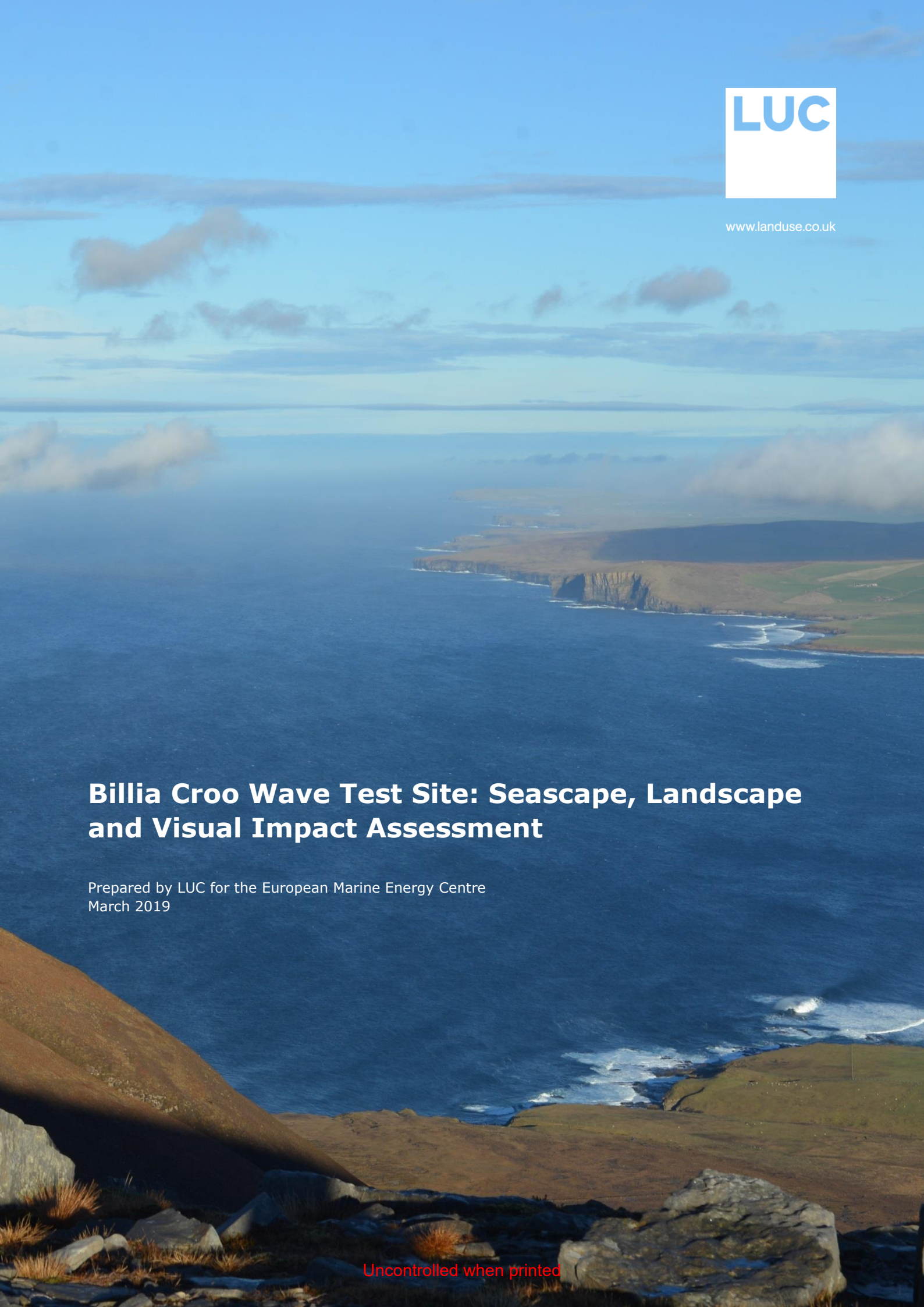

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Billia Croo Wave Test Site: Seascape, Landscape and Visual Impact Assessment

Prepared by LUC for the European Marine Energy Centre
March 2019

Project Title: Billia Croo Wave Test Site: Seascape, Landscape and Visual Impact Assessment

Client: European Marine Energy Centre Ltd.

Version	Date	Version Details	Prepared by	Checked by	Approved by
0.1	17 January 2019	Draft	PDM/SH	PDM	SO
0.2	31 January 2019	Final draft	PDM/SH	PDM	SO
0.3	7 March 2019	Revised report	SH	PDM	PDM
1.0	20 March 2019	Finalised			EMEC (CL)

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1 Introduction

Purpose of this Report

1.1 The European Marine Energy Centre Limited (EMEC) is seeking Section 36 consent under the Electricity Act 1989, to cover a range of testing activities that may be carried out at their Billia Croo wave test site, off the south-west coast of mainland Orkney. The wave test site is located within the sensitive context of the Hoy and West Mainland National Scenic Area (NSA).

1.2 In order to streamline licensing and testing for developers, a site-wide consent is sought, that will allow activities and installations within a defined Project Envelope (REP646). The SLVIA is therefore based on a 'realistic worst case' development scenario, using the maximum likely parameters of the project envelope in terms of the scale of the development.

1.3 LUC has been appointed to undertake a seascape, landscape and visual impact assessment (SLVIA) of the test site. The SLVIA examines the effects of activities and installations within the Project Envelope on:

- Landscape as a resource in its own right (including coastal landscape and seascape), caused by changes to its constituent elements, its specific aesthetic or perceptual qualities, and/or its character; and
- Views and visual amenity as experienced by people, resulting from changes in the appearance of the landscape.

1.4 This SLVIA report stands alongside the Environmental Appraisal report that has been prepared by Xodus Group to support the Section 36 consent application. It has been undertaken by Chartered Landscape Architects at LUC.

1.5 The SLVIA report comprises the following sections:

- Section 2 presents the scope and approach to the assessment, policy and guidance, and a summary of the methodology, which is detailed in Appendix 1;
- Section 3 describes the baseline conditions against which the assessment is made, including details of landscape and coastal character, landscape designations, and visual receptors;
- Section 4 sets out the elements of the project envelope that relate to the SLVIA, and identifies the 'realistic worst case' in terms of the extent and quantity of development;
- Section 5 presents the assessment of effects and potential mitigation relating to: landscape and coastal character across the study area; views as experienced by people across the study area, with reference to five representative viewpoints; and the special qualities of the NSA;
- Section 6 presents a summary of the SLVIA; and
- Section 7 includes a list of references.

1.6 The SLVIA report is supported by the following appendices:

- Appendix 1 describes the methodology used for the SLVIA;
- Appendix 2 presents the methodology used for generating supporting graphics;
- Appendix 3 sets out the detailed assessment of effects on landscape receptors;
- Appendix 4 presents the detailed assessment of effects at representative viewpoints;
- Appendix 5 provides the methodology and assessment of effects on the special qualities of the NSA; and
- Appendix 6 includes copies of consultation material.

2 Approach and Methodology

Scope of the Assessment

Effects Assessed in Full

2.1 This assessment is focused on changes that will occur in the marine environment. It therefore focuses on the changes that may occur to the character of the marine and coastal landscape (sometimes referred to as 'seascape'). The assessment also examines the effects of the test site on views, as perceived by people, as a result of changes in the marine outlook. The assessment goes on to consider changes in the special qualities of the National Scenic Area in which the test site is located.

2.2 The test site covers a range of activities and installations, with the deployed devices changing over the lifespan of the consent (20 years). Effects are not therefore assessed for separate construction, operation and decommissioning phases, as it is assumed that installation and removal works may be being carried out at any time during the 20-year consent.

2.3 All potentially significant landscape and visual effects have been examined.

Effects Scoped Out

2.4 On the basis of the desk based and field survey work undertaken, the professional judgement of the LVIA team, experience from other relevant projects, and feedback received from consultees (refer to Table 2.1), the following topic areas have been 'scoped out' of detailed assessment:

- effects on receptors outside the visual envelope of the test site (see Section 3) and/or beyond 5km from the test site boundary, where it is judged that significant effects are unlikely to occur;
- effects on 'residential visual amenity', i.e. the visual component of 'living conditions', since the devices deployed within the test site will not be so overbearing or dominating as experienced from any individual property as to result in unacceptable living conditions;
- physical effects on coastal/onshore landscape, since there are no onshore elements within the project envelope;
- effects arising from vessel movements outside the test site, since vessels will be moving through areas where shipping is already a feature; and
- cumulative effects, since no other consented or planned developments have been identified that would interact with the test site to give rise to potentially significant cumulative effects.

Policy and Guidance

2.5 National and local planning policies relevant to landscape and visual matters are briefly reviewed below, as well as available guidance on undertaking SLVIA.

National Planning Policy

2.6 The Billia Croo wave test site is located partly within the Hoy and West Mainland National Scenic Area. National Scenic Areas (NSA) are designated under the Planning etc. (Scotland) Act 2006, which describes them as being "*of outstanding scenic value in a national context*."

2.7 Scottish Planning Policy paragraph 212 states that:

"Development that affects a National Park, National Scenic Area, Site of Special Scientific Interest or a National Nature Reserve should only be permitted where:

- *the objectives of designation and the overall integrity of the area will not be compromised; or*
- *any significant adverse effects on the qualities for which the area has been designated are clearly outweighed by social, environmental or economic benefits of national importance."*

Marine Planning

2.8 The Pilot Pentland Firth and Orkney Waters Marine Spatial Plan includes Policy 4D on landscape and seascape, that states:

"The siting and design of any proposed development(s) and/or activities should demonstrate how the proposal takes into account visual impact and existing character and quality of landscape and seascape.

Development(s) and/or activities that affect National Scenic Areas (NSAs) and Special Landscape Areas (SLAs) should only be permitted where:

- *they will not adversely affect the integrity of the area or its special qualities for which it has been designated; or*
- *any significant adverse effects are clearly outweighed by social, environmental or economic benefits of national importance for NSAs and local importance for SLAs.*

Scottish Planning Policy should be considered in both the planning and decision-making stages."

Local Development Plan

2.9 Relevant policies of the Orkney Local Development Plan (LDP) 2017 – 2022 include Policy 9G Landscape, which refers to: respecting local landscape, townscape and seascape character; cumulative effects; the importance of the NSA; and wild land. The LDP also sets out policies on coastal development.

Guidance

2.10 This assessment has been carried out in accordance with the principles contained within the following documents:

- Landscape Institute and the Institute of Environmental Management and Assessment (2013) *Guidelines for Landscape and Visual Impact Assessment*. 3rd Edition ('GLVIA3');
- Landscape Institute (2011) *Photography and Photomontage in Landscape and Visual Impact Assessment*. Advice Note 01/11;
- Scottish Natural Heritage (2012) *Offshore Renewables – guidance on assessing the impact on coastal landscape and seascape*; and
- Scottish Natural Heritage (unpublished, 2018) *Guidance for Assessing the Effects on Special Landscape Qualities*. Working draft 11.

Consultation

2.11 In undertaking the assessment, consultation on scope and approach was undertaken with Orkney Islands Council and with Scottish Natural Heritage. Letters were sent to both bodies, and responses are summarised in Table 2.1.

Table 2.1: Consultation Responses

Consultee	Date of response	Issue Raised	Response/Action Taken
Orkney Islands Council	30 November 2018	Requested that the scheduled monuments at Breckness and Ness Battery be included within the SLVIA.	The evaluation of impacts on historic 'setting' of scheduled monuments is not part of the scope of the SLVIA. Consideration of visual impacts on people at these locations is discussed in Section 5.
Scottish Natural Heritage	4 December 2018	It will be important for the project description to provide the realistic worst-case scenario.	See Section 4.
		Highlighted the sensitivity of the location within a National Scenic Area, and the need to consider different types of effect, including cumulative and night-time effects.	The NSA context is noted in the baseline. It is assumed 'cumulative' refers to intra-project interactions as no other proposals have been noted. Night-time effects are considered in the assessment of effects on coastal character and views.
		A focussed assessment of impact upon the special qualities of the NSA should be included. A draft methodology for assessing effects on special qualities was provided.	An assessment of effects on special qualities has been undertaken using the SNH methodology and is included in Appendix 5.
		This assessment should be used to inform SLVIA mitigation, in particular project layout, spacing, arrangements, heights etc.	High-level principles for siting and layout have been developed. However, discussions with EMEC have indicated that operational demands will be the primary driver for siting individual installations.
		Reserved judgement on viewpoints until ZTV made available.	ZTV (as shown in Figure 2) was provided to SNH on 13 December 2018. Further comments noted below.
		Suggested running alternative ZTVs to test height limits.	No heights greater than 12m have been suggested by EMEC, and lower heights are not expected to produce noticeably different ZTVs, therefore this has not been done, though some observations on a potential 'height limit' are offered in Section 4.
		Wirelines, or wirelines overlaid on baseline photography, with the extent of the test site indicated, should be provided to illustrate the location and scale of the project footprint.	Annotated photographs, indicating the extent of the test site, and the locations of visible features, are provided for each viewpoint, in Figures 4 to 8.
Scottish Natural Heritage	15 January 2018	Welcomed use of special qualities assessment methodology. Confirmed agreement with the proposed viewpoints.	Noted.

Consultee	Date of response	Issue Raised	Response/Action Taken
Scottish Natural Heritage	20 February 2019	Requested additional assessment of lighting, including effects on the special qualities of the NSA.	Additional detail has been provided within the assessment sections (Appendix 3 and 4, and Section 5), focusing on the likely effects of marker lights on night-time landscape character and views. Project-specific information will be provided within the Project-specific Environmental Monitoring Programme as supporting information to marine licence applications.

Assessment Methodology

Study Area

2.12 The study area for the SLVIA has been defined as a 5km radius around the outer edge of the extended wave test site area, as shown on Figure 1. The 5km distance was defined based on field-based observation of the WEC currently deployed at the site, as well as on the topographical barriers that contain views along the west coast of the Mainland and the north coast of Hoy. The 5km radius study area was agreed with consultees as noted in Table 2.1. The study area was further refined through generation of a zone of theoretical visibility, discussed in Section 3 and shown in Figure 2.

2.13 It was accepted that, given the nationally designated landscape context, viewpoints beyond this distance would be considered in the SLVIA if they were judged to be of particular sensitivity. This was considered to be the case for the high hills of Hoy, and views from these summits are included in the assessment.

Data Sources

2.14 The following data sources have informed the assessment:

- LUC (2016) *Orkney and North Caithness Coastal Character Assessment*. Scottish Natural Heritage.
- LUC (1999) *Orkney Landscape Character Assessment.* Scottish Natural Heritage Review No. 100.
- Scottish Natural Heritage (2010). *The special qualities of the National Scenic Areas*. Scottish Natural Heritage Commissioned Report No.374
- Ordnance Survey (OS) maps at a range of scales.
- OS Terrain 5 height data used for ZTVs.
- EMEC (2019) *Billia Croo Test Site – Project Envelope for Devices and Operations*. REP646.
- GIS data provided by EMEC.

Field Survey

2.15 Field survey work was carried out over three days during November 2018, during a range of weather conditions. The coastal and landward parts of the study area were visited, including the assessment viewpoints and other locations where the potential effects could be evaluated. Records were made in the form of field notes at viewpoints, and panoramic photography was taken.

Methodological Overview

2.16 The assessment has been undertaken in line with guidance noted at paragraph 2.10. The methodology is set out in detail in Appendix 1. The key steps for assessing landscape and visual effects are as follows:

- the landscape (including 'seascape') of the study area was analysed and landscape receptors identified;
- the area over which the Project will be visible was established through creation of a zone of theoretical visibility (ZTV);
- the visual baseline was recorded in terms of the different groups of people who may experience views of the development and the nature of their existing views and visual amenity;
- viewpoints were selected (including representative viewpoints, specific viewpoints and illustrative viewpoints), and agreed with consultees (see Table 2.1);
- likely significant effects on landscape and visual resources were identified; and
- the level (and significance) of landscape and visual effects was judged with reference to the sensitivity of the resource/receptor (its susceptibility and value) and magnitude of effect (a combination of the scale of effect, geographical extent and duration/reversibility).

Judging the Levels of Effect

2.17 The separate judgements of susceptibility, value, scale, geographical extent, duration and reversibility, are considered together to provide an overall profile of each identified effect. An overview is then taken of the distribution of judgements to make an informed professional assessment of the overall level of each effect, drawing on guidance provided in GLVIA3. A numerical or formal weighting system is not applied. Instead, consideration of the relative importance of each aspect feeds into the overall decision.

2.18 The levels of effect used in this SLVIA are defined as shown in Table 2.2 for landscape effects and Table 2.3 for visual effects. The descriptions are provided as examples, and each effect is judged individually.

Table 2.2 Levels of Landscape Effect

Level	Effect Description
Major	The Project will result in an obvious and widespread change in landscape/seascape characteristics and character, such as permanent loss of key characteristics, likely affecting a highly-valued landscape with a medium or high susceptibility to that type of change.
Moderate	The Project will result in a noticeable change in landscape/seascape characteristics and character, such as a large-scale but temporary change in landscape features, likely affecting a landscape with a medium susceptibility to that type of change. This level of effect may also occur when a smaller scale of change acts on a more highly valued landscape.
Minor	The Project will result in a small change in landscape/seascape characteristics and character, such as a localised effect occurring over a long duration, or a larger-scale effect on an area of lower susceptibility and/or value.
Negligible	The Project will not result in a noticeable change in landscape/seascape characteristics or character.

Table 2.3 Levels of Visual Effect

Level	Effect Description
Major	The Project will result in an obvious and widespread change in the visual amenity experienced by the receptor(s), who are likely to have medium or high susceptibility to that type of change. For example, this level of effect may arise from the permanent obstruction or interruption of a highly valued view.
Moderate	The Project will result in a noticeable change in the visual amenity experienced by the receptor(s), who are likely to be of medium susceptibility to that type of change. For example, this level of effect may arise from a large-scale but temporary change in a view, or a smaller change affecting a highly valued view.
Minor	The Project will result in a small change in the visual amenity experienced by the receptor(s), who may be of lower susceptibility to that type of change. For example, this level of effect may arise from a larger-scale but temporary change in a view that is not highly valued, or a very small change experienced by higher-susceptibility receptors.
Negligible	The Project will not result in a noticeable change in the visual amenity experienced by the receptor(s).

Direction of Effects

2.19 The direction of effect (positive, negative or neutral) is determined in relation to the degree to which the proposal fits with landscape character and the contribution to the landscape or visual amenity that the development makes. For the purposes of this assessment, the precautionary principle indicates that the presence of the test site should be considered a negative change in the context of this highly scenic and nationally designated landscape.

Assumptions and Limitations

2.20 This SLVIA has been undertaken based on a Project Envelope of devices and operations (see REP646). While this envelope provides sufficient information to determine a realistic worst-case for assessment, in terms of number and size of devices, it does not offer any certainty as to the type and mix of devices that may be deployed. The realistic worst-case, described in Section 4, has been determined in order to identify the maximum likely significant effects of the project envelope, and to provide enough information to enable an informed decision to be taken.

2.21 No details of phasing can be determined, since this is dependent on developer interest: there may be periods of intense activity in the test site; or there may be periods when few or even no devices are installed.

3 Existing Conditions

3.1 This section provides a description of the site and the study area and sets out the landscape and visual baseline against which the realistic worst-case development is assessed.

Billia Croo Wave Test Site

3.2 As of January 2019, EMEC are finalising an extended lease agreement with the Crown Estate Scotland, and the site for the purposes of this assessment is therefore this larger area, rather than the current wave test site. The extent of both the current wave test site and the extended lease area are shown on Figure 1, and where the term 'test site' is used in this report, this should be taken as a reference to the larger area.

3.3 The test site is a maximum of 6.4km from north to south and covers around 11km^2 of the sea. The inshore part of the test site extends to the shoreline, while the offshore part is a minimum of around 900m from the coast, extending out to around 3.7km in places. The test site currently consists of open sea, with a number of features that are visible to observers on nearby land.

