

Scottish Natural Heritage

Visualisations for aquaculture

Draft Guidance Note



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Summary of recommendations

To be completed

Visualisations are ...

ZTV maps (maps depicting the Zone of Theoretical Visibility of an aquaculture development) are essential...

Photomontages

Introduction

Visualisations inform decision-makers about the likely effects of an aquaculture proposal. They help to inform local communities and the wider public about what change is likely if the planned development takes place. Therefore, it is important that they are of a good standard that reasonably portrays the likely effects of proposed development.

'*Visualisations for aquaculture*' offers guidance on how to prepare illustrations of the likely landscape and visual effects of a proposed development for marine aquaculture. It supplements SNH's 2011 guidance on *The Siting and Design of Aquaculture in the Landscape*¹, jointly prepared with the Scottish Salmon Producer's Organisation and Association of Scottish Shellfish Growers. That explains the legislative requirements to undertaking an assessment. It offers advice on selecting an appropriate location for aquaculture in relation to the landscape; and outlines the considerations to be made in siting and designing equipment and installations to lessen their visual impact and impact on landscape character.

Usually, visualisations are one part of an Environmental Statement which offers a key means of explaining the likely effects of a proposed development. Although they can never replicate the full experience of seeing a fish farm or shellfish farm on site, visualisations are important technical documents that need to follow basic principles if they are to communicate as best as possible the likely effect of an aquaculture proposal. It is important to understand the limitations of visualisations, as well as their appropriate uses. Photographs, photomontages and sketches – can assist in representing how a proposal will appear in its surroundings; how it will change views, for example from a coastal path or tourist route. This guidance explains more about these aids to inform both decision makers and local communities. .

BACKGROUND

Landscape and Visual Impact Assessment

Visualisations are undertaken within a Landscape and Visual Impact Assessment (LVIA) either as part of an Environmental Impact Assessment (EIA), or part of a planning application. LVIA is the method used to identify and assess the effects of, and significance of, change resulting from development on both the landscape as an environmental resource and on people's views and visual amenity (ref).

General guidance on LVIA preparation is given in the Guidance for Landscape and Visual Impact Assessment², commonly referred to as GLVIA. 'Landscape' is taken to include the marine and coastal environment: e.g. '*assessment of the Landscape and Visual effects of change in the marine and coastal environments should carefully consider the relationship between land and sea in coastal areas and...the open sea*' (GLVIA, para. 2.9).

¹ SNH, 2011 *The siting and design of aquaculture in the landscape: visual and landscape considerations*. Available at: <http://www.snh.org.uk/pdfs/publications/heritagemanagement/marineaquaculture.pdf>

² Guidelines for Landscape and Visual Impact Assessment, 3rd edition, 2013 (GLVIA)

In applying GLVIA principles to any EIA for aquaculture the following landscape issues (see *The siting and design of aquaculture in the landscape: visual and landscape considerations*, 2011 p.51) are relevant:

ENVIRONMENTAL IMPACT ASSESSMENT FOR AQUACULTURE: SUMMARY OF LANDSCAPE ISSUES

The landscape component of an Environmental Statement (ES), should:

- Demonstrate the options considered for the development location, and explain the reasons for the preferred location; include an explanation of environmental as well as economic, social and practical considerations;
- Explain how the proposal relates to relevant planning guidance for the area and the policies of other consultees; and
- Where the proposed location lies within, or near to a designated area, consider and describe the likely impact of the development on the qualities for which the area has been designated.

Developers are required to present an assessment of the impact of a scheme on the landscape and how any identified significant adverse impacts can be reduced by mitigating measures. Therefore an ES is likely to include:

- Information from the appropriate spatial plans and development plan policies, including how the relevant advice and guidance has been used to help locate and design the proposal;
- An explanation of how the proposed scheme responds to the key characteristics of the local coastal landscape, including details of how any predicted adverse impacts on the landscape character or visual amenity will be mitigated;
- If appropriate, an explanation of how the proposal will avoid creating an adverse cumulative impact on the landscape;
- A visual impact assessment (see Section 4 of this guidance); and
- A map indicating key viewpoints, accompanied by illustrations or photomontages. These should illustrate how the final, mitigated proposal will be seen in context.

Visualisation techniques

Visual analysis forms one part of visual impact assessment, itself a component of LVIA. It is essential that a proposal is assessed within its wider landscape and visual context, and visualisations are important in illustrating this. Preparing and producing photographs and photomontages require a degree of skill, and should be of good quality.

Many of the principles in preparing visualisations for other forms of development apply to preparing those for aquaculture proposals. Recent experience of

visualisation techniques comes largely from their use in wind farm assessment, and many of the principles can be applied to aquaculture.³

Visualisations include plans, maps, wirelines, photographs and photomontages. Different types are likely to be used at different stages in the assessment process. The main forms for aquaculture proposals will be plans, location maps, zones of theoretical visibility (ZTV) maps, and photomontages. Plans and location maps are straightforward to produce so this guidance focuses on ZTV maps and photomontages.