View of Hoy Sound and the Orkney Mainland from Hoy: the test site is on the left of the view

3.4 The current wave test site is marked out by five cardinal buoys at its corners. Each buoy is conical, around 3m across and rising 6-8m above the waterline. The five buoys are each painted in a different pattern of yellow and black stripes so that they may be distinguished. By night, the buoys are each marked with a white flashing light with a nominal range of four miles (6.4km). Again, for identification, each light flashes with a varying sequence depending on their location within the site. The cardinal buoys have been in place since 2004 and mark out the zone that vessels are advised to avoid.

Cardinal buoy at Billia Croo (EMEC)

3.5 The wave test site is periodically used for the testing of wave energy converters (WEC). At the time of undertaking the assessment the only installation visible above the surface was a single floating WEC. This device is called the Penguin, and has been in place since March 2017. It measures 28m by 15m, and its top surface is around 1.8m above the waterline. The Penguin is installed in the most northerly part of the current wave test site. It is indicated in the photographs in Figures 4-8, where it is visible.

The Study Area

3.6 The study area has been defined as a 5km radius around the boundary of the wave test site, as described in Section 2.12. The landward extent of the study area is shown in Figure 1, and the focus of the SLVIA is on the area with potential visibility of the test site, as shown on Figure 2. The northern and western extents of the study area are not shown as they comprise only open sea to the west of Orkney.

3.7 This part of the Atlantic is wide, open and expansive. On calm days the sea may appear tranquil, at other times choppy, and a deep swell is often evident. Towards Hoy Sound the sea becomes turbulent with tidal currents, and large waves crash against the rocky coasts. Seabirds nesting on the cliffs are audible above the sound of the wind and waves. Marine activity in this area includes the regular Scrabster-Stromness ferry, some fishing boats inshore, and in summer, tourist and recreational boats. Further offshore, larger vessels are occasionally visible.

3.8 The inland study area comprises two distinct areas: the Orkney Mainland; and the north of the island of Hoy. Within the study area, notable features on the Mainland include the town of Stromness, with its dispersed outlying settlements, and the intricate western coastline. Hoy provides dramatic contrast, with towering hills and cliffs. Overall the landscapes are remote and rural, with small scattered settlements. There are generally wide-ranging views towards the open sea.

Moorland and marginal farmland near Yesnaby, typical of the less settled parts of the south-west Mainland

3.9 The coast of Orkney Mainland is edged by rugged sandstone cliffs which meet gently sloping farmland. The topography generally rises to a low-lying gentle ridge of hills (158m at the highest point) running north to south, approximately 2.5km inland. Land cover consists largely of windswept rough grasses and moorland. Vegetation is low growing, with little to no tree cover. The lower lying land is mainly used for pastoral farming, which gives way to undeveloped moorland on higher slopes.

3.10 Stromness town sits in the south west of the Mainland. Other settlements are dispersed, as individual farms or small clusters of houses, surrounding Stromness or following the A-road to the north. There is little else in the way of built environment, other than farm buildings, basic infrastructure and individual wind turbines. There is a small network of roads radiating out from Stromness. The A967 is the main route running north to south, with a few minor roads branching west towards the coast. Core path WM26 runs north along the clifftop, and there is a small network of core paths in the area around Stromness. A very short section of National Cycle Network Route 1 can be found within the study area, running east from Stromness.

3.11 The northernmost part of Hoy, including the impressive St John's Head, also sits within the study area. Much of this landscape is dominated by hills and elevated moorland, with settlement restricted to the lower lying land in the northeast. The hills (up to 479m high) are typically rounded summits with a covering of windswept grasses and heath. Some bedrock is exposed on occasional crags. The coastal landscape is characterised by its towering cliffs, over 150m tall. Again, a small network of minor roads radiates from the ferry pier at Moaness, connecting very few scattered dwellings. A core path, H1, follows the valley between Cuilags and Ward Hill.

3.12 The study area also includes a small portion of the island of Graemsay. This is similar in topography to the Mainland, being low lying with limited relief. It is much smaller and less settled than the adjacent area of Mainland with only a few buildings. There is a small lighthouse at the northwest tip of the island.

Settled farmland at the edge of Stromness

3.13 Being off the north coast of Scotland, Orkney experiences a temperate, wet climate, with temperatures mild in winter and low in summer. It also experiences limited daylight hours in winter, but long days in summer. Orkney is well renowned for its almost constant winds, with gales common in winter.

3.14 Orkney is also well known for its evidence of Neolithic settlements and has a rich cultural history, still evident as standing stones and brochs throughout much of its landscape. Visible remains along the coast of the study area include the ruins of Breckness House, and the coastal defences at Ness Battery and Point of Oxan. The "Heart of Neolithic Orkney" World Heritage Site includes several sites, the closest of which is Skara Brae, 5.7km from the test site.

Landscape and Coastal Character

3.15 This section provides a description of the landscape and coastal character across the study area, drawing on published studies. The coastal character of the study area is defined in the *Orkney and North Caithness Coastal Character Assessment* (LUC, 2016), while the onshore landscape character is described in the *Orkney Landscape Character Assessment* (LUC, 1999).

Orkney and North Caithness Coastal Character Assessment

3.16 This coastal character assessment (CCA) (LUC, 2016) was undertaken at both regional and local scales, in line with SNH methodology on coastal character assessment (Carol Anderson Landscape Associates, 2018). Regional coastal character areas (RCCA) and local coastal character areas (LCCA) are defined as lengths of coast, with the descriptions for each area broadly indicating its offshore and onshore extent. LCCAs are shown in Figure 3.

3.17 At a regional scale the west coast of the Mainland within the study area all falls in RCCA 25: Breckness and Row Head. At a local scale this RCCA is divided into three LCCAs. Given the modest extent of the study area, the SLVIA focuses on effects at a LCCA level. For the purposes of this assessment, LCCAs 29a and 29b on Graemsay are considered together, as they are continuous and only a small section of each is within the study area.

3.18 The key characteristics of all the LCCAs in the study area, and from where the test site is potentially visible (see Figure 2), are presented in Table 3.1.

Table 3.1 Local Coastal Character Areas

LCCA	Key characteristics
25a Point of Ness to Billia Croo	• South-west facing onto the Hoy Sound as it opens out to the turbulent Atlantic. • Sinuous coastline of shallow bays and headlands, with a small sandy beach backed by coarser cobbles at Warbeth. • Pasture slopes gently away from the coastal edge to a series of low hills which contain the coastal edge to the north, with settlements on the hill slopes orientated towards the coast. • Coastal defences include Ness Battery, a relic of Orkney's wartime heritage in defending Scapa Flow. • At Breckness there are the remains of Breckness House and broch on the shore line. • The dramatic Hoy hills are ever present in views across the Hoy Sound to the south, and the rising landform of Black Craig contains views to the north-east.
25b Billia Croo to Neban Point	• Fronts onto the Atlantic, and the wide, open, expansive sea dominates the character of the coast. • Relatively straight, and comprising high, rugged sandstone cliffs, indented with caves along the base of Black Craig. • Undeveloped and accessible only on foot, the coast has a strong sense of remoteness. • Open and undeveloped moorland rises away from the cliff edge to low hills at Black Craig to the south-east and the larger North Hill to the north-east. • The open Atlantic is ever present in views, and views into the settled and farmed lowland to the south-east are also available.
25c Neban Point to Bay of Skaill	• Open and exposed to the Atlantic, with strong elemental qualities. • Rugged sandstone cliffs of up to 50m in height, with an intricately weathered shoreline displaying a distinctive layered geology. • Spectacular coastal cliff scenery at Yesnaby, with caves, blowholes, geos and sea stacks including "Yesnaby Castle". • Unsettled, but built structures include Yesnaby Gun Battery, a promontory fort at Brough of Bigging and the Broch of Borwick. • Backed by rolling, semi-natural coastal heath and grassland rising to hills to the south and falling into the Skaill basin to the north. • There are open, unimpeded sea views to the west, and ever-changing views from the coastal path along a succession of headlands to the north and south.
29a and 29b Graemsay [1]	• Semi-enclosed flows of tidal water, seldom very calm. • Boat traffic, lighthouse at Pont of Oxan, ferries approaching Stromness and views out to open sea create a strong maritime influence. • Low-lying island character has a strong relationship with north-east Hoy, with views to high hills and the open sea. • Consistent coastal edge of low cliffs, skerries, shingle and sandy bays • Scattered settlement on sloping farmland rising to whaleback ridgeline of the island. • Views of Stromness to the north and the open sea to the west.

[1] Key characteristics for these LCCAs are not defined in the CCA document, and have therefore been developed from the CCA text.

30d Middle Skerry to Out Taings[1]	• Large, semi-enclosed, flow of strong tidal water, a sense of visual containment to the east. • Passage of boat traffic and associated navigational aids. • Dynamic coastal edge comprises areas of rugged cliff, sloping rock platforms, skerries and small sandy bays. • Pasture and arable hinterland; steep convex slopes; sparse settlement and largely isolated.
37b St John's Head	• Dramatic stretch of coast exposed to the vast, open expanse of the Atlantic Ocean. • Large-scale, rugged, red sandstone cliffs, all over 150m in height and deeply indented with geos that extend up to 450m inland. • The Old Man of Hoy, a dramatic and distinctive sea stack. • Smooth undeveloped moorland hinterland rises away from the cliff tops to rounded inland peaks. • Views from the cliff top walk are available, north and south along the colourful and rugged coastal cliffs, east to dramatic inland hills and west across the sometimes turbulent seas of the Atlantic.
37c Braebuster	• Open and exposed to the Atlantic, particularly in the west, with some shelter provided by Mainland and Graemsay in the east. • Relatively straight and low-lying coast, in contrast with the rugged cliffs south of Kame of Hoy and the rounded summits in the Hoy interior. • Broad, rocky foreshore, with shallow bays and caves, and small cliffs west of Bay of the Tongue. • Hinterland rises gradually away from the coast across open moorland towards Cuilags, with some farmland around the small scattered settlement on the minor road from Hoy. • Dramatic enclosing landform and lack of intervisibility with nearby settlement at Hoy enhances the sense of isolation. • Elevated and open views to open seas to the west and Mainland to the north.

3.19 Since all coastal character areas, by definition, have a marine element and key characteristics that relate to the sea, all the above LCCAs have been considered in the assessment.

Orkney Landscape Character Assessment

3.20 The landscape character assessment (LCA) (LUC, 1998) was undertaken across the whole of Orkney as part of a national programme undertaken by SNH. The LCA defines a number of distinct landscape character types (LCT) that occur across the islands, some of which have a strong coastal component. These are shown in Figure 3, and the key characteristics of the LCTs in the study area are presented in Table 3.2. Only those LCTs that are with potential visibility of the test site (Figure 2) are listed.

Table 3.2 Landscape Character Types

LCT	Key characteristics
2 Whaleback Island Landscapes	• Gently dome shaped islands; • Improved pastures, occasionally in walled enclosures with orientation to the sea; • Scattered settlement associated with the roads; • Abandoned crofts and small farms on more remote islands; • Isolation and solitude; and • Consciousness of the plays of light on the sea surrounding the islands.
8 Inclined Coastal Pastures	• Improved pastures sloping down to coast; • Rectilinear field patterns often with strong orientation to coastline;

	• Mixture of small-scale clusters of resettled crofts and less developed geometric landscape of estate farms; • Roads running parallel to coast, giving access to coastal fringe and higher pastures/ moorland; • Occasional large houses/ farms with tree frameworks; • Extensive views out to sea and restricted views inland; and • Rich coastal archaeology.
12 Coastal Hills and Heath	• Hills with strong relief reaching 150m along the coast; • Rough, improved grassland, and maritime heath with a range of green hues and grass textures; • Subtle topographic features visible on hillsides, e.g. terraces and low crags; • Large-scale field enclosures occasionally walled; • Sheep and cattle grazing; • Scattered farms and some ruined/ abandoned farmsteads; and • Hilltop cairns.
13 Cliff Landscapes	• Eroding coastal features – cliffs, stacks and caves; • Rough grass and montane vegetation right up to cliff edge; • Wildlife interest of salt-tolerant flora; and • Sea birds.
19 Rolling Hill Fringe	• Rolling border between low-lying and upland landscapes; • Improved pasture on lower slopes, enclosed in fenced fields; • Rougher grassland, enclosed by stone walls on high ground gives way to unenclosed moorland hills; • Roads and scattered settlement; and • Archaeological interest.
22 Rugged Glaciated Hills	• Steep hills with craggy cliff faces and quite rounded summits; • Moorland and montane vegetation; and • No settlement or roads.

3.21 Based on a review of the above key characteristics, it was determined that the following LCTs have a strong coastal component, the key characteristics of which would be susceptible to the activities proposed within the project envelope:

- 2 Whaleback Island Landscapes;
- 8 Inclined Coastal Pastures; and
- 13 Cliff Landscapes.

3.22 Of these, only a small part of LCT 2 is located in the study area, on Graemsay, and significant effects on the character of this island are considered unlikely. As such, the SLVIA examines effects on LCTs 8 and 13 only. While changes in the outlook from other LCTs are considered in terms of visual effects, it is not anticipated that substantive changes to their character will occur.

Landscape Value and Designations

3.23 This section sets out the relative value that is, or may be, attached to different landscapes within the study area by society.

3.24 Valued landscapes are often recognised by designation (defined either by statute or identified in development plans). However, the fact that an area of landscape is not designated does not mean that it does not have value. Factors which indicate that a landscape is valued may also include whether or not it contributes to a distinctive or attractive landscape setting of a

settlement, if it has high conservation interest (including cultural or historical or nature conservation interest) or if recreational activities are concentrated there.

3.25 In the case of the present SLVIA, almost the whole of the study area lies within the Hoy and West Mainland NSA, designated at a national level for its scenic quality. The special qualities of the NSAs have been defined by SNH (2010), and the special qualities of the Hoy and West Mainland NSA are listed below:

- *"A palimpsest of geology, topography, archaeology and land use*
- *An archaeological landscape of World Heritage Status*
- *The spectacular coastal scenery*
- *Sandstone and flagstone as an essence of Orkney*
- *A long-settled and productive land and sea*
- *The contrast between the fertile farmland and the unimproved moorland*
- *A landscape of contrasting curves and lines*
- *Land and water in constantly changing combinations under the open sky*
- *The high hills of Hoy*
- *The townscape of Stromness, its setting and its link with the sea*
- *The traditional buildings and crofting patterns of Rackwick"*

3.26 The effect of the realistic worst-case development on these special qualities is examined in detail in Appendix 5, using a methodology designed for this purpose by SNH. The boundaries of the NSA are shown on Figure 1.

Visual Baseline

3.27 This section identifies the extent of possible visibility of devices permitted within the project envelope and identifies visual receptors that will be assessed. This section also introduces the viewpoints that will be used to assess effects on receptors, including reasons for their selection.

Analysis of Visibility

3.28 A ZTV was generated to an assumed height of 12m above high water, across the whole of the site area. 12m is stipulated as the maximum device height in the project envelope, and any taller device would need further assessment. The ZTV is illustrated in Figure 2 and indicates the maximum extent of theoretical visibility of device(s)/component(s) across the study area.

3.29 Individual devices or components would be less visible than the ZTV indicates, as would devices/components less than 12m above water level. However, the ZTV indicates a maximum extent beyond which no devices would be theoretically visible. The ZTV takes no account of variations in visibility arising from weather conditions.

3.30 The ZTV indicates visibility along much of the Mainland coast from Row Head south of the Bay of Skaill, down to the headland south of Stromness. Theoretical visibility extends inland up to 2.5km in places, although this is frequently more limited due to higher ground along the coast. Generally, visibility is restricted to the coastal strip and the unsettled hills alongside. Notable locations along the coast include Yesnaby and Black Craig, where high visibility offered by higher elevation is coupled with nearby road access. There is no visibility from the town of Stromness, with intermittent theoretical visibility of part of the site from the dispersed settlement towards Outertown and south to Stromness Citadel. The line of low hills running northwards from Stromness, which includes the Hill of Miffia and the Hill of Lynedardy, block the view of the test site from further inland. There is very little visibility from roads; this is limited to the minor roads branching towards Yesnaby and through Outertown. Well beyond the study area, the ZTV indicates visibility of a small part of the site across the Clestrain area and adjacent higher ground, at over 10km from the site.

3.31 The ZTV indicates visibility of the whole site from the northern coasts of Hoy and Graemsay. On Graemsay, theoretical visibility is indicated across the north-eastern part of the island. The ZTV takes in the north-facing slopes of the Hoy Hills, up to the summits of Sui Fea and Cuilags, and extending south to the long summit of Ward Hill. There is very little visibility indicated across the settled area around Moaness. Beyond the study area, visibility is indicated from the north-facing slopes of Kingie Lang and Lyrawa Hill, including a section of the B9047 between 8km and 10.5km from the site.

3.32 Theoretical visibility of the test site from the sea extends across and far beyond the study area.

Key Visual Receptors

3.33 Key visual receptors have been identified by examining the ZTV as described above, and by determining the locations where susceptible receptors may be located, drawing on desk-based and field-based observations. Key receptors with potential visibility are:

- Communities in any of the settlements or individual residences across the area which lie within the ZTV, in particular people in the Outertown area, and the adjacent dispersed settlement extending east towards Stromness;
- Recreational users of the landscape (residents or visitors) within the ZTV, including those using footpaths and cycle routes, in particular:
  - Walkers on the West Coast Path (core path WM26) between Stromness and the Bay of Skaill, as well as people walking on other core paths around Outertown and Ness;
  - Walkers climbing to the summits of Sui Fea and Cuilags on Hoy;
  - Walkers using core paths on Graemsay;
  - People visiting the cliffs at Yesnaby; and
  - People accessing the coast at Warbeth Beach; and
- Users of the marine environment, including:
  - People involved in recreational sailing or boat trips;
  - People arriving or departing from the islands on the Scrabster to Stromness ferry; and
  - People using the passenger ferry between Stromness, Graemsay and Moaness.

Selection of Viewpoints for Assessment

3.34 This section sets out the viewpoints selected to represent views from publicly accessible areas for the receptors identified above. They have been used to inform the assessment of visual effects on the potential receptors identified.

3.35 The selection of viewpoints was informed by field work and desk-based research (including a consideration of access and recreation across the local area, vantage points and the distribution of settlements). These viewpoints are representative of the range of views, viewing experiences and types of viewer which may potentially be affected by the project.

3.36 A total of six viewpoints were selected and agreed in consultation with SNH and the Council (see Table 2.1). Details of the viewpoints are provided in Table 3.3 and their locations are shown in Figure 2.

Table 3.3 Viewpoint Selection

Viewpoint, grid reference and figure no.	Receptor and activity of receptor being represented	Reason for Selection
Viewpoint 1 Yesnaby 321823, 1015675 Figure 4	Recreational visitors walking on West Coast Path (core path WM26) or viewing the coast from Yesnaby car park.	Popular clifftop location with nearby car park, offering elevated views south-west across the test site.

Viewpoint 2 Black Craig 322009, 1010994 Figure 5	Recreational visitors walking on West Coast Path (core path WM26), including those making the ascent of Black Craig from Outertown to the observation post.	Hill top viewpoint close to the test site and overlooking the whole area. The observation post at the summit is associated with the wave test site.
Viewpoint 3 Outertown 323344, 1010055 Figure 6	Residents of Outertown and surrounding dispersed settlement. People working in the nearby area. People using core path WM29.	Elevated view from Outertown, representing the only settled part of the study area within the ZTV, including a number of dwellings that have views of the sea.
Viewpoint 4 Warbeth Beach 323569, 1008526 Figure 7	Recreational visitors to the beach. Walkers along the coast nearby (core path WM31). People visiting Stromness Cemetery.	Sea level viewpoint on popular signposted beach with car park, well used by local people as well as visitors.
Viewpoint 5 Cuilags 321013, 1003368 Figure 8	Walkers climbing the hills in the north of Hoy.	Elevated summit representing the surrounding hills in the north of Hoy, offering elevated and wide-ranging views, including northward across the site.