Zone of Theoretical Visibility Maps

The main considerations in undertaking a visual assessment: how to select key viewpoints, the types of views to consider and how to cater for the different groups of people who will view the development (whether residents, tourists or visitors) are set out in section 4 of SNH's 2011 guidance on *The siting and design of aquaculture in the landscape* and also in GLVIA.

An initial stage in a visual assessment is the preparation of a map depicting the Zone of Theoretical Visibility (ZTV maps). They are used to help identify the LVIA study area and key viewpoint locations (see section below on viewpoint selection). The following is a summary of the main points. More detailed information, albeit tailored to turbine proposals, is available in SNH's wind farm visualisation guidance (see section 2, para 24 – 70).

ZTV maps depict the area over which a development can theoretically be seen, based on a Digital Terrain Model (DTM) and overlaid on a map base. They are produced using a specialised software package. Operation of even the most user-friendly of these requires a high level of expertise and understanding of the features and assumptions in the software. The name and details of software used should be noted in the ES and on the ZTV itself, including the version and date of the data used.

While ZTVs are a very useful tool, they do require careful interpretation. The maps represent only **theoretical** visibility as the proposal may not be visible in reality due to localised screening. They do not give any idea of what a development will look like, nor the nature or magnitude of any change.

A site visit combined with a ZTV will help in deciding on a provisional list of viewpoints. At this stage, it is useful to consult the determining authority and consultees to judge how representative the list is of the range of likely landscape and visual receptors, and whether they include particularly sensitive vantage points. Designated landscapes and popular walking and scenic routes can also be considered.

A ZTV map indicates areas from where an aquaculture development is theoretically visible within the study area, but it cannot show what it will look like, nor indicate the nature of landscape or visual impacts.

³ SNH, 2014, *Visual Representation of Windfarms*. Available at: <http://www.snh.org.uk/pdfs/publications/heritagemanagement/Visual%20representation%20of%20wind%20farms%20-%20version%202.1%20-%20December%202014.pdf>

ZTV CONSIDERATIONS

The viewer height in a ZTV map is generally 2m above ground level. This is higher than the camera height recommended for photography (1.5m) to compensate for potential inaccuracies in digital terrain data.

The DTM generally uses topographic information to present the **bare ground visibility**. In some cases it may be necessary to consider forestry which will screen a development site, but forestry does not provide a permanent screen, as it will be felled and replanted over a period of time. As a general rule ZTVs should be generated to err on the side of caution, over-representing visibility.

ZTV production requires accurate data on the locations of the proposal (e.g. cages and feed barges). The height of structures will also need to be provided; a general height of cage superstructure may suffice. Onshore infrastructure may need to be included.

Extent of ZTV

The extent of the ZTV map, illustrating locations from where the development will potentially be visible, should extend far enough to include the areas where significant visual impacts are likely to occur (acknowledging that these cannot be established until the impact assessment has been completed; but the ZTV provides an essential starting-point). This forms the basis from which, the LVIA 'study area' will be agreed.

The extent of the ZTV required may need to be adjusted inwards or outwards according to the specific characteristics of the landscape and/or the development. For example:

- where a development is proposed for a steep-sided, narrow loch with limited access and no high-level views, the visual effect is likely to be restricted within the loch system. A ZTV with a radius of 2km may suffice. But for elevated views, the nature of view will differ and it may be necessary to consider a greater distance;
- where a proposal is sited in an open or expansive coast, the ZTV radius will be greater, e.g. 10km.;
- other factors such as complex seaways or straits, or the presence of ferry routes, or sensitive viewpoints may require a larger ZTV radius to ensure they are appropriately considered;
- when illustrating cumulative effects with a series of ZTVs, the overall radius is likely to be larger still (15km+).

The extent of the ZTV should be discussed with, and will be agreed by, the determining authority and consultees. Separate maps may be required for onshore and water-based equipment, and discussion with the determining authority and consultees will help with deciding whether this is appropriate.

Figure 1 shows assessment of likely impact, testing viewpoints from opposing shores up to 8km away.

Presentation of ZTVs

A ZTV should be presented on a single sheet of paper using OS 1:50,000 as the base map. For a ZTV to be clear and legible when overlain with colour-shading, the base map needs to be in greyscale. This is to prevent confusion of overlays. The base map must also be of a high quality resolution and not too light or dark.

Each cage, or line of buoys, and feed barge should be clearly marked on the ZTV. Numbered viewpoint locations should also be shown on the main ZTV, labelled so as to avoid obscuring ZTV information. For ease of legibility, and particularly with larger radius ZTVs, concentric rings to indicate different distances from the proposed development, e.g. 2km, 5km are recommended.