3.37 Other viewpoints that were considered and visited, but not used as assessment viewpoints, included:

- Stromness Citadel, a vantage point at the edge of Stromness, overlooking Hoy Sound, but with limited visibility of the southern part of the site only; and
- The lower-lying part of north Hoy, around Braebuster and the adjacent coast, from where views of the site were limited due to low elevation, in comparison with the view from nearby Cuilags.

4 The Proposed Development

The Project Envelope

4.1 In order to streamline licensing and testing for developers, EMEC is seeking Section 36 consent under the Electricity Act 1989 to cover a range of testing activities and installations within a defined 'project envelope'.

4.2 A project envelope (sometimes known as a 'Rochdale envelope') is used in EIA where the precise nature of a development is uncertain, and the approach therefore aims to define 'worst-case' scenarios for assessment, on the basis that the eventual project will not result in any greater impacts than those that have been assessed in the EIA. However, it is also important that these scenarios are realistic, to avoid the unnecessary assessment of effects associated with combinations of parameters that would not occur.

4.3 The Project Envelope (REP646) for the Billia Croo wave test site describes a range of maximum parameters that will limit the extent of activities and installations permitted under the Section 36 consent. The following section identifies the parameters that have fed into the SLVIA process. Other parameters, such as the presence of underwater installations, or the type and size of foundations, will not give rise to seascape/landscape or visual effects, and are therefore not considered further.

Devices and Operations

4.4 EMEC was established to support the development of the marine renewable energy industry. Testing of single, multiple and arrays of wave energy converters (WECs) and components at the open-sea test facilities at Billia Croo can offer developers the opportunity to assess their device performance, survivability and reliability. The activities and deployments expected to occur at Billia Croo are listed in the Project Envelope as follows:

- "*Testing activities associated with single devices and arrays deployments, including installation, maintenance and decommissioning works.*
- *Installation, maintenance, and testing of subsea cables.*
- *Testing of device components.*
- *Buoys and scientific instrument/equipment deployments and surveys.*
- *Marine works including site preparation and simultaneous operations.*"

4.5 As the onshore substation has already been established at EMEC, this assessment does not include any onshore infrastructure, and all installations and activities (with the exception of boat movements to and from the site) will take place within the test site, as shown on Figure 1, and described in Section 3.

4.6 The extent and level of effects on landscape and views is considered to be most closely related to the following parameters:

- The size of devices deployed in the test site (length, width and height above sea level), as well as their form and colour;
- The number of devices deployed in the test site at any one time;
- The size and form of different devices deployed simultaneously, and the resulting composition of the test site as seen in views;
- The likely change in deployed devices during the 20-year consent period;

- Installed lighting across the test site; and
- The activities associated with installation and decommissioning of each device.

Wave Energy Converters

4.7 A wide range of WEC types are described in the Project Envelope, including floating, submerged and fixed devices, and may take a variety of forms.

Example of one type of WEC device installed at Billia Croo (EMEC/Mike Roper)

4.8 Table 4.1 sets out the key parameters, as defined in the Project Envelope, that limit the size of any one WEC. The greater the size of any given device, the greater its visibility, and therefore the greater the level and extent of likely impact.

Table 4.1 WEC Device Parameters

Device parameter	Project envelope maxima
Distance above sea surface for surface-piercing elements	Maximum distance protruding from sea surface should not exceed 12m, excluding navigational and communication equipment.
Length of floating structures	Maximum length of 200m for surface piercing elements of floating devices. In cases where devices have floating components of greater than 20m in length, the height to which such components can extend above the sea surface is limited to 8m
Width of floating structures	For the maximum length of 200m, a maximum width of 12m is allowed. For devices under 50m length, a width of 30m is allowed.

4.9 The maximum device dimensions would therefore be either:

- 200m long by 12m wide and 8m high; or
- 20m long by 30m wide and 12m high.

4.10 Some devices may comprise more than one component to function, and the Project Envelope therefore refers to 'WEC assemblages'. For the purposes of the SLVIA, it is assumed that the combined components of an assemblage will not exceed these dimensions, though they may occupy a larger area of sea.

4.11 It is noted that individual components, as well as WECs, may be tested on site, and that floating platforms may also be temporarily deployed, but that these will be subject to the same conditions as set out above.

Number and Configuration of WECs

4.12 The present wave test site has five offshore berths and two inshore berths where devices can be installed. The extended test site will allow for a maximum of three further berths, though the positions of these are undetermined. The project envelope assumes that arrays will be allocated on a maximum of five test berths at any one time. A total of no more than 20 WEC devices, including assemblages and components, will be on site at any one time.

4.13 In addition to WECs, the project envelope allows for up to two floating platforms to be deployed at any one time.

4.14 In terms of the layout and configuration of devices within the test site, the project envelope states that: *"it is not possible to determine which test berths are most appropriate for arrays without taking into consideration the size or type of device to be tested."* The Project Envelope defines a notional minimum spacing of 50m between devices, but notes that the positioning and spacing of devices within the test site will depend upon a number of operational matters, including but not limited to:

- resource availability;
- inter-array effects;
- specific seabed conditions; and
- localised hydrodynamic effects.

Aerial photo of past deployments and activities at Billia Croo (EMEC/Colin Keldie)

Electrical Hubs and Scientific Equipment

4.15 The Project Envelope allows for a maximum of ten electrical hubs to be installed on site at any one time. Electrical hubs may be floating or surface-piercing, and these hubs will extend a maximum of 12m above the sea surface, excluding navigational and communication equipment.

4.16 Scientific equipment may also be deployed on site, for example wave measurement buoys. The Project Envelope does not provide maximum numbers or dimensions for these, and it is assumed that any above-water equipment will be small in scale compared to the WEC devices.

Marine Works

4.17 Marine works covers operational activities on site, including installation, maintenance and decommissioning of devices and components. The following information is summarised from the Project Envelope.

4.18 Major works such as installation, retrieval/redeployment, and decommissioning activities may take up to one month each and are likely to require larger vessel types to be on site. Such works would be carried on at a maximum of two berths at any one time.

4.19 A wide range of other activities will be required, including regular maintenance visits, surveys, cable installations and so on. The majority of these activities will require smaller boats (under 30m length), though certain operations may require specialist vessels up to 130m.

4.20 The frequency of operations depends upon the requirements of individual developers. Some devices may be installed for a period of years, while others will be in place for a few months. For the purposes of the SLVIA, it is assumed that:

- Major operations, i.e. those taking up to one month and/or requiring large vessels, will take place, on average, every six months; and
- Everyday operations using smaller craft will take place on a weekly basis.

4.21 No more than 12 vessels will be permitted on site at any one time.

Lighting and Marking

4.22 All devices and equipment deployed in the test site will need to be marked and lit in accordance with marine safety standards, and this will be specified by the relevant regulatory authorities. For the purposes of the SLVIA, it is assumed that all devices and equipment will be painted yellow and will be fitted with flashing lights similar in brightness to those attached to the existing cardinal buoys. It is assumed that flashing patterns will not be coordinated across different devices. The lighting characteristics of specific projects will be detailed within the Project-specific Environmental Monitoring Programme, submitted as supporting documentation to marine licence applications. In addition, photographs will be provided following installation to illustrate the day and night time characteristics of the project.

Realistic Worst-case Scenario

4.23 This defines the 'realistic worst-case' development scenario, based on the above summary of the Project Envelope, which has been assessed in the SLVIA. The scenario assumes that:

- The development will comprise up to 20 separate WECs (single devices, components or assemblages), all of which are assumed to be floating or surface piercing;
- The devices/components will be grouped around five berths, which are assumed to be spaced across the entire test site;
- A variety of forms, types and sizes of devices/components will be present, though it is assumed that all devices/components will be at or approaching the maximum dimensions;
- In addition to the 20 devices/components, the scenario assumes the presence of two floating platforms and ten electrical hubs, and a number of smaller scientific instruments;

- All devices/components and other equipment will be painted yellow, and will be fitted with flashing yellow lights with a nominal range of three nautical miles (5.6km) – flashing patterns are assumed to vary between devices;
- The arrangement of WECs will change on a regular basis over the consent period, with WECs being installed or decommissioned on average every six months;
- During each installation or decommissioning procedure, large vessels will be on site for up to one month at a time; and
- Operations using smaller vessels (up to 30m) will take place on a weekly basis.

4.24 It is assumed that the range of devices installed will vary over the consent period, as different devices/components will be tested for varying lengths of time. Installation and decommissioning of devices/components will continue throughout the consent period, and so there will be no construction or decommissioning phase to the proposal as a whole. The SLVIA only considers the operational effects as described above.

Proposals Outside the Project Envelope

4.25 No devices or operations that exceed the parameters within the project envelope would be permitted under the Section 36 consent that is being sought. However, devices that exceeded these parameters could still be proposed if individual consents are granted. Both EMEC and SNH have expressed interest in a 'height limit' for the site, which is understood to mean the height beyond which the landscape and visual effects of a device would become unacceptable.

4.26 The running of alternative ZTVs is one means by which this might be tested, but based on the 12m ZTV in Figure 2, it is the hills surrounding the test site that limit the extent of visibility. These hills are between 80m and 150m high, so that devices would have to be substantially taller to give rise to an increased extent of visibility.

4.27 It is suggested that not only the height, but the apparent bulk of an offshore feature would be most likely to give rise to greater effects. Devices of 12m are likely to be seen as low-lying, responding to the horizontal sea. Devices that are both taller and broader will respond less well to this context. In addition, they may result in obstruction of views from sea level, particularly if placed close to the shore. Without detailed modelling and analysis, it is not possible to be precise about such a limit, but it is thought that devices over 25m to 30m would be much more prominent in views from sea level.

Future Baseline in the Absence of the Proposal

4.28 The Billia Croo wave test site is an established facility. In the absence of gaining Section 36 consent, the test site would likely continue to be used for its intended purpose. The device currently in situ will remain in place for the duration of its testing period. Future consents would continue to be sought on a case-by-case basis, and WEC devices would continue to be deployed within the scope of these individual consents.

Potential Sources of Effects

4.29 Sources of operational effects on the seascape/landscape and views will include:

- The presence of a number of WEC devices, components, buoys, platforms and other equipment in an area of sea, over a 20-year period;
- The interrelationships between different device types, and the changing combinations of devices over time;
- The presence of lighting in an area of sea; and
- Operational activities taking place in the sea on a regular basis over a 20-year period.

5 Assessment of Effects

Assessment of Effects on Coastal and Landscape Character

5.1 The components of the landscape which may potentially be affected by a development are known as the landscape receptors. These are identified in Section 3 and include local coastal character areas (LCCA) and landscape character types (LCT). LCCAs and LCTs are illustrated in Figure 3.

5.2 Judging the significance of effects requires consideration of the nature of the landscape receptor (sensitivity) and the nature of the effect on those receptors (magnitude), as set out in detail in the methodology (Appendix 1).

5.3 The detailed assessment of effects on each of these landscape receptors is set out in Appendix 3. This assessment is summarised in By night, lighting is most frequent along the more settled coasts within Hoy Sound. Out to sea, there are occasional passing boats, and flashing lights on the cardinal buoys. These lights have only a small effect on the remoteness that is part of the character of the unsettled outer coasts of west Mainland and Hoy. The addition of further lighting in the form of visible marker lights will intensify this effect, particularly if 20 surface-piercing structures are all fitted with differently flashing lights. However, the individual lights are not bright or overly noticeable (based on observation of the cardinal buoys from Outertown) and so are not predicted to give rise to effects on night-time coastal and landscape character over and above effects during the day.

5.4 The lighting characteristics of specific projects will be detailed within the Project-specific Environmental Monitoring Programme, provided as supporting information to marine licence applications. Photographs will be provided following installation to illustrate the day and night time characteristics of the project.

5.5 Table 5.1, and in the paragraphs below.

Effects on Coastal Character

5.6 The test site will be visible from coastal landscapes across the study area, as shown on the ZTV. The effect of these views on the character of these coastal landscapes is predicted to be limited along most of this coastline.

5.7 The coastal landscapes of the study area generally have strong characteristics that are highly distinctive, and not highly susceptible to changes of the type proposed. However, more vulnerable characteristics are also present, particularly the degree of remoteness and wildness that is a feature of Orkney's west coast. Almost the whole of the study area is within the NSA, and coastal landscape is a feature of the special qualities, and value was therefore judged to be universally high. Overall, landscape sensitivity was judged to be high for those LCCAs with strong wildness value or elevated views over the sea, while lower-lying and settled landscapes were found to be of medium sensitivity.

5.8 The magnitude of effect was generally judged to be low across most LCCAs. This was primarily due to the distance from the test site, and the limited influence that devices and activities within the test site would have on key characteristics, leading to a small scale of effect. Geographical extent was generally found to be moderate with reference to the extent of coastline in the study area. As noted elsewhere, all effects are anticipated to be long term and fully reversible. In two cases, the scale of effect was judged to be larger primarily due to the proximity of these LCCAs to the test site, and the likely effect that the presence of the test site would have on key views that contribute to their character. This led to medium magnitude of effect being recorded for two LCCAs on the west Mainland coast.

5.9 The assessment identified minor effects across the majority of LCCAs examined, including the high-sensitivity coastlines of north Hoy, due to the low magnitude of effect predicted as a result of the test site. Moderate effects on coastal character are predicted to occur within two LCCAs on

the west Mainland coast. This moderate effect is anticipated to be experienced between Breckness in the south and Yesnaby in the north, representing around 7km of coastline.

Effects on Landscape Character

5.10 Effects on onshore landscape character were only examined where LCTs had a strong coastal component in their key characteristics. Effects on the Inclined Coastal Pastures LCT, representing the settled coastal farmland within the study area, are predicted to be minor, as these landscapes do not directly overlook the test site, and have lower wildness levels. Moderate effects are predicted on the Cliff Landscapes LCT, along the west Mainland coast, due to its elevated position close to the test site, and the potential for effects on wildness character and key views along the coast towards Hoy.

Effects of Lighting

5.11 By night, lighting is most frequent along the more settled coasts within Hoy Sound. Out to sea, there are occasional passing boats, and flashing lights on the cardinal buoys. These lights have only a small effect on the remoteness that is part of the character of the unsettled outer coasts of west Mainland and Hoy. The addition of further lighting in the form of visible marker lights will intensify this effect, particularly if 20 surface-piercing structures are all fitted with differently flashing lights. However, the individual lights are not bright or overly noticeable (based on observation of the cardinal buoys from Outertown) and so are not predicted to give rise to effects on night-time coastal and landscape character over and above effects during the day.

5.12 The lighting characteristics of specific projects will be detailed within the Project-specific Environmental Monitoring Programme, provided as supporting information to marine licence applications. Photographs will be provided following installation to illustrate the day and night time characteristics of the project.

Table 5.1 Summary of effects on landscape receptors

Receptor	Sensitivity	Magnitude	Level of effect
LCCAs			
25a Point of Ness to Billia Croo	Medium	Low	Minor
25b Billia Croo to Neban Point	High	Medium	Moderate
25c Neban Point to Bay of Skaill	High	Medium	Moderate
29a and 29b Graemsay	Medium	Low	Minor
30d Middle Skerry to Out Taings	Medium	Low	Minor
37b St John's Head	High	Low	Minor
37c Braebuster	High	Low	Minor
LCTs			
8 Inclined Coastal Pastures	Medium	Low	Minor
13 Cliff Landscapes	High	Medium	Moderate

Assessment of Effects on Views

5.13 This section sets out the assessment of the predicted visual effects that will occur as a result of the test site. The relevant visual receptors are identified in Section 3.

5.14 Judging the significance of visual effects requires consideration of the nature of the visual receptors (sensitivity) and the nature of the effect on those receptors (magnitude).

Viewpoint Assessment

5.15 To help inform the assessment, a viewpoint assessment was undertaken, focusing on sensitive receptors at five representative locations agreed with consultees. This viewpoint assessment is set out in Appendix 4, and the findings are presented in Table 5.2 and discussed below.

5.16 Figures 4-8 show the existing view from each of these viewpoints, alongside a montage view that illustrates the extent of the wave test site in each view.

Table 5.2 Summary of the Viewpoint Assessment

Location	Sensitivity	Magnitude	Level of effect
1 Yesnaby	High	Medium	Moderate
2 Black Craig	High	Medium	Moderate
3 Outertown	High	Low	Minor
4 Warbeth Beach	High	Low	Minor
5 Cuilags	High	Low	Minor

5.17 The viewpoint assessment examined effects on receptors at five locations. The receptors at these locations are mainly recreational users of the landscape, including walkers on the coastal paths, hill-walkers and visitors to the beaches, as well as members of the community in the settled part of the study area around Outertown (viewpoint 3). Due to their occupation and interest in their landscape surroundings, susceptibility was judged to be high, and value was also judged to be high due to the spectacular nature of views in the NSA.

5.18 Devices and activities within the project envelope were judged to have medium or low magnitude of effect on these receptors. From the elevated viewpoints on the west Mainland coast (viewpoints 1-3), the test site will be closer and more prominent than it will appear from other locations in the study area. Effects were assessed as being moderate in views from Yesnaby and Black Craig which represent close, elevated views over the entire test site. Partial views from lower levels on the west Mainland coast, at Outertown and Warbeth, were predicted to result in minor effects. More distant views of the test site from Hoy, in the context of a panoramic view, were also assessed as having minor effects.

Effects on Recreational Receptors in the Study Area

5.19 The closest receptors are users of the coastal path (core path WM26) between Stromness and Skaill. This route passes Warbeth Beach (viewpoint 4) and runs adjacent to the site at Billia Croo, but overlooks the test site from the higher section between Black Craig (viewpoint 2) and Neban Point. From this section the whole of the test site will be visible, at the foot of the cliffs and at close distance offshore. Further north, towards Yesnaby (viewpoint 1), the inshore area will be less visible, but the whole of the offshore part of the test site will be seen. Moderate effects are predicted on walkers at these locations, but walkers undertaking the whole route will be exposed to this view for around 7km of walking, which is likely to take 2-3 hours. The continual presence of devices and activities in offshore views has the potential to reduce the sense of wildness that is an attraction of this walking route. The effect would be greater for those walking south, as the test site will appear in the context of long views to Hoy. Due to this sequential element to views,

the scale of effect on walkers undertaking the whole route is predicted to be large, affecting a medium geographical extent, and resulting in a major effect.

5.20 Visitors to Yesnaby include those day-trippers who may visit Yesnaby Castle and other features nearby, but are less likely to undertake longer walks. Effects on these receptors are set out in Appendix 4 in relation to viewpoint 1, and are predicted to be moderate.

5.21 From further south on the coastal path, on lower ground around Billia Croo and the ruins at Breckness House, views of the test site will be more limited due to the lack of elevation and the low-lying nature of the devices/components. Beyond Breckness, views will be further restricted due to the indentations of the coast, with only part of the test site visible. These effects are represented by viewpoint 4 at Warbeth Beach. From this section of the coastal path, the scale of the effect will be small, resulting in minor visual effects for walkers and visitors.

5.22 Further east, there are a series of core paths forming short circular walks from Stromness, and accessing the Citadel viewpoint at the southern edge of the town. Stromness golf course is also in this area. The ZTV indicates partial visibility of the test site, which will be 3-5km away. The panoramic view from the Citadel takes in Hoy and Graemsay as well as Scapa Flow and parts of Stromness, and the test site will be a small element of this view. Effects are predicted to be minor at most for receptors in this area. Similar effects are predicted for walkers on the core paths around Graemsay, which are also low-lying and relatively distant.

5.23 Hill walkers head for the higher ground of Hoy, and one popular route is a circuit of Cuilags, St John's Head and Ward Hill, accessed from Moaness or Rackwick. Only the hill summits and ridges are within the ZTV, and these high points offer panoramic views across the Mainland, Hoy, Scapa Flow and the surrounding sea, as exemplified by viewpoint 5 Cuilags. Although fully visible, the test site will be relatively distant at 5km or more from these hills, and will form a series of small elements in the sea as part of a much wider view. The scale of effect is predicted to be small and the effect on hill walkers will be minor.

Effects of Lighting at Night

5.24 Recreational users of the landscape will not, generally, be present during the hours of darkness, though some walkers and day-trippers may still be out in the dusk landscape particularly in winter, due to the shorter hours of daylight. Visitors may also come to view the sunset from Yesnaby. In such views, device marker lights present within the test site will be visible, and will be seen alongside the flashing lights of the cardinal buoys. This will represent an intensification of this existing effect, and is likely to draw attention away from other elements in the view, particularly if there are numerous lights with uncoordinated flashing patterns. The scale of this effect is judged to be medium, and the geographical extent will be small. The effect on dusk walkers and visitors as a result of lighting will be moderate.

Effects on Community Receptors

5.25 Only a small part of the study area within the ZTV is settled, comprising the dispersed settlement west of Stromness. Viewpoint 3 is representative of views likely to be experienced by the community in this area. Only the southern and inshore parts of the test site will be visible, depending on the precise location of the viewer within Outertown: this is indicated by the purple and blue shades on the ZTV, where visibility of the whole site is shaded pink. Devices and activities will not interrupt or appear in front of views towards Hoy, which forms the principal visual focus towards which many houses are oriented. The test site is located in an area that is currently used by boats and other activity, and the scale in the change in view is predicted to be small, across a medium geographical extent. The effect on views experienced by the Outertown and Innertown communities is judged to be minor.

Effects of Lighting at Night

5.26 At night, marker lights within the southern part of the test site will be visible to these receptors, in the context of the buoy lights which are already part of the view. The additional lighting is predicted to have a small scale of effect across a medium geographical extent, and the level of effect at night will be minor.

Effects on Travelling Receptors

5.27 Few roads pass through the ZTV, other than local roads discussed above. The most important route is the Scrabster-Stromness ferry that passes some 2km south of the test site on its daily passage. From the ferry, spectacular views of the Old Man of Hoy and St John's Head are available, forming the focus for passengers. Approaching Hoy Sound, views north to Black Craig and beyond also draw the attention. From sea level, the low-lying devices/components are unlikely to be highly noticeable features, though they are likely to be visible in clear conditions. The ferry journey takes 90 minutes, and the test site's appearance for a short section of this time is unlikely to affect the passengers' enjoyment of the views. Views of the test site will be similar or less from the Stromness-Moaness passenger ferry. The scale of the effect will be small, across a small geographical extent, and the level of effect on ferry passengers will be minor.

Effects of Lighting at Night

5.28 During night or evening crossings in darkness, it is likely that device marker lights within the test site will be visible to ferry passengers. This will be in the context of the existing cardinal buoy lights and will be a small feature in the passing view.

Assessment of Effects on Designated Landscapes

5.29 An assessment was undertaken of the effects of the test site on the special qualities of the Hoy and West Mainland NSA. This applied a methodology developed for this purpose by SNH, and is presented in Appendix 5.

5.30 The assessment examined four of the special qualities that were considered to be susceptible to the test site, namely:

- *The spectacular coastal scenery*
- *A long-settled and productive land and sea*
- *A landscape of contrasting curves and lines*
- *Land and water in constantly changing combinations under the open sky*

5.31 Overall, risk to the special qualities as a result of the devices and activities within the project envelope is low. The special quality describing 'the spectacular coastal scenery' is the quality with the highest potential to be affected by the test site. The effects on this special quality are likely to be felt most from the area around Billia Croo, Black Craig and Yesnaby, where the test site is closest to shore. In this area, devices/components would not obscure the coastal scenery, but would add another element of visual focus which may potentially divert the viewer's attention.

5.32 The effects are likely to be felt most when the test site is viewed from elevated locations in close proximity, and particularly in southward views to the hills and cliffs of Hoy. In order to experience the NSA in this way, the viewer is most likely to be passing through the landscape on foot along the core path WM26.

5.33 At night, it is possible that marker lights will be visible from across the areas identified in the ZTV (Figure 2). The above mentioned 'spectacular coastal scenery' is unlikely to be appreciated at night, though there will be some visibility of lighting at dusk and sunset. Effects on this special quality from lighting will be limited. None of the special qualities refer to lighting, dark skies, or tranquillity more generally. It is therefore judged that marker lighting within the test site does not have the potential to undermine the NSA or its special qualities.

5.34 The test site may be interpreted by some as contributing to the other special qualities considered in this assessment. For instance, marine energy devices contribute towards the productivity of the sea. The exact nature of this contribution is dependent on the nature of the devices/components installed. The scale of effect of a device/component, however, will remain small as it will be contained by the parameters laid out in the Project Envelope.

5.35 Based on the assessment presented in Appendix 5, it is not anticipated that there will be any unduly adverse effects on the integrity of the NSA, or the special qualities for which it has been designated.

Mitigation

5.36 A degree of mitigation is designed into the scheme, such as the extent of the test site, the limits that have been placed on the size and particularly the height above sea level of devices and components, and the complete reversibility of the installations and activities, with no physical effects on the seascape or landscape.

5.37 Secondary mitigation of effects is more difficult to achieve, particularly given the uncertainty as to the number, size and form of WECs and other equipment that may be installed. It will not be possible to screen or otherwise reduce visibility of floating or surface-piercing infrastructure, and any mitigation would need to focus on the placement of devices in the test site.

5.38 While operational constraints are expected to determine the placement and spacing between WECs, it is recommended that consideration be given to the following:

- Devices, particularly larger ones, should ideally be placed as far offshore as possible, to reduce their visual presence in views from land;
- Devices of similar form and scale should be placed together, while those of contrasting form or scale should be placed further apart, in order to retain a degree of visual coherence across the test site;
- Maximum spacing should be maintained between devices, so that the test site primarily appears as an area of open sea, interspersed with occasional devices/components;
- Devices should all be painted the same colour, to retain visual coherence;
- Navigational marker lights should be the same colour and brightness, subject to safety requirements, to retain visual coherence;
- The number of floating or surface-piercing devices should be minimised: the greater the number of with sub-surface devices among the 20 WECs, the fewer the number of visible devices;
- Maintenance activities involving large vessels should be kept to a minimum, particularly if these involve night working and use of lighting; and
- The number and size of floating platforms should be minimised.

5.39 Due to the uncertainty around the equipment to be installed, it is not possible to conduct a meaningful assessment of residual effects that takes such measures into account. It is likely that even if applied, these measures would not substantively reduce the levels of effect assessed in this SLVIA, although they may improve the appearance of the test site in key views.

6 Summary

Summary of effects

6.1 The SLVIA has assessed the potential effects on landscape and visual receptors of the future operational activities associated with the Billia Croo test site, under the parameters of the project envelope. All operational impacts of the project are judged to be long term, and are fully reversible.

Effects on Landscape Character

6.2 Effects on coastal character were judged to be moderate along the coastline between Yesnaby in the north and Breckness in the south, as represented by LCCAs 25b and 25c. This level of effect is largely due to the highly sensitive nature of these coastal character areas, as a result of their remoteness and elevated views over the sea. The magnitude of effect in this area was also judged to be higher, due to the close proximity to the test site. A minor level of effect is anticipated on coastal character across the rest of the study area.

6.3 Moderate effects on onshore landscape character will be limited to the western edge of the Mainland, where the strong coastal influence defines the Cliff Landscapes LCT. The wild character and key views associated with this LCT are sensitive to changes in the seascape. Elevated views overlooking the test site are available in this area. Effects on landscape character across other parts of the study area will be minor or negligible.

Effects on Views

6.4 Viewpoint assessments indicate that a moderate level of effect is likely to be experienced from elevated positions along the west Mainland coast, in close proximity to the test site, as represented by Viewpoints 1 and 2. Minor effects are expected from lower elevations on the Mainland coast or from Hoy due to partial or distant views, respectively.

6.5 Recreational receptors are present throughout the study area and will experience different levels of effect depending on their location. Notably, walkers along the section of Core Path WM26 between Yesnaby and Black Craig are likely to experience major effects, as a result of sequential and sustained views of devices and activities within the test site. Visitors to Yesnaby Castle and immediate surroundings are likely to experience moderate effects as the test site would present an alternative focal point in the high value view offered from these cliffs. Moderate effects would also be experienced by visitors to this location at night time (including dusk/sunset), as a result of the lighting associated with the test site.

6.6 The level of effect on recreational receptors in other areas is deemed to be minor, mainly due to a smaller scale of effect as the devices and activities will be a small element in the wide scenic views that characterise this area.

6.7 Effects on community receptors are likely to be minor, both in the daytime and at night, as only the southern portion of the test site will be visible, from Outertown and nearby settlement, and will be in an area where offshore activity is already a feature in the view.

6.8 Effects on receptors travelling through the area by ferry will be minor, as the devices and operations within test site will be passing features in the view, and are unlikely to detract from the passenger's overall experience.

Effects on the Special Qualities of the NSA

6.9 The SLVIA examined the implications of these predicted effects for the special qualities of the National Scenic Area designation, using a draft methodology provided by SNH for this purpose. Those special landscape qualities with reference to the sea or coast were considered in the assessment, and the majority of these are anticipated to be affected in a minor way by the

devices and activities within the project envelope. The special quality relating to 'spectacular coastal scenery' is likely to experience a moderate effect, although this will be localised in extent as this effect will be experienced mainly by walkers on the elevated west Mainland coast. The test site will not have any unduly adverse effect on the integrity of the NSA or the qualities for which it has been designated.

Conclusion

6.10 Billia Croo wave test site is an established facility, and devices and activities similar to what is proposed under the project envelope have been consented in the area previously. The project envelope seeks to ensure that a level of mitigation is built-in, by restricting the device dimensions (maximum height above sea surface of 12m) and number (no more than 20 devices/components installed at any one time).

6.11 The SLVIA has considered a realistic worst-case based on the project envelope, though the number, size and type of devices will change regularly throughout the 20-year period of the consent, as different devices and components are installed and decommissioned. The presence of these features, and regular activity within the test site, will locally affect the sense of wildness associated with the west Mainland coast, and is predicted to affect landscape/coastal character and views in this area. The SLVIA assumes that these effects will be adverse, based on the precautionary principle, but it may be that for some viewers the range of devices will create a novel feature of interest in the view.

6.12 Beyond the mitigation embedded in the project envelope, there is little scope to further absorb the development into the landscape/seascape. The suggested secondary mitigation measures described in paragraph 5.36 rely on location and arrangement of deployed devices to create a more coherent appearance, and should be implemented wherever possible.

6.13 The SLVIA has identified a number of effects on coastal character and on visual amenity. These effects will occur primarily along limited sections of coastal landscape in close proximity to the test site, and will be experienced by higher sensitivity receptors. For the majority of landscape and visual receptors in the study area, the overall effects of the test site are likely to be minor. The devices and activities within the project envelope are fully reversible: under the terms of the lease, all equipment will be removed from the test site at the end of the 20-year consent period, at which point all landscape and visual effects will cease.

7 References

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Appendix 1
Assessment Methodology

Method for Assessing Landscape Effects

7.1 Judging the significance of landscape effects requires consideration of the nature of the landscape receptors (sensitivity) and the nature of the effect on those receptors (magnitude).

Nature of Receptors (Sensitivity)

7.2 GLVIA3 states that the nature of landscape receptors, commonly referred to as their sensitivity, should be assessed in terms of the susceptibility of the receptor to the type of change proposed and the value attached to the resource.

Susceptibility of Landscape Receptors

7.3 Susceptibility means "the ability of the landscape receptor (whether it be the overall character or quality/condition of a particular type or area, or an individual element and/or feature, or a particular aesthetic and perceptual aspect) to accommodate the proposed development without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies" (GLVIA3 para 5.40).

7.4 Judgements on susceptibility of receptors (which may include individual features or areas) are recorded as **high, medium** or **low** according to Table 7.1.

Table 7.1 Susceptibility of Landscape Receptors

Susceptibility	Definition
High	The landscape receptor is less able to accommodate the type of development proposed without undue negative consequences to the baseline situation. Attributes that make up the character of the landscape offer limited opportunities for accommodating the change without key characteristics being fundamentally altered, leading to a different landscape character.
Medium	The landscape receptor is partly able to accommodate the development without undue negative consequences to the baseline situation. Attributes that make up the character of the landscape offer some opportunities for accommodating the change without key characteristics being fundamentally altered.
Low	The landscape receptor is more able to accommodate the development without undue negative consequences to the baseline situation. Attributes that make up the character of the landscape are resilient to being changed by the type of development proposed.

Value of the Landscape Resource

7.5 The European Landscape Convention advocates that all landscape is of value, whether it is the subject of defined landscape designation or not: *"The landscape is important as a component of the environment and of people's surroundings in both town and country and whether it is ordinary*

landscape or outstanding landscape."[2] The value of the landscape resource is recognised as being a key contributing factor to the sensitivity of landscape receptors.

7.6 Value of the landscape resource is determined with reference to:

- a review of designations, and the level of policy importance that they signify (such as landscapes designated at international, national or local level); and
- application of criteria that indicate value (such as landscape quality, scenic quality, rarity, representativeness, conservation interests, recreation value, perceptual aspects, associations e.g. with artists or writers).

7.7 National-level landscape designations, such as National Scenic Areas, generally indicate landscape of higher value. There is, however, variation across both designated and undesignated areas, and so judgements regarding value are also informed by fieldwork and by the defined special qualities of the designated area.

7.8 Judgements on value are recorded as of **high, medium** and **local** value according to Table 7.2.

Table 7.2 Definitions of Landscape Value

Value	Definition
High	Areas or features designated at a national level e.g. National Scenic Areas, and which contribute to the defined special qualities of the area. Landscapes with high scenic/recreational value, and/or high conservation interest. Landscapes that are rare or unique.
Medium	Areas or features designated at a local level e.g. local authority designated landscapes, or areas/features within national designations that do not contribute to their special qualities. Landscapes with some scenic/recreational value, or cultural associations, or features which are rare at a local level.
Local	Areas or features that are not formally designated but may be valued at a local level. Landscapes which may have limited aesthetic qualities or are of a character that is widespread.

7.9 It should be noted that whilst landscape designations at an international or national level are likely to be accorded the highest value, it does not necessarily follow that such landscapes all have a high susceptibility to change. There may be a complex relationship between the value attached to a landscape and its susceptibility to change. Therefore the rationale for judgements on the sensitivity of the landscape is clearly set out for each receptor based on these components.

Nature of Effect (Magnitude)

7.10 The nature of the effect on each landscape receptor (magnitude) is reported in terms of its scale, geographical extent, duration and reversibility.

Scale

7.11 For landscape character areas, the scale of change depends on the degree to which the character of the landscape is changed through removal of existing landscape components or addition of new ones. Of particular concern is how the changes affect the key characteristics of the landscape.

[2] Council of Europe, (2000). The European Landscape Convention – Council of Europe Treaty Series No. 176.

7.12 In this assessment scale is described as being **large, medium, small** or **imperceptible**, with reference to the definitions set out in Table 7.3.

Table 7.3 Scale of Landscape Change

Size/scale	Definition
Large	Extensive loss or modification of landscape elements or addition of new elements and features which alter the key characteristics and perceptual character of the landscape to a large extent.
Medium	Loss of landscape elements and features or addition of new ones which result in discernible and distinct changes to landscape characteristics and character.
Small	A perceptible but small change to landscape characteristics and character as a result of the loss of landscape elements and features or addition of new ones.
Imperceptible	A change to landscape character or characteristics that is barely detectable.

Geographical Extent

7.13 The geographical extent over which the landscape effect will be felt is described in relation to the extent of the study area. An effect on a larger scale which is felt across the study area is described as **large** in extent. An effect at the scale of, say a local coastal character area would be described as **medium** in extent, while a very localised effect would be described as **small** in extent.

Duration

7.14 Duration is reported in relation to the projected duration of the development. In this assessment, since the lifespan of the lease for the test site is 20 years, and shorter term construction effects are not separately considered, all effects are treated as **long term**.

Reversibility

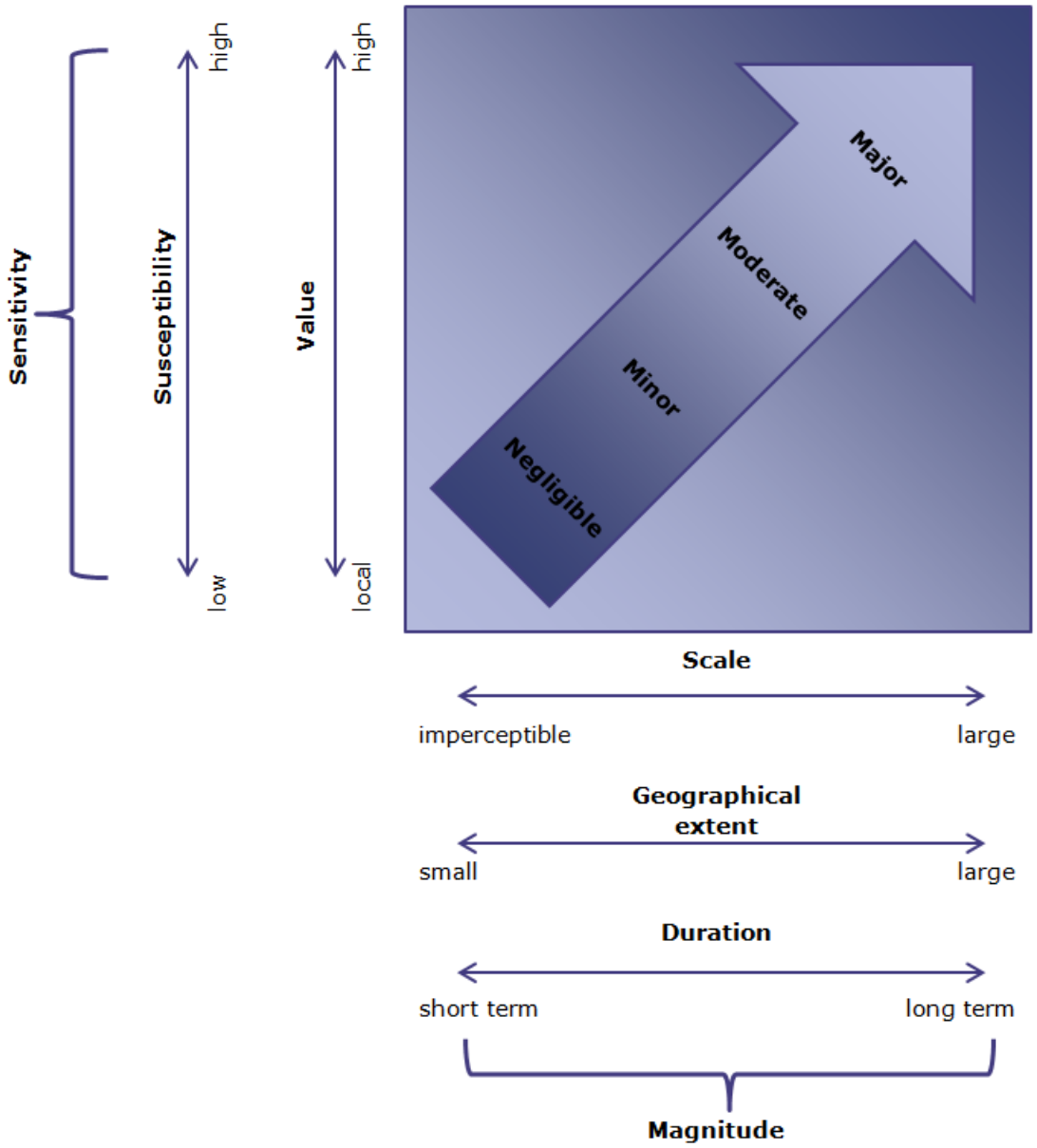
7.15 Reversibility is the degree to which the landscape can be restored to its original condition. In the present case, once the test site has been fully decommissioned, the area will return to its previous condition as an area of open sea. Therefore, all effects are treated as **fully reversible**.

Judging the Levels of Effect

7.16 The evaluations of the individual aspects set out above (susceptibility, value, scale, geographical extent, duration and reversibility) are considered together to provide an overall profile of each identified effect. An overview is then taken of the distribution of judgements for each aspect to make an informed professional assessment of the overall level of each effect, drawing on guidance provided in GLVIA3. A numerical or formal weighting system is not applied. Instead, consideration of the relative importance of each aspect feeds into the overall decision.

7.17 Levels of effect are identified as **negligible**, **minor**, **moderate** or **major**. The following Diagram 7.1 indicates how these various components are combined to inform the overall level of effect.

Diagram 7.1 Judging levels of effect



7.18 The levels of effect used in this SLVIA are defined in Table 7.4.

Table 7.4 Levels of Landscape Effect

Level	Effect Description
Major	The development will result in an obvious and widespread change in landscape/seascape characteristics and character, such as permanent loss of key characteristics, likely affecting a highly-valued landscape with a medium or high susceptibility to that type of change.
Moderate	The development will result in a noticeable change in landscape/seascape characteristics and character, such as a large-scale but temporary change in landscape features, likely affecting a landscape with a medium susceptibility to that type of change. This level of effect may also occur when a smaller scale of change acts on a more highly valued landscape.

Level	Effect Description
Minor	The development will result in a small change in landscape/seascape characteristics and character, such as a localised effect occurring over a long duration, or a larger-scale effect on an area of lower susceptibility and/or value.
Negligible	The development will not result in a noticeable change in landscape/seascape characteristics or character.

Direction of Effects

7.19 The direction of effect (positive, negative or neutral) is determined in relation to the degree to which the proposal fits with landscape character and the contribution to the landscape that the development makes. For the purposes of this assessment, the precautionary principle indicates that the installation of devices/components should be considered a negative change to this nationally designated landscape.

Method for Assessing Visual Effects

7.20 Visual effects are experienced by people at different locations around the study area. Visual receptors are the people who will be affected by changes in views at different places, and they are usually grouped by what they are doing at that place (residents, motorists, recreational users, etc.).

7.21 Judging the significance of visual effects requires consideration of the nature of the visual receptors (sensitivity) and the nature of the effect on those receptors (magnitude).

Nature of Receptors (Sensitivity)

7.22 GLVIA3 states that the nature of visual receptors, commonly referred to as their sensitivity, should be assessed in terms of the susceptibility of the receptor to changes in the views they experience, and the value attached to those views.

Susceptibility of Visual Receptors

7.23 The susceptibility of visual receptors to changes in views/visual amenity is a function of their occupation or activity, and the extent to which their attention is focussed on views (GLVIA3, para 6.32). This is recorded as **high**, **medium** or **low** according to Table 7.5.

Table 7.5 Susceptibility of Visual Receptors

Susceptibility	Receptor Group
High	Communities where views contribute to the landscape setting enjoyed by residents; people engaged in outdoor recreation (including users of footpaths whose interest is likely to be focussed on the landscape); visitors to heritage assets or other attractions where views of surroundings are an important contributor to experience.
Medium	Travellers on roads, or who otherwise have a passing interest in their surroundings.
Low	People engaged in outdoor sport or recreation which does not depend upon appreciation of views of the landscape; people at their place of work whose attention is not on their surroundings.

Value of the View

7.24 Recognition of the value of a view is determined with reference to:

- recognised importance in relation to heritage assets or planning designations;
- the value attached to views by visitors, for example through appearances in guide books or on tourist maps, or provision of facilities such as interpretation boards; and/or
- references to the view in literature and art.

7.25 Judgements on value of views are recorded as of **high, medium** and **local** value according to Table 7.6.

Table 7.6 Definitions of Value Attached to Views

Value	Definition
High	Views associated with nationally designated landscapes (perhaps identified in special qualities), or a view promoted as particularly scenic and which may be regularly used in guide books for that part of the country.
Medium	Views associated with locally designated landscapes, or which are locally promoted perhaps through the provision of seating or interpretation.
Local	Views associated with core paths or scenic views within undesignated landscapes.

Nature of Effect (Magnitude)

7.26 The nature of the effect on visual receptors (magnitude) is reported in terms of its scale, geographical extent, and duration/reversibility.

Scale of Effect

8.51 The scale of change depends on:

- the extent of the loss or addition of features within the view, and changes in its composition including the proportion of the view occupied by the development;
- the degree of contrast or integration of any new features or changes in the landscape with the existing or remaining landscape elements and characteristics in terms of form, scale and mass, line, height, colour and texture; and/or
- the nature of the view of the development, in terms of whether views will be full, partial or glimpsed.

7.27 In this assessment scale is described as being **large, medium, small** or **imperceptible**, with reference to the definitions set out in Table 7.7.

Table 7.7 Scale of Visual Change

Size/Scale	Definition
Large	Large change in view, perhaps where the development is in close proximity in a direct line of vision, or affecting a substantial part of the view, or providing contrast with the existing view.
Medium	Clearly perceptible change in view, perhaps where the development is relatively close but at an oblique angle or further away in the direct line of vision, creating a distinct new element in the view.

Size/Scale	Definition
Small	Small change in view, perhaps where the development is at a distance or oblique angle, or where the scale of the landscape absorbs the development well.
Imperceptible	Change in view which is barely perceptible.

Geographical Extent of Effect

7.28 This records the extent of the area over which the changes would be visible e.g. whether there is only one point from where the development can be glimpsed, or whether similar views can be gained from large areas. In this assessment of geographical extent it is described as being **small**, **medium** or **large**.

Duration of Effect

7.29 Duration is reported in relation to the projected duration of the development. In this assessment, the operational effects include the regular installation and decommissioning of devices/ components, and shorter-term construction effects are not separately considered. Since the lifespan of the lease for the test site is 20 years, all operational effects are treated as **long term**.

Reversibility of Effect

7.30 Reversibility is the degree to which the view can be restored to its original condition. In the present case, once the test site has been fully decommissioned, marine views will once again look out to open sea. Therefore, all effects are treated as **fully reversible**.

Judging the Levels of Effect

7.31 As for landscape effects, the evaluations of the individual aspects set out above (susceptibility, value, scale, geographical extent, duration and reversibility) are considered together to provide an overall profile of each identified effect. An overview is then taken of the distribution of judgements for each aspect to make an informed professional assessment of the overall level of effect, drawing on guidance provided in GLVIA3.

7.32 A numerical or formal weighting system is not applied, instead consideration of the relative importance of each aspect feeds into the overall decision. Levels of effect are identified as **negligible**, **minor**, **moderate** or **major**. Diagram 7.1 indicates how these various components are combined to inform the overall level of effect.

7.33 The levels of effect used in this SLVIA are defined as shown in Table 7.8.

Table 7.8 Levels of Visual Effect

Level	Effect Description
Major	The development will result in an obvious and widespread change in the visual amenity experienced by the receptor(s), who are likely to have medium or high susceptibility to that type of change. For example, this level of effect may arise from the permanent obstruction or interruption of a highly valued view.
Moderate	The development will result in a noticeable change in the visual amenity experienced by the receptor(s), who are likely to be of medium susceptibility to that type of change. For example, this level of effect may arise from a large-scale but temporary change in a view, or a smaller change affecting a highly valued view.

Level	Effect Description
Minor	The development will result in a small change in the visual amenity experienced by the receptor(s), who may be of lower susceptibility to that type of change. For example, this level of effect may arise from a larger-scale but temporary change in a view that is not highly valued, or a very small change experienced by higher-susceptibility receptors.
Negligible	The development will not result in a noticeable change in the visual amenity experienced by the receptor(s).

Direction of Effects

7.34 The direction of effect (positive, negative or neutral) is determined in relation to the degree to which the proposal fits with the existing view, and the contribution to the view that the development makes. For the purposes of this assessment, the precautionary principle indicates that the installation of devices/components should be considered a negative change in scenic views of the Orkney seascape.

Appendix 2
Methods for Creating ZTVs and Visualisations

Zones of Theoretical Visibility

7.35 A 'Zone of Theoretical Visibility' (ZTV) describes the area over which a development can theoretically be seen, from a two-metre eye level. The ZTV was produced to show the maximum visibility of the test site, and was calculated for points with 250m spacing covering the test site, with an assumed structure height of 12m.

7.36 The ZTV therefore shows areas from which 12m devices in any part of the test site may be visible. The ZTV of individual devices within this area would be reduced.

7.37 ZTVs for this scheme were processed using a digital terrain model based on Ordnance Survey Terrain 5 data (obtained from Ordnance Survey in December 2018), and produced using ESRI ArcMap 10.5.1 software. The sea has been levelled to 0m using the high-water level (as defined in the OS Boundary Line dataset). Earth curvature and atmospheric refraction have been taken into account.

7.38 The ZTV does not take into account built form, localised undulations and vegetation. Therefore, actual visibility on the ground will be less than indicated by the plan. Visibility across the sea assumes a flat surface that does not reflect the swell which will affect visibility from the marine part of the study area. Additionally, the ZTV does not reflect the extent to which atmospheric visibility reduces with distance from the development.

7.39 The ZTV is shown in Figure 2.

Production of Visualisations

7.40 Visualisations were produced to aid the assessment of the visual effect of the test site and were created using site photography, a DTM (Digital Terrain Model) and a 3D block model of the test site (see details below). All photography was carried out in accordance with the Landscape Institute Advice Note 01/11.

Photography

7.41 A series of partly overlapping photographs was taken using a digital SLR camera with a fixed 35mm lens (equivalent to a 52.5mm focal length lens on a 35mm film camera). All viewpoint photography was executed using a fully levelled tripod with panoramic head. During field photography, various parameters were recorded including the OS coordinates of the viewpoint locations, date and time, and camera settings, and these are presented on the viewpoint images (Figures 4-8). Other information was recorded for alignment purposes, such as bearings to distinct features in the view. The individual photos were stitched together in Photoshop using cylindrical projection to form wide angle panoramic images with a 90-degree horizontal field of view. The image was then turned into Planar projection within PTGui software.

7.42 The images are presented on an A3 page with a horizontal view of 90 degrees.

Digital Terrain Model (DTM)

7.43 A 3D landform model of the study area was created using gridded Ordnance Survey (OS) Terrain 5 data. This data is in OS National Grid coordinates and consists of height values (metres AOD) at each intersection of a 5m horizontal grid. From this model wireframe views were produced to show the profile of the terrain from the selected viewpoints to assist with camera positioning within the 3D software.

Annotations

7.44 The extent of the scheme was modelled into the DTM in Topos. The selected viewpoints were added to the model (using onsite GPS readings and aerial mapping) and views were created within Topos using identical camera parameters. These camera views were then rendered and produced with pixel dimensions to match the stitched photographs.

7.45 Once aligned, the extent of the test site was accurately transposed onto the photograph, indicating the area of sea in which the test site is located.

7.46 The visualisations are aimed to inform the visual assessment and show the maximum (worst case) extent across which infrastructure could be located, although the number, size and spacing of devices within this area will vary. Due to the uncertainty as to the infrastructure to be installed, is not possible to provide photorealistic images of how the test site may appear over time.

Appendix 3
Assessment of Effects on Landscape Character

7.47 Each of the following assessment tables discusses one landscape receptor, i.e. local coastal character area (LCCA) or landscape character type (LCT). Relevant receptors are listed in Table 7.9, and their key characteristics are set out in Section 3. For the purposes of this assessment, LCCAs 29a and 29b are considered together, as they are continuous and only a small section of each is within the study area.

7.48 LCCAs and LCTs are illustrated on Figure 3.

Table 7.9 Landscape receptors

Group	Receptor
LCCAs	25a Point of Ness to Billia Croo
	25b Billia Croo to Neban Point
	25c Neban Point to Bay of Skaill
	29a Point of Oxan to the Pier and 29b The Pier to Point of Oxan
	30d Middle Skerry to Out Taings
	37b St John's Head
	37c Braebuster
LCTs	8 Inclined Coastal Pastures
	13 Cliff Landscapes

Table 7.10 Effects on LCCA 25a Point of Ness to Billia Croo

Key characteristics
• South-west facing onto the Hoy Sound as it opens out to the turbulent Atlantic. • Sinuous coastline of shallow bays and headlands, with a small sandy beach backed by coarser cobbles at Warbeth. • Pasture slopes gently away from the coastal edge to a series of low hills which contain the coastal edge to the north, with settlements on the hill slopes orientated towards the coast. • Coastal defences include Ness Battery, a relic of Orkney's wartime heritage in defending Scapa Flow against enemy attacks. • At Breckness there are the remains of Breckness House and broch on the shore line. • The dramatic Hoy hills are ever present in views across the Hoy Sound to the south, and the rising landform of Black Craig contains views to the north-east.
Sensitivity
Susceptibility This low-lying coast faces south-west and is defined by views across Hoy Sound to the hills of Hoy. The relationship between land and sea is therefore of high importance to the coastal character. Views to the open sea are more open to the north of Breckness, and more restricted from the south by the sinuous nature of the coast. This is a settled area with some existing built development, though increasingly less so to the north-west. The susceptibility of this LCCA to changes in the seascape is judged to be medium. **Value** The LCCA is within the NSA, and the relationship between the south-west Mainland and the hills of Hoy is a key quality of the designated landscape. Other elements of this LCCA that contribute to the special qualities of the NSA include the visible geology and archaeology, the contrasting lines and curves, and the relationship of land and water. The value of the landscape is judged to be high. The **sensitivity** of this landscape to the devices and activities within the project envelope is judged to be medium.
Magnitude of effect
Scale There will be no physical changes to the coastal landscape, but the test site is visible offshore from much of this coast, particularly north of Breckness. Due to the low-lying nature of the coast, visibility of the test site is more restricted from areas to the south (see the ZTV in Figure 2). The offshore infrastructure, including lighting, will have greatest presence across the least settled and developed part of the LCCA. Devices/components and activity in the southern part of the test site, particularly in the inshore area, will be visible in an area where some offshore activity is already seen, including the offshore lights on the cardinal buoys. The majority of the key characteristics will be unaffected by the operation of the test site by day or by night. The scale of the effect is judged to be medium to the north of Breckness, and low to the south. **Geographical extent** The presence of devices and activity within the test site will primarily affect the coastal landscape between Black Craig and Breckness, comprising the northern third of this LCCA, and representing a small geographical extent. **Duration and reversibility** Long term and fully reversible. The **magnitude of the effect** on the character of the northern part of this LCCA, north of Breckness, is judged to be medium, while south of this it will be low.
Level of effect
Overall, considering the scale, extent and duration of the change to the baseline, and the value placed on the resource, the level of effect on the northern part of this LCCA, north of Breckness, is judged to be **moderate**, and to the south of this is judged to be **minor**.

Table 7.11 Effects on LCCA 25b Billia Croo to Neban Point

Key characteristics
• Fronts onto the Atlantic, and the wide, open, expansive sea dominates the character of the coast. • Relatively straight, and comprising high, rugged sandstone cliffs, indented with caves along the base of Black Craig. • Undeveloped and accessible only on foot, the coast has a strong sense of remoteness. • Open and undeveloped moorland rises away from the cliff edge to low hills at Black Craig to the south-east and the larger North Hill to the north-east. • The open Atlantic is ever present in views, and views into the settled and farmed lowland to the south-east are also available.
Sensitivity
Susceptibility This elevated section of coast is dominated by the open sea to the west. Undeveloped and relatively inaccessible, it has a strong sense of remoteness. The high cliffs offer expansive views out to sea, which combined with limited views inland means that the marine environment is very important to this coast. Although the existing wave test site is present offshore, the expansion and intensification of this use could affect key characteristics, and susceptibility is judged to be high. **Value** The LCCA is within the NSA, and although not on the scale of Hoy, exemplifies the coastal scenery that is a special quality of the designated landscape. Other elements of this LCCA that contribute to the special qualities of the NSA include the visible geology and the relationship of land and water. The value of the landscape is judged to be high. The **sensitivity** of this landscape to the devices and activities within the project envelope is judged to be high.
Magnitude of effect
Scale The whole of the test site will be clearly visible from this elevated coast, and it will occupy a substantial angle of the seaward view. The presence of offshore infrastructure and equipment across this panorama will affect key characteristics including the openness of the sea and the remoteness of the coast. By night, marker lights on fixed devices will be visible as an uncharacteristic feature, although cardinal buoy lighting is currently present. This will further affect qualities of remoteness. Other key characteristics of the physical coastline will be unaffected. The scale of the effect on coastal character, by day and by night, is judged to be medium. **Geographical extent** The whole of this relatively small LCCA will be affected: around 2.5km of coast, representing a small geographical extent. **Duration and reversibility** Long term and fully reversible. The **magnitude of the effect** on the character of this LCCA is judged to be medium.
Level of effect
Overall, considering the scale, extent and duration of the change to the baseline, and the value placed on the resource, the level of effect on this LCCA is judged to be **moderate**.

Table 7.12 Effects on LCCA 25c Neban Point to Bay of Skaill

Key characteristics
• Open and exposed to the Atlantic, with strong elemental qualities. • Rugged sandstone cliffs of up to 50m in height, with an intricately weathered shoreline displaying a distinctive layered geology. • Spectacular coastal cliff scenery at Yesnaby, with caves, blowholes, geos and sea stacks including "Yesnaby Castle". • Unsettled, but built structures include Yesnaby Gun Battery, a promontory fort at Brough of Bigging and the Broch of Borwick. • Backed by rolling, semi-natural coastal heath and grassland rising to hills to the south and falling into the Skaill basin to the north. • There are open, unimpeded sea views to the west, and ever-changing views from the coastal path along a succession of headlands to the north and south.
Sensitivity
Susceptibility An open and exposed coast, at the outer edge of the Orkney archipelago. The expansive open sea is a dominant characteristic of the coastal landscape. There is relatively limited fishing activity. The sea state varies: sometimes tranquil; other times the noise of wind and waves is a feature. There is no settlement along the shore, and access to the cliffs only at Yesnaby. The area has a strong sense of remoteness, with rugged cliffs offering views to seaward and along the coast. The susceptibility is judged to be high. **Value** The LCCA is largely within the NSA, and similarly to 25b, exemplifies the coastal scenery that is a special quality of the designated landscape. Other elements of this LCCA that contribute to the special qualities of the NSA include the visible geology and the relationship of land and water. The value of the landscape is judged to be high. The **sensitivity** of this landscape to the devices and activities within the project envelope is judged to be high.
Magnitude of effect
Scale The test site will be clearly visible from this elevated coast, particularly in the southern parts of the LCCA between Neban Point and Yesnaby, which is closer to the test site. North of Yesnaby, the test site will be over 3km from the coast, and the ZTV (Figure 2) indicates more intermittent visibility. The extent of the sea view potentially occupied by the test site will reduce from further north. The test site will affect the unimpeded sea views from the cliff tops, but other key characteristics will remain unaffected. By night, marker lighting will be visible particularly in the northern part of the test site where there is currently no light, though cardinal buoys are visible further south. The scale of the effect on coastal character by day and by night is judged to be medium. **Geographical extent** The presence of devices and activity within the test site will primarily affect the southern part of this LCCA, between Neban Point and Yesnaby, and extending somewhat further north, representing a medium geographical extent. **Duration and reversibility** Long term and fully reversible. The **magnitude of the effect** on the character of this LCCA is judged to be medium.
Level of effect
Overall, considering the scale, extent and duration of the change to the baseline, and the value placed on the resource, the level of effect on this LCCA is judged to be **moderate**.

Table 7.13 Effects on LCCA 29a and 29b Graemsay

Key characteristics
• Semi-enclosed flows of tidal water, seldom very calm. • Boat traffic, lighthouse at Pont of Oxan, ferries approaching Stromness and views out to open sea create a strong maritime influence. • Low-lying island character has a strong relationship with north east Hoy, with views to high hills and the open sea. • Consistent coastal edge of low cliffs, skerries, shingle and sandy bays • Scattered settlement on sloping farmland rising to whaleback ridgeline of the island. • Views of Stromness to the north and the open sea to the west.
Sensitivity
Susceptibility The low-lying coast of Graemsay is set in the tidal waters of Hoy Sound. The small island has a strong relationship with the high hills of Hoy as well as the Mainland coast to the north. The surrounding open waters are seldom very calm, and views of boat traffic and navigational aids contribute to the strong maritime influence on character. Views to the north-west include Atlantic breakers and the open sea beyond the mouth of the sound. The susceptibility of this coastal landscape is judged to be medium. **Value** Graemsay lies at the heart of the NSA, between the hills of Hoy and the low-lying south-west Mainland, though it has more in common with the latter. Graemsay represents the long-settled and productive farmland that contrasts with the moorland hills and with the sea, and its coastline contributes to the contrasting curves and lines, and to the land and water special qualities. The value of the coastal landscape is judged to be high. The **sensitivity** of this landscape to the devices and activities within the project envelope is judged to be medium.
Magnitude of effect
Scale The test site is a minimum of 4.5km from Graemsay, and only the closer parts of the test site would be theoretically visible from the low-lying coast. Devices and activities within the test site would form a small feature in the wider context of this coast, which is already influenced by human activity in the waters. Marker lights would be distant features, again in the context of lights on passing ships and on the Mainland shore. The scale of the change in coastal character by day and night is judged to be small. **Geographical extent** The effect would occur across the north-western coast of Graemsay, between Hestor and The Lash, around 3km of coastline which is considered to represent a medium geographical extent. **Duration and reversibility** Long term and fully reversible. The **magnitude of the effect** on the character of this LCCA is judged to be low.
Level of effect
Overall, considering the scale, extent and duration of the change to the baseline, and the value placed on the resource, the level of effect on this LCCA is judged to be **minor**.

Table 7.14 Effects on LCCA 30d Middle Skerry to Out Taings

Key characteristics
• Large, semi-enclosed, flow of strong tidal water, a sense of visual containment to the east. • Passage of boat traffic and associated navigational aids. • Dynamic coastal edge comprises areas of rugged cliff, sloping rock platforms, skerries and small sandy bays. • Pasture and arable hinterland; steep convex slopes; sparse settlement and largely isolated.
Sensitivity
Susceptibility This coast is characterised by a large, semi-enclosed flow of strong tidal water with tidal races and views of Atlantic breakers. Views across to the Mainland and Graemsay provide a sense of visual containment, and direct views towards the open sea. Maritime influence comes from the open sea to the north-west, and the passage of boat traffic in nearby waters. It is an exposed but low-lying coast, with limited settlement in the hinterland. Susceptibility is judged to be medium. **Value** This area is within the NSA, backed by the hills of Hoy and looking across to the south-west Mainland. This section of the Hoy coast, though low-lying, contributes to special qualities including the contrasting curves and lines, the fertile farmland, and the combinations of land and water. The value of the coastal landscape is judged to be high. The **sensitivity** of this landscape to the devices and activities within the project envelope is judged to be medium.
Magnitude of effect
Scale The test site is over 3km from this LCCA and will occupy a relatively narrow angle of view as a result of the orientation. Due to the low elevation, the more distant parts of the test site will not be visible. The presence of boat traffic and other marine activity is already a feature of this coast, and the majority of the characteristics will not be adversely affected. At night, marker lighting may by visible alongside existing lights on the cardinal buoys, and on the Mainland shore. The scale of the effect by day and by night is judged to be small. **Geographical extent** The effect will extend across this LCCA, covering around 2km of coast, which is judged to be a small geographical extent. **Duration and reversibility** Long term and fully reversible. The **magnitude of the effect** on the character of this LCCA is judged to be low.
Level of effect
Overall, considering the scale, extent and duration of the change to the baseline, and the value placed on the resource, the level of effect on this LCCA is judged to be **minor**.

Table 7.15 Effects on LCCA 37b St John's Head

Key characteristics
• Dramatic stretch of coast exposed to the vast, open expanse of the Atlantic Ocean. • Large-scale, rugged, red sandstone cliffs, all over 150m in height and deeply indented with geos that extend up to 450m inland. • The Old Man of Hoy, a dramatic and distinctive sea stack. • Smooth undeveloped moorland hinterland rises away from the cliff tops to rounded inland peaks. • Views from the cliff top walk are available, north and south along the colourful and rugged coastal cliffs, east to dramatic inland hills and west across the sometimes turbulent seas of the Atlantic.
Sensitivity
Susceptibility This very elevated coast faces west, on to the vast, open expanse of the Atlantic. The high cliffs are exposed to the winds which sweep across the cliff tops and the waves which batter the shoreline. The area has very strong wildness qualities, with only occasional passing boats including the regular Scrabster-Stromness ferry. Panoramic views are available across the sometimes turbulent seas of the Atlantic, influenced by the ever changing weather, and extending north to west Mainland. The susceptibility is judged to be high. **Value** This area is within the NSA and forms an intrinsic part of its character. The high cliffs are described as being 'like a rampart against the sea' and express the spectacular coastal scenery and sandstone geology that are noted as special qualities. The value of this coast is high. The **sensitivity** of this landscape to the devices and activities within the project envelope is judged to be high.
Magnitude of effect
Scale The LCCA is between 3.5 and 8km from the test site, which would occupy a small angle of the northward view. Due to the elevation, the whole test site will be seen from the northern part of the LCCA, though to the south of St John's Head the ZTV indicates only intermittent visibility from the cliff top, since the coast is oriented more to the west. Devices and activities within the test site will form a small feature in northward views from part of this LCCA, but the effect on key characteristics will be limited. Lighting within the test site may be visible and will be uncharacteristic in the seaward view, although they will be distant and there are passing boats along this coast. The scale of the effect is judged to be small. **Geographical extent** The effect will occur between Kame of Hoy and St John's Head, which is judged to be a medium magnitude of effect. **Duration and reversibility** Long term and fully reversible. The **magnitude of the effect** on the character of this LCCA is judged to be low.
Level of effect
Overall, considering the scale, extent and duration of the change to the baseline, and the value placed on the resource, the level of effect on this LCCA is judged to be **minor**.

Table 7.16 Effects on LCCA 37c Braebuster

Key characteristics
• Open and exposed to the Atlantic, particularly in the west, with some shelter provided by Mainland and Graemsay in the east. • Relatively straight and low-lying coast, in contrast with the rugged cliffs south of Kame of Hoy and the rounded summits in the Hoy interior. • Broad, rocky foreshore, with shallow bays and caves, and small cliffs west of Bay of the Tongue. • Hinterland rises gradually away from the coast across open moorland towards Cuilags, with some farmland around the small scattered settlement on the minor road from Hoy. • Dramatic enclosing landform and lack of intervisibility with nearby settlement at Hoy enhances the sense of isolation. • Elevated and open views to open seas to the west and Mainland to the north.
Sensitivity
Susceptibility Increasingly elevated and increasingly exposed to the west, this LCCA lies at the mouth of Hoy Sound, facing north-west out towards the open sea. The coast is exposed to wind and waves which crash onto the foreshore. The area has a strong sense of wildness, with only a few dwellings in the hinterland, and occasional passing boats. There are views north across the sound and out to sea, framed by the cliffs of west Mainland and by the Kame of Hoy. The susceptibility to changes in seascape is judged to be high. **Value** This coast is within the NSA, and though not as dramatic as the coast to the west, it forms part of the high ground of Hoy, contrasting with the lower-lying Mainland across the sound. It contributes to special qualities including spectacular coastal scenery, geology, and the combination of land and water. The value of this coastal landscape is judged to be high. The **sensitivity** of this landscape to the devices and activities within the project envelope is judged to be high.
Magnitude of effect
Scale The test site will be between 3 and 4km from this coast and will occupy a relatively narrow area of the view due to the orientation. From the more elevated parts of the LCCA, a greater extent of the test site will be visible. The offshore environment is not devoid of man-made features, and although devices and activities within the test site will be clearly visible in good weather conditions, the majority of the key characteristics will remain unaffected. By night, the cardinal buoy lighting is visible but not prominent, and additional marker lights will not greatly increase the presence of lighting in the coastal character. The scale of the effect is judged to be small. **Geographical extent** The effect will occur across this LCCA, which is judged to be a medium geographical extent. **Duration and reversibility** Long term and fully reversible. The **magnitude of the effect** on the character of this LCCA is judged to be low.
Level of effect
Overall, considering the scale, extent and duration of the change to the baseline, and the value placed on the resource, the level of effect on this LCCA is judged to be **minor**.

Table 7.17 Effects on LCT 8 Inclined Coastal Pastures

Key characteristics
• Improved pastures sloping down to coast; • Rectilinear field patterns often with strong orientation to coastline; • Mixture of small-scale clusters of resettled crofts and less developed geometric landscape of estate farms; • Roads running parallel to coast, giving access to coastal fringe and higher pastures/moorland; • Occasional large houses/farms with tree frameworks; • Extensive views out to sea and restricted views inland; and • Rich coastal archaeology.
Sensitivity
Susceptibility These farmed and settled areas gain their unique character from their relationship with the coast, facing on to the sea and away from the interior of the islands. The areas of this LCT at Outertown and on north-west Hoy are representative of the type. The two areas face each other across Hoy Sound: views out to sea from the Mainland area look south-west to the high hills and cliffs of Hoy, and west out to the open Atlantic; from Hoy views look back to the Mainland, along the cliffs of the west coast. Susceptibility to changes in the marine environment is judged to be medium. **Value** These areas are within the NSA and their interrelationship across Hoy Sound contributes to the special qualities of the designated area. The value of this landscape is judged to be high. The **sensitivity** of this landscape to the devices and activities within the project envelope is judged to be medium.
Magnitude of effect
Scale The test site will be visible in views from these areas, in the context of the existing views across Hoy Sound. From the southern area, devices and activities within the test site will occupy a small portion of the seaward view and will be over 3km away. The scale of the effect is judged to be small. From the area of this LCT on the Mainland, the test site will be closer and the devices and activities more prominent, forming a larger part of the offshore view particularly in the area inland of Breckness and Billia Croo that is close to the inshore part of the test site. By night, cardinal buoy lighting is a minor feature of this landscape, alongside other offshore lights on passing boats. Additional marker lights may be visible but would not affect the character of the landscape. The majority of the key characteristics of the LCT would not be affected by the test site, even in this area. The scale of the effect on landscape character by day or night is judged to be small. **Geographical extent** The effect will predominantly occur across the section of this LCT between Breckness and Black Craig, which represents a small geographical extent. **Duration and reversibility** Long term and fully reversible. The **magnitude of the effect** on the character of this LCCA is judged to be low.
Level of effect
Overall, considering the scale, extent and duration of the change to the baseline, and the value placed on the resource, the level of effect on this landscape is judged to be **minor**.

Table 7.18 Effects on LCT 13 Cliff Landscapes

Key characteristics
• Eroding coastal features – cliffs, stacks and caves; • Rough grass and montane vegetation right up to cliff edge; • Wildlife interest of salt-tolerant flora; and • Sea birds.
Sensitivity
Susceptibility This LCT is defined by the sea and the coastal edge, creating spectacular scenery. The sections of this LCT within the study area comprise the cliffs of west Mainland and Hoy. These elevated cliffs are open and exposed to the sea, with a strong sense of wildness. The susceptibility is judged to be high. **Value** The cliffs are a feature of the NSA and are noted in the special qualities of the designated landscape. The value of this landscape is judged to be high. The **sensitivity** of this landscape to the devices and activities within the project envelope is judged to be high.
Magnitude of effect
Scale The Hoy section of the LCT is relatively distant from the test site, and the devices and activities within it would not form a large presence in sea views to the north. From the west Mainland section, the devices and activities will be a much larger feature in views, being less than 1km from the coast. They will form a new focal feature in the seaward view, affecting characteristics of scenery and wildness, though other key characteristics will be unaffected. By night, though some lighting is present on passing boats and the cardinal buoys, additional marker lights will be visible in the seaward view. The scale of the effect is judged to be medium across the west Mainland section of this LCT, by day and night, and small elsewhere. **Geographical extent** The effect will primarily occur within this LCT along a narrow strip of coastal landscape extending from Black Craig north to Yesnaby, but not extending any great distance inland. This is judged to be a medium geographical extent in the context of the study area. **Duration and reversibility** Long term and fully reversible. The **magnitude of the effect** on the character of this LCCA is judged to be medium across the area described above, and low elsewhere.
Level of effect
Overall, considering the scale, extent and duration of the change to the baseline, and the value placed on the resource, the level of effect on this landscape is judged to be **moderate**, within the area between Black Craig and Yesnaby.

Appendix 4
Assessment of Effects on Views

7.49 The following tables present a detailed assessment of the effects on views experienced by receptors at five representative viewpoints, listed in Table 3.3. These viewpoints were selected and agreed with consultees as locations where sensitive receptors are present in the study area. This viewpoint assessment has informed the evaluation of effects on visual receptors across the study area, which is presented in Section 5.

Table 7.19 Effects at Viewpoint 1 Yesnaby

Grid reference	Figure number	Direction of views
321823, 1015675	Figure 4	South-west
Receptor type	**Distance to test site**	**Approximate elevation**
Recreational	3.3km	31m

Description of baseline views

This viewpoint sits on a small promontory along the intricate west coast, north of Billia Croo. This area of coastline has a more rugged character than the section south of Billia Croo.

To the north, views of the cliffs continue, with the clifftop mostly undeveloped flat heathland. The exception to this is the car parking area which contains a few scattered derelict buildings. A small but prominent drystone cairn sits between the viewpoint and car park.

Looking inland, there are distant views over mixed farmland and grassy heath, with occasional farm buildings and associated infrastructure. The topography ranges from undulating in the northeast to rolling hills in the southeast. To the south, the dramatic cliffs of Hoy (including the Old Man) are easily visible, drawing the viewer's attention.

The cardinal buoys demarcating the test site are not distinguishable, though marker lights may be seen at night. The floating device currently installed is visible without the aid of binoculars, though is not a noticeable feature.

Sensitivity

Susceptibility

Receptors include recreational visitors viewing the geomorphological features of the cliffs and the remains of an historic fort. Receptors also include users of the coastal core path, for whom an appreciation of the landscape forms part of the recreational experience. Receptor susceptibility is assessed as high.

Value

The view falls within the Hoy and West Mainland National Scenic Area, which includes "*spectacular coastal scenery*", including views to and from Hoy, as a special quality. This is one of the only points at which to access the coast south of Skaill, and the view is promoted locally. The value attached to this view is judged to be high.

The **sensitivity** of visual receptors at this location is judged to be high.

Magnitude of effect

Scale

The test site occupies a small but important portion of the view, entering the field of vision when looking towards Hoy. Due to the elevated position gained from the cliffs at Yesnaby, the extent of the test site is more readily visible. However, some localised screening is offered by the small headlands around Neban Point. Devices and activities within the test site would result in the presence of a number of offshore features in the view towards Hoy, which may create an alternative focal point, but would not cause any visual obstruction due to their low position. At night, marker lights may be a visible but distant feature. The presence of devices and activities in the view is judged to be a medium scale change of view, by day and night.

Geographical extent

Similar views would be experienced from the core path following the coastline towards Billia Croo (approx. 5km), though not from further inland. The visual effects are considered to be medium in geographical extent.

Duration and reversibility

Long term and fully reversible.

The **magnitude of the effect** on receptors at this viewpoint is judged to be medium.

Level of effect

Overall, considering the scale, extent and duration of the change to the baseline, and the value placed on the resource, the level of effect experienced by receptors at this location is judged to be **moderate**.

Table 7.20 Effects at Viewpoint 2 Black Craig

Grid reference	Figure number	Direction of views
322009, 1010994	Figure 5	West
Receptor type	**Distance to test site**	**Approximate elevation**
Recreational	1.2km	111m

Description of baseline views

Black Craig, a high point to the north-west of Stromness, provides an elevated viewpoint out to sea.

The viewpoint is situated in a landscape of coastal cliffs and heath, with views south-east over fields and pastoral farmland towards Graemsay and Scapa Flow. Views inland are somewhat limited by rolling moorland hills in the middle distance. To the southwest, the spectacular cliffs of Hoy provide a dramatic backdrop to Hoy Sound. The view to the west is of the open sea, expansive and largely uninterrupted to the horizon.

This location provides a good vantage point of the whole wave test site, illustrated by the EMEC environmental observation station situated on the summit of Black Craig. This is a small building containing monitoring equipment. The Penguin WEC currently installed is visible without the aid of binoculars, as are the closest cardinal buoys. Marker lights can be seen at night.

Sensitivity

Susceptibility

Representative of views experienced by recreational users of the core path which runs along the cliff top. Receptors are most likely to be moving through the landscape, along this path with continuous views towards the test site. Views towards the cliffs of Hoy are the visual focus when walking southwards. The test site sits in this line of sight towards Hoy. The seascape is relatively undeveloped, barring the clifftop observation station. Receptor susceptibility is assessed as high.

Value

The view falls within the Hoy and West Mainland National Scenic Area, which includes "*spectacular coastal scenery*" as a special quality. This location allows an appreciation of the contrasts between farmland and moorland, and between west Mainland and Hoy, that are also referenced in the special qualities. The value of this view is judged to be high.

The **sensitivity** of visual receptors at this location is judged to be high.

Magnitude of effect

Scale

The entire test site is visible from this point, and devices and activities will form new noticeable features in the sea to the west. When compared to the other large-scale landscape features that are visible, including the towering cliffs of Hoy, the visual presence of these features is likely to be reduced. The test site will be visible as a number of offshore features in the water, of varied size and potentially discordant forms. The 'worst-case' envisages up to 20 devices, of which each may be larger than the present Penguin WEC. However, it is clear from the visualisation (Figure 5) that these features will be spread over a large area of open sea. Marker lights on these devices would be clearly visible in addition to existing lights, and different flashing patterns may cause visual confusion. However, few receptors are likely to be present at night. The devices and activities within the test site would form new focal features in the offshore view but would not cause any visual obstruction. The scale of the change in view is judged to be medium.

Geographical extent

The views from this point are representative of those along the core path from Black Craig to Yesnaby (a length of approximately 5km). The visual effects are considered to be medium in geographical extent.

Duration and reversibility

Long term and fully reversible.

The **magnitude of the effect** on receptors at this viewpoint is judged to be medium.

Level of effect

Overall, considering the scale, extent and duration of the change to the baseline, and the value placed on the resource, the level of effect experienced by receptors at this location is judged to be **moderate**.

Table 7.21 Effects at Viewpoint 3 Outertown

Grid reference	Figure number	Direction of views
323344, 1010055	Figure 6	West
Receptor type	**Distance to test site**	**Approximate elevation**
Recreational, community	1.5km	70m

Description of baseline views

A string of scattered settlement follows the road north-west of Stromness towards Outertown. Sitting on the gentle slope of a hill, below the brow, views inland from this point are restricted.

Looking along the slope to the northwest, grazing land is interspersed with houses and larger farm buildings. The summit of Black Craig provides the skyline to the north-west. Looking south-west down the slope there are extensive views of the open sea, uninterrupted to the horizon. The cliffs and hills of Hoy create a scenic backdrop in the south, while to the south-east is the island of Graemsay with Scapa Flow beyond.

The southern part of the test site is visible from this point, and the closer cardinal buoys can be distinguished. At night, the marker lights on the cardinal buoys can clearly be seen, but are not highly noticeable features in the view. Passing boats include fishing boats in the sound, and the regular Scrabster-Stromness ferry.

Sensitivity

Susceptibility

This viewpoint represents the community of Outertown, comprising scattered farms and houses north-west of Stromness. Although there are relatively few houses along this stretch, many are orientated towards views of the open sea to the southwest. A core path also passes along this minor road, forming a loop route from Stromness. Receptor susceptibility is assessed as high.

Value

The view falls within the Hoy and West Mainland National Scenic Area, which includes "*spectacular coastal scenery*" as a special quality. The views towards the cliffs of Hoy are a component of this designation, and value is judged to be high.

The **sensitivity** of visual receptors at this location is judged to be high.

Magnitude of effect

Scale

The existing wave test site forms a small part of the view from Outertown, including the coastal waters beneath Black Craig to the west. Deployment of further devices/components may increase the intensity of use within this area. The majority of the wider test site will be out of sight behind Black Craig. Devices and activities will be visible as a number of offshore features in the water, of varied size and potentially discordant forms. At night, additional lighting will be visible, but assuming a similar brightness to the existing lights will not be a highly noticeable feature in the seaward view across settled farmland. Devices and activities will form a new focal point in the offshore view, diverting attention from the scenic views of Hoy, though not interrupting these views. The proposed test site would result in a small-scale change in the view.

Geographical extent

Similar views would be experienced by community and recreational receptors from across the Outertown area, and to a lesser extent further east towards Innertown. This is considered to be a medium geographical extent.

Duration and reversibility

Long term and fully reversible.

The **magnitude of the effect** on receptors at this viewpoint is judged to be low.

Level of effect

Overall, considering the scale, extent and duration of the change to the baseline, and the value placed on the resource, the level of effect experienced by receptors at this location is judged to be **minor**.

Table 7.22 Effects at Viewpoint 4 Warbeth Beach

Grid reference	Figure number	Direction of views
323569, 1008526	Figure 7	West
Receptor type	**Distance to test site**	**Approximate elevation**
Recreational	2.9km	2m

Description of baseline views

From the beach, the hills and cliffs of Hoy are the main visual focus, across the water beyond the sandy beach and rocky skerries. To the west, there are views of the open sea to the horizon. The low headland of Breckness extends from the Mainland shore, with the ruins of Breckness House visible. Behind this the hill of Black Craig rises. Views inland from this low elevation are of rolling farmland with associated farms and houses, rising to the ridges of the Innertown area. A number of houses appear on the skyline. Views east towards Stromness and Graemsay are restricted by the local hummocky topography.

Looking northwest from the beach, the southern end of the wave test site is visible in the distance, though the cardinal buoys are not discernible. Passing boats include the regular Scrabster-Stromness ferry and fishing boats in the sound, which will also be visible at night along with marker lights on the southern cardinal buoys.

Sensitivity

Susceptibility

Receptors include walkers on the coastal core path (WM31) which forms a circular route from Stromness, as well as walkers and recreational visitors to the beach, which has its own car park. Similar views, though more restricted, are experienced by visitors to the adjacent cemetery. Receptor susceptibility is assessed as high.

Value

The view is part of the Hoy and West Mainland NSA, which includes "*spectacular coastal scenery*" as a special quality, and this view exemplifies the contrast between the hills of Hoy and the farmland of west Mainland. Parking and seats are provided for the enjoyment of the view. Value is judged to be high.

The **sensitivity** of visual receptors at this location is judged to be high.

Magnitude of effect

Scale

The southern part of the test site will be visible, occupying a portion of the open sea view to the west. The low headland of Breckness and the higher ground further north screen views of the majority of the test site. Due to the low elevation, devices/components would appear as a line of features low on the horizon, and these are unlikely to be prominent from this angle. The dramatic cliffs of Hoy will continue to provide the focal point in the view, further south. At night, due to the low elevation, additional marker lights are not expected to be highly visible, and only those in the southern part of the test site would be seen. Devices and activities within the test site would result in a small-scale change of view.

Geographical extent

Similar visual experiences are limited to this small area of coast and the adjacent cemetery and inland paths, an area no more than 1km across. This is due to the coastline topography, whereby the Project is only intermittently visible from the indented coast. The visual effects are considered to be small in geographical extent.

Duration and reversibility

Long term and fully reversible.

The **magnitude of the effect** on receptors at this viewpoint is judged to be low.

Level of effect

Overall, considering the scale, extent and duration of the change to the baseline, and the value placed on the resource, the level of effect experienced by receptors at this location is judged to be **minor**.

Table 7.23 Effects at Viewpoint 5 Cuilags

Grid reference	Figure number	Direction of views
321013, 1003368	Figure 8	North
Receptor type	**Distance to test site**	**Approximate elevation**
Recreational	5.2km	435m

Description of baseline views

Views from this high point are spectacular and panoramic. To the south the rounded hilltops of Ward Hill are visible across the deep valley, leading down to the sharp cliffs at Rackwick. To the north and north-west, beyond the foreground ridge, there are views over the vast open sea. The low-lying Mainland occupies the north-east of the view. The change in landscape between the west coast cliffs, the settled farmland, and the town of Stromness in the bay, is clearly visible. The island of Graemsay sits within the waters of Hoy Sound, with the Loch of Stenness and the high ground of the Mainland in the distance.

The extent of the wave test site is visible to the north from this elevated position. The Penguin WEC can be seen in clear conditions, and the cardinal buoys are visible with binoculars. Passing boats include the regular Scrabster-Stromness ferry. It is assumed that marker lights on the cardinal buoys are visible by night, but that they would be faint.

Sensitivity

Susceptibility

Receptors are walkers looking for a remote and unspoiled experience. Though there is no formal path, the hill is climbed from the east, and from Rackwick via the path to the Old Man of Hoy, with walkers also accessing Sui Fea above St John's Head to the west. Receptor susceptibility is assessed as high.

Value

A prominent summit with panoramic views across the Hoy and West Mainland NSA. The view exemplifies several of the special qualities of the NSA, such as spectacular coastal scenery, geology, and the visible contrast between Hoy and the Mainland. Value is judged to be high.

The **sensitivity** of visual receptors at this location is judged to be high.

Magnitude of effect

Scale

The test site will be visible in its entirety to the north. At just over 5km distance, the test site will form a modest feature in the view, occupying a similar proportion of the view as the island of Graemsay. Within this area, devices and activities will be seen as clusters of features across the open sea, rather than a continuous mass. Marker lights are unlikely to be a noticeable feature: the presence of receptors at this location by night is also considered unlikely. The test site will create a new feature in the view to the north, but will not detract from the other features that are visible, nor result in any obstruction of the wide panoramas available. The scale of change of in the view is judged to be small.

Geographical extent

The test site will be visible from the hilltops and uppermost slopes of Cuilags, Sui Fea and Lounders Fea, as well as from the summit of the more distant Ward Hill. Receptors climbing these hills are likely to experience similar effects, and the geographical extent is judged to be medium.

Duration and reversibility

Long term and fully reversible.

The **magnitude of the effect** on receptors at this viewpoint is judged to be low.

Level of effect

Overall, considering the scale, extent and duration of the change to the baseline, and the value placed on the resource, the level of effect experienced by receptors at this location is judged to be **minor**.

Appendix 5
Assessment of Effects on Special Qualities of the National Scenic Area

Introduction

7.50 The test site is located partly within the Hoy and West Mainland National Scenic Area (NSA), as shown in Figure 1.

7.51 At the request of Scottish Natural Heritage (SNH) an assessment has been undertaken of the effects of deployments and activities within the project envelope on the special qualities of the NSA.

7.52 The assessment has been undertaken in accordance with the unpublished draft "*Guidance for Assessing the Effects on Special Qualities and Special Landscape Qualities*", prepared by SNH and made available to LUC for the purpose of undertaking this assessment.[3] This seeks to assess the effects of the use of the test site on the qualities that define the landscape of the NSA.

7.53 The special qualities of the NSA are listed in Section 3 and are described in detail in *The special qualities of the National Scenic Areas* (SNH, 2010). As per the guidance, some of the listed qualities have been scoped out of this assessment as there is no potential for them to be affected by the test site. The following special qualities are considered further:

- A palimpsest of geology, topography, archaeology and land use
- The spectacular coastal scenery
- A long-settled and productive land and sea
- A landscape of contrasting curves and lines

7.54 The assessment is presented below in the tabular format recommended by the draft guidance.

[3] LUC was supplied with 'Working Draft 11' of the guidance, dated November 2018.

Assessment of Effects on the Special Qualities of the Hoy and West Mainland NSA

The Development	
This assessment was undertaken to inform an application for Section 36 consent, covering a range of future deployments and activities within the established Billia Croo Wave Test Site. These deployments and activities are set out in a project envelope, which is discussed in detail in Section 4 of this SLVIA Report. The assessment of effects on special qualities has considered the same 'realistic worst-case' development scenario used for the SLVIA, which is defined in Section 4. The extent of the test site in relation to the NSA is shown on Figure 1.	
The Study Area	**How the area is used and experienced by people**
The study area has been defined as the area where the ZTV for the Project overlaps with the boundary of the NSA. This includes the areas of theoretical visibility which extend beyond the 5km study area for the associated SLVIA. Field observations and viewpoint assessments undertaken for the SLVIA confirm that this is a realistic area in which effects may occur. The ZTV indicates visibility along much of the Mainland coast from Row Head south of the Bay of Skaill, down to the headland south of Stromness. Generally, visibility is restricted to the coastal strip and the unsettled hills alongside. The ZTV indicates visibility of the whole site from the north-west of Graemsay, and from the northern coast and hills of Hoy. The ZTV and NSA boundary are shown in Figure 2.	Recreationally, the area is used by people walking along the coastal Core Path WM26 between Stromness and Skaill, and on the other core paths closer to Stromness and on Graemsay. Hill walkers climb the hills of Hoy, including the summits of Cuilags and Ward Hill. Coastal features such as Warbeth Beach or the cliffs at Yesnaby attract tourists and recreational visitors, for whom the seascape is likely to be of great importance. Recreational users of the seas include people sailing or kayaking in the coastal waters, and people on boat trips and diving excursions from Stromness. Intermittent views of the coast will be experienced by people driving along the minor roads in the Outertown area, although these are not main thoroughfares. The Scrabster-Stromness and Stromness-Moaness ferries pass through the area. A small number of houses are in the study area, including the settlements of Outertown and Innertown west of Stromness, and isolated dwellings elsewhere. Visual receptors within the study area are discussed in Section 3 of the SLVIA.

Special quality identified for inclusion in this assessment	Detailed descriptions/ underpinning landscape characteristics	Impacts of the development on key characteristics and effects	Proposed (embedded) mitigation and suggested (residual) mitigation and timescales	Level of impact and possible future risk
A palimpsest of geology, topography, archaeology and land use	Where the coastal cliffs expose the geology, the layering of landform over time is exemplified. Bedding planes become visible, eroded by the sea. Differences in the topography of the Mainland and Hoy illustrate the influence of underlying geology. The archaeological layer of the palimpsest is exposed at various points in the study area, such as at the remains of Breckness House. The surface layer of land use is constantly evolving, more so in the more accessible areas of farmland around Stromness.	The palimpsest described refers only to the landscape, rather than including the seascape. Whilst in place, the test site will add a layer of activity to the offshore palimpsest. As the test site is reversible, however, it will leave no lasting imprint and this layer will not be evident in the longer term.	The proposed deployments and activities are fully reversible in terms of their visible effects.	Whilst in operation, the devices and activities within the test site would extend the 'land use' layer of the palimpsest out to include the coastal waters off the south-west Mainland. The devices and activities would not leave an irreversible imprint. The effect on this special quality will be small in scale and localised in extent, restricted to areas where devices and activities will be clearly seen. The level of effect will be minor.

Special quality identified for inclusion in this assessment	Detailed descriptions/ underpinning landscape characteristics	Impacts of the development on key characteristics and effects	Proposed (embedded) mitigation and suggested (residual) mitigation and timescales	Level of impact and possible future risk
The spectacular coastal scenery	The towering red sandstone cliffs of the north coast of Hoy characterise this special quality. Including the Old Man of Hoy sea stack, and the 338m-high cliffs of St John's Head, the topography of Hoy offers dramatic contrast to that of the Mainland. From the south-west Mainland, the impressive cliffs of Hoy draw the eye. Atlantic waves crashing against the jagged rocks illustrate the raw power of natural forces at work on this high energy coastline. Although much lower in height, the cliffs of the south-west Mainland also exhibit these natural forces, with intricate erosional features of geos and caves. On calmer days, the coastal scenery becomes spectacular for its openness. Expansive views to the horizon offer a feeling of remoteness, with little by way of human intervention, particularly in	Views towards the cliffs of Hoy are the visual focus from much of the coast of the south-west Mainland. When viewed from here (especially from Core Path WM26) the test site often appears in this line of sight towards Hoy. Although the spectacular cliffs themselves will remain undisturbed by the devices and activities, and will still offer a dramatic backdrop, the test site will be seen in the foreground in views of Hoy from the Mainland. Floating or surface-piercing devices have the potential to affect this special quality by introducing another visual focus, particularly around Billia Croo where the test site is closest to shore. Uninterrupted views towards the horizon will be affected, but not obscured. Marker lights will be visible, but 'coastal scenery' is	Restricted device dimensions and numbers proposed in the Project Envelope (e.g. maximum height above sea surface of 12m) go some way towards mitigating the impacts of the development on this special quality. Visual distraction offered by the test site is dependent on the number, type and arrangement of devices. For instance, sub-surface devices are likely to affect the special quality less than surface-piercing ones. However, there is little scope to fully absorb the development into the landscape/seascape, since the potential for some surface-piercing equipment must remain available. Project-specific photographs will be provided following installation within the relevant Project-specific Environmental Monitoring Programme.	This special quality focuses on the visual character of the coastline, and of the northern coast of Hoy in particular. Devices and activities within the test site will be visible when looking towards the spectacular coast of Hoy from much of the Mainland study area. The cliffs will still be the visual focus; however, some disturbance in the foreground view will be experienced from the northern half of the study area. The effect will be medium in scale and localised in extent. The level of effect will be moderate.

Special quality identified for inclusion in this assessment	Detailed descriptions/ underpinning landscape characteristics	Impacts of the development on key characteristics and effects	Proposed (embedded) mitigation and suggested (residual) mitigation and timescales	Level of impact and possible future risk
	the area between Black Craig and Yesnaby.	unlikely to be appreciated at night.	The effects of devices and activities within the test site are fully reversible.	

Special quality identified for inclusion in this assessment	Detailed descriptions/ underpinning landscape characteristics	Impacts of the development on key characteristics and effects	Proposed (embedded) mitigation and suggested (residual) mitigation and timescales	Level of impact and possible future risk
A long-settled and productive land and sea	The southern half of the study area exhibits the fertile grazing land and the linear farmsteads which represent the long-settled productivity of the island. Farmland is backed by rolling heath and grassland, and edged by coastal cliffs. Sight lines downslope towards the coast are reminders of Orkney's inextricable relationship with the sea, which has been used as a resource throughout the inhabited history of Orkney. Historic building remains and souterrains along the coastlines of the Mainland and Hoy demonstrate this historic	The devices and activities within the test site will have no effect on the productivity of the land in the study area. The purpose of the Billia Croo Wave Test Site is to increase the productivity of the sea, by finding efficient ways to utilise its power as a natural resource.	The devices and activities are bounded by the parameters of the project envelope, within which there can be variation. This allows for differences in the form of the devices to be tested, providing for flexibility in the design of devices. This in turn allows developers the flexibility to seek productive device types. There are no on-shore elements included in the assessment.	Arguably, the test site is a modern-day representation of Orkney's productive relationship with the sea as a natural resource. This special quality will not be undermined by devices and activities within the test site. The effect will be small in scale and localised in extent. The level of effect will be negligible.

Special quality identified for inclusion in this assessment	Detailed descriptions/ underpinning landscape characteristics	Impacts of the development on key characteristics and effects	Proposed (embedded) mitigation and suggested (residual) mitigation and timescales	Level of impact and possible future risk
	association. In the present day, the ferries and fishing boats through Hoy Sound illustrate the ongoing reliance on the sea as a productive resource.			

Special quality identified for inclusion in this assessment	Detailed descriptions/ underpinning landscape characteristics	Impacts of the development on key characteristics and effects	Proposed (embedded) mitigation and suggested (residual) mitigation and timescales	Level of impact and possible future risk
A landscape of contrasting curves and lines	The landforms described by this special quality are present throughout the study area: - Rounded hills slope gently towards the coast, truncated by steep rugged cliffs and underscored by the sea; - Linear field boundaries bend around curved inclines; - Squared outlines of buildings are scattered across smooth slopes; and	The definition of this special quality refers to the horizontality of the sea. Devices and activities within the test site will introduce new shapes and surfaces into the seascape. From the water's edge in some locations around Billia Croo, it is possible that the test site could partially interrupt the view to the horizon, breaking up this line.	The effects of devices and activities within the test site on this special quality are dependent on the form of the devices installed. The Project Envelope allows for variation in the form and size of the device, within limits. Due to range of device types and scale described in the project envelope, it has not been possible to provide visualisations (either day or night) of the types of development that may happen at the site. Therefore, photographs will be provided	The nature of the device (e.g. whether it is surface-piercing or sub-surface; whether it is rounded or square; whether it is a single device or an assemblage) will determine the nature of the effect on the visual-spatial patterns of the landscape. Given the extent of the test site in the context of the NSA, the effect on this special quality is likely to be small in scale and localised in extent. The level of effect will be minor.

Special quality identified for inclusion in this assessment	Detailed descriptions/ underpinning landscape characteristics	Impacts of the development on key characteristics and effects	Proposed (embedded) mitigation and suggested (residual) mitigation and timescales	Level of impact and possible future risk
	- Lines of swell are visible from afar, rolling towards the coastline. The size and scale of these forms may differ between the Mainland and Hoy, however this landscape quality is equally present.		following installation within the Project-specific Environmental Monitoring Programme, to illustrate the day and night time characteristics of specific projects.	

Summary of effects and risk, with recommendations

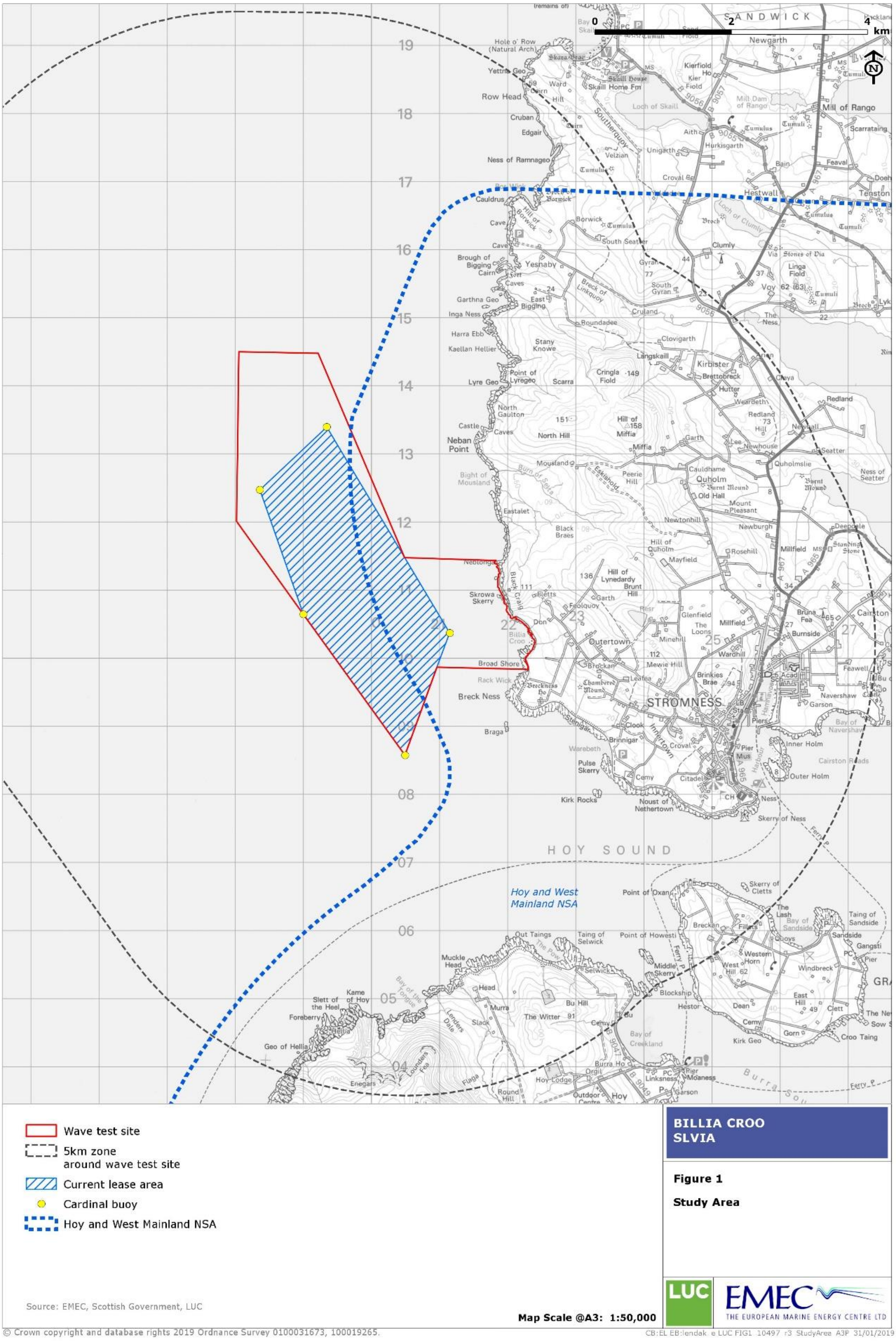
Overall, risk to the special qualities as a result of the devices and activities within the project envelope is low.

A number of special qualities make up the Hoy and West Mainland NSA, with four out of 11 being considered applicable to this particular proposal. Of these, it is the special quality which describes 'the spectacular coastal scenery' which will potentially be affected most by devices and activities within the test site. The effects on this special quality are likely to be felt most from the area around Billia Croo, Black Craig and Yesnaby, where the test site is closest to shore and therefore most visible to people enjoying the scenery. In this area, the presence of devices and activities within the test site would not obscure the coastal scenery, but would add another element of visual focus which may potentially divert the viewer's attention. The presence of lighting in the offshore area is unlikely to affect any of the special qualities examined.

The effects are likely to be felt most when the test site is viewed from elevated locations in close proximity, and particularly in southward views to the hills and cliffs of Hoy. In order to experience the NSA in this way, the viewer is most likely to be passing through the landscape on foot along the core path WM26.

The other special qualities considered in this assessment may be contributed to by the presence of the test site. For instance, marine energy devices contribute towards the productivity of the sea. The exact nature of this contribution is dependent on the nature of the devices/components installed. The scale of effect of the device/component, however, will remain small as it is contained by the parameters laid out in the Project Envelope.

Figures



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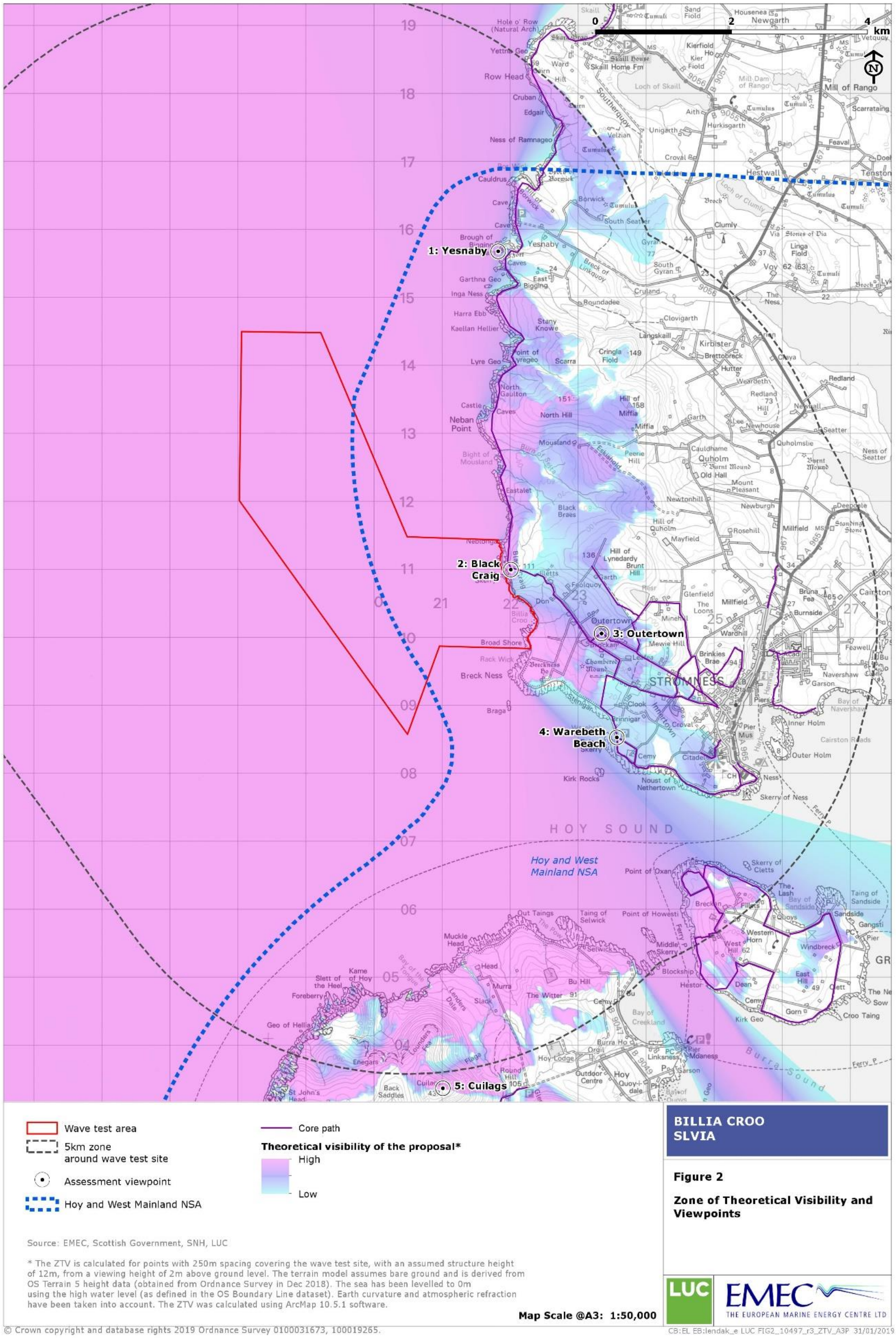

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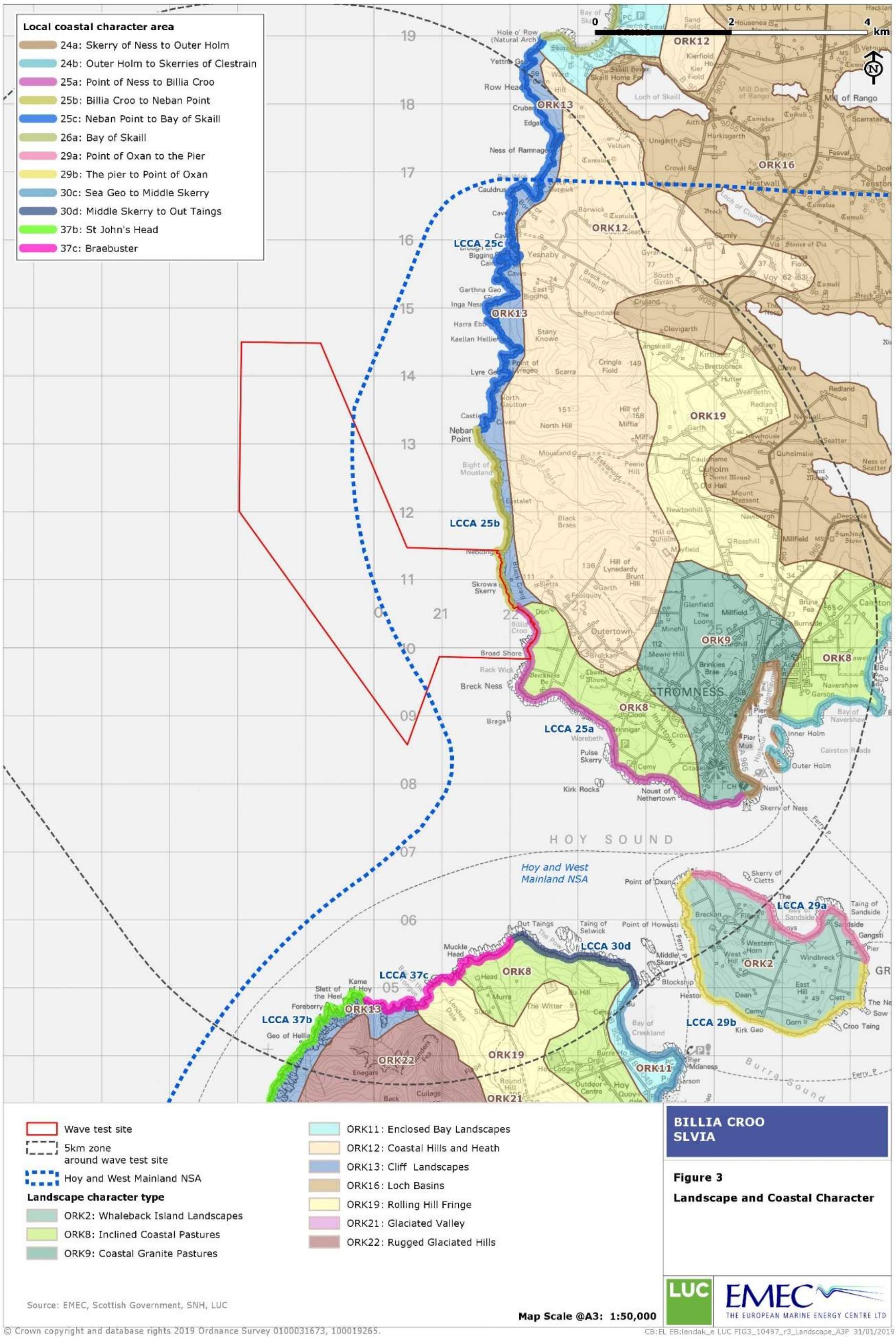

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Figure 4
Viewpoint 1: Yesnaby

OS reference:	321823 E 1015675 N	Horizontal field of view:	90° (cylindrical projection)	Camera:	Nikon D600
AOD:	24 m	Recommended viewing		Lens:	Nikkor AF 50mm f/1.8D
Direction of view:	220°	distance at A3:	25 cm	Camera height:	1.5 m AGL
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Figure 5.1
Viewpoint 2: Black Craig

OS reference:	322009 E 1010994 N	Horizontal field of view:	90° (cylindrical projection)	Camera:	Nikon D600
AOD:	109 m	Recommended viewing		Lens:	Nikkor AF 50mm f/1.8D
Direction of view:	205°	distance at A3:	25 cm	Camera height:	1.5 m AGL
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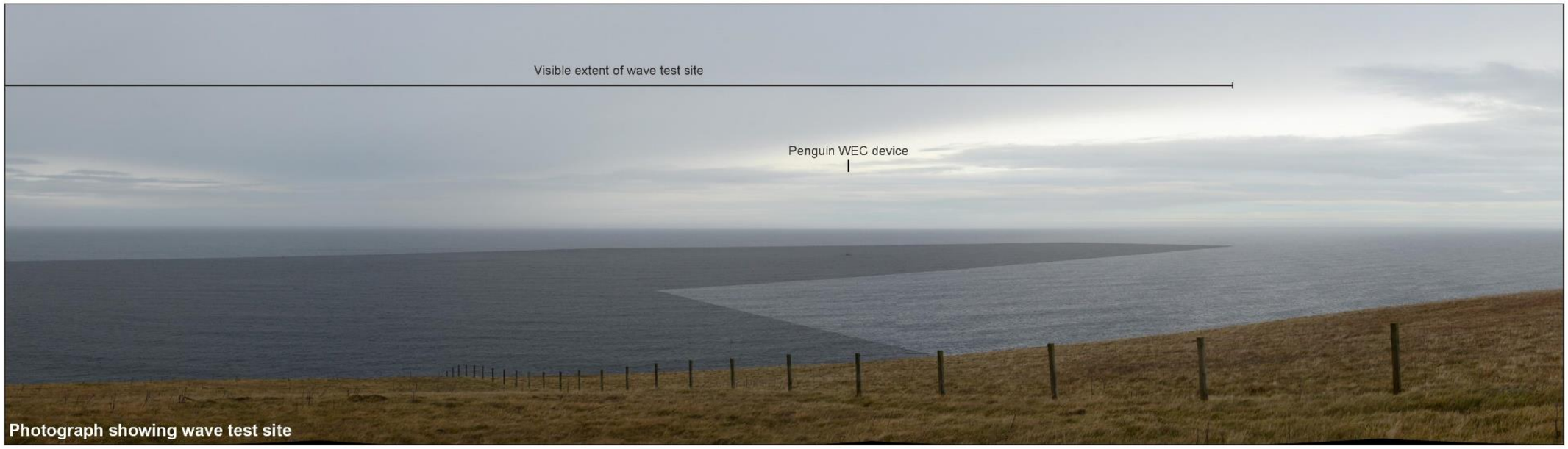

Figure 5.2
Viewpoint 2: Black Craig

OS reference:	322009 E 1010994 N	Horizontal field of view:	90° (cylindrical projection)	Camera:	Nikon D600
AOD:	109 m	Recommended viewing		Lens:	Nikkor AF 50mm f/1.8D
Direction of view:	295°	distance at A3:	25 cm	Camera height:	1.5 m AGL
				Date and time:	14/11/2018 10:15

Figure 6
Viewpoint 3: Outertown

OS reference:	323344 E 1010055 N	Horizontal field of view:	90° (cylindrical projection)	Camera:	Nikon D600
AOD:	78 m	Recommended viewing		Lens:	Nikkor AF 50mm f/1.8D
Direction of view:	275°	distance at A3:	25 cm	Camera height:	1.5 m AGL
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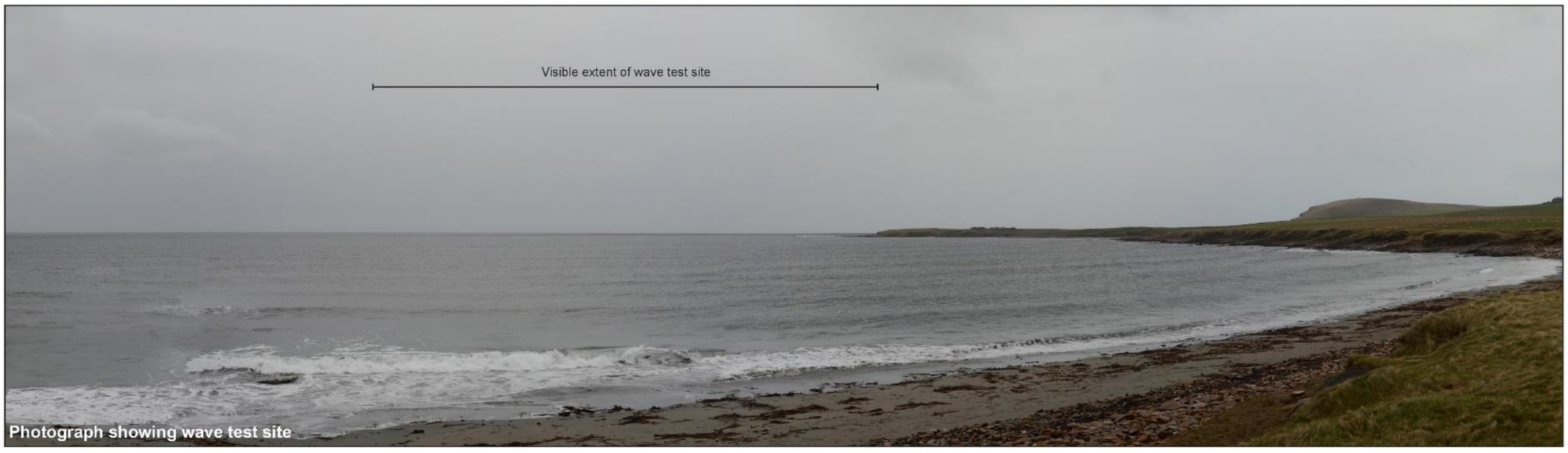

Figure 7
Viewpoint 4: Warbeth Beach

OS reference:	323569 E 1008526 N	Horizontal field of view:	90° (cylindrical projection)	Camera:	Nikon D600
AOD:	7 m	Recommended viewing		Lens:	Nikkor AF 50mm f/1.8D
Direction of view:	295°	distance at A3:	25 cm	Camera height:	1.5 m AGL
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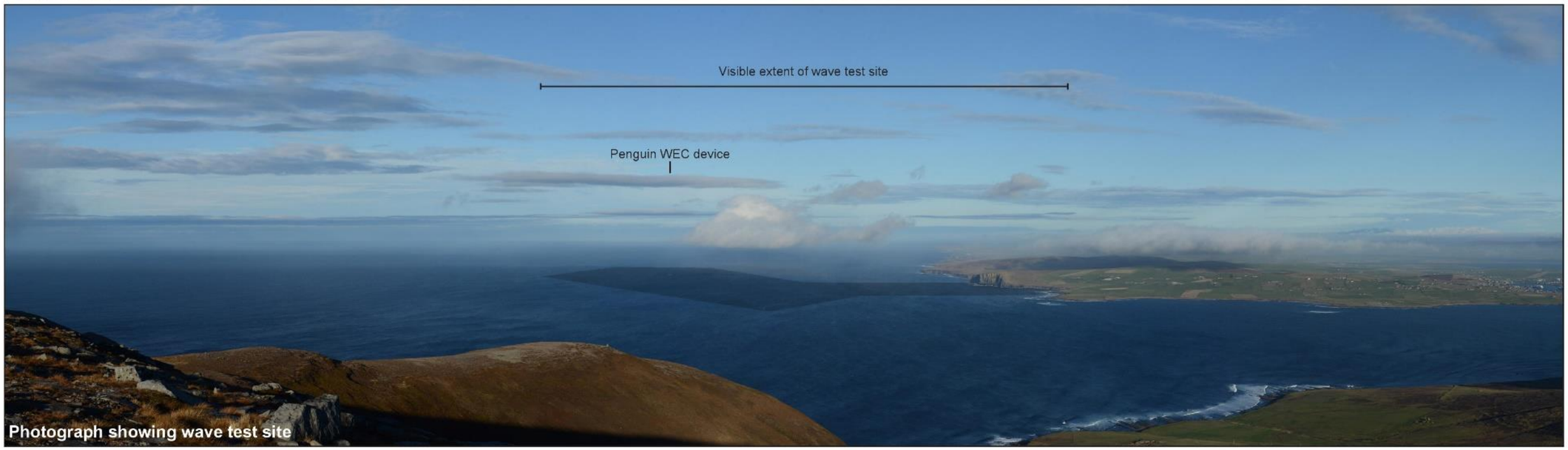

Figure 8
Viewpoint 5: Cuilags

OS reference:	321013 E 1003368 N	Horizontal field of view:	90° (cylindrical projection)	Camera:	Nikon D600
AOD:	431 m	Recommended viewing		Lens:	Nikkor AF 50mm f/1.8D
Direction of view:	355°	distance at A3:	25 cm	Camera height:	1.5 m AGL
				Date and time:	15/11/2018 11:20