Areas of potential visibility should be illustrated by a colour overlay. This should be transparent so the detail of the underlying OS map can be seen clearly. It should be legible by colour-blind people. Information on key assumptions made in ZTV production must be shown or summarised in the ES.

Viewpoint selection

The quality of viewpoints – that they are appropriate to the range of landscape sensitivities and receptors– is essential to a fair assessment.

It is essential that the number of key viewpoints is proportionate to the assessment. The final decision on the list of proposed viewpoints is determined by the planning authority. Section 4 in SNH's 2011 siting and design guidance provides detail on viewpoint selection.

Viewpoint locations will be established in agreement with the planning authority, They are likely to include design viewpoints, by which the location and design may be amended; and illustrative viewpoints to show likely effects. It will also decide which views need illustrated by photomontage. In addition to being useful for assessment and illustration, viewpoints ought to be accessible. The illustration should have a thumbnail map and grid reference to show the precise location, so a viewpoint can easily be found by assessors and others.

Fixed viewpoints are easiest for good quality photography. Thus, if offshore viewpoints are needed, e.g. from ferry routes, judgement must be made as to whether conditions will enable the resulting photographic quality to illustrate clearly the likely appearance of the development. It is also difficult to judge the distance or scale of an object when it is out at sea, especially where there is no 'scale indicator' in the view to give a familiar, comparative size. Therefore, in preparing photographs, consider any reference points on shore or in the view, and give the viewpoint's precise geographical reference point as this will help the viewer to place the image in its context on site. Existing landmarks like lighthouses, and prominent on-shore buildings and landmarks will aid in estimating the scale and extent of a development, while distinctive landforms like cliffs, headlands, hills and islands will be key to appreciating effects at the location (see Fig. 2).

Visualisations

Photomontages

Photomontages combine a photograph of an existing ‘baseline’ view with a computer-rendered image of a proposal. Thus **photomontages illustrate the likely view of the aquaculture proposal as it would be seen in a photograph**. While photomontages are based on a photograph of the existing landscape view, they **are not a substitute for a field visit**. They are one tool to aid the assessment of a proposal. Nevertheless, they are useful as they help gain an understanding of the potential appearance – scale, form and configuration – of a development.

Photomontages and ZTVs at A3 will generally suffice for illustrating aquaculture proposals. There may be occasions when larger images are required (e.g. close-up views of larger schemes or from sensitive viewpoints). The planning authority will determine if this is needed.

Paper copies of visualisations must be supplied to decision-makers and consultees, and members of the public must also have access to these colour, paper copies. This ensures the same images are referred to. Visualisations are useful but they must be used with care. The following table outlines the scope of their usefulness:

Usefulness	Limitations
Visualisations given an impression of a proposed aquaculture development and how it will look in its landscape context.	Neither photographs nor illustrations can replicate a view as seen in reality by the human eye.
Used carefully in the field, visualisations can be used to inform assessment; and aid development and appraisal of a development’s layout and design.	Visualisations provide a tool for assessment that can be compared with an actual view in the field; they are not a substitute for a site visit.
	Images are static and do not convey wave movement; they can only represent the view from a single location at a particular time and in particular weather and light conditions.

The weather conditions and light quality in our coastal and marine environment changes rapidly and is far more variable than inland, so it is not possible to represent the whole spectrum of conditions. Visualisations need to show optimum visibility and clarity – how a development is likely to appear in the clearest conditions.

Photography

Undertaking photography for visualisations requires high quality specification and equipment. SNH's wind farm visualisation guidance (e.g. Annex F on cameras, lenses and data provision), together with the Landscape Institute's photography and photomontage Advice Note 01/11⁴, provide detail on this. The key points, for the recommended method of producing photomontages for aquaculture proposals, are summarised in Table 2 on the next page.

Aquaculture equipment and structures: what to illustrate

Visualisations should depict the range of structures to be used, the scale and configuration of equipment, including the colour schemes of any feed barges and larger structures including accommodation modules, used. How the feed barges are located in relation to the cage layout and, in turn how these relate to the coastline can all be represented by photomontage from an agreed viewpoint.

Where the proposed aquaculture development is an oyster farm, which is located in the intertidal zone, then the visualisations should present the situation at low tide. Although oyster trestles are submerged for much of the time, and are only intermittently visible, the foreshore is particularly sensitive and light effects can contrast dramatically with surrounding land.

⁴ Landscape Institute Advice Note 01/11. *Photography and photomontage in landscape and visual assessment*. Available at <http://www.landscapeinstitute.org/PDF/Contribute/LIPhotographyAdviceNote01-11.pdf>

Table 2 Specification for preparing photographs : Key Points		
Photography	Camera	Full Frame Sensor Size, on a tripod. This helps achieve good quality images at the correct scale; it also enables the scale of an image to be verified if necessary.
	Lens	50mm fixed focal length
	Camera height	1.5m (unless alternative height is justified, in agreement with planning authority)
	Location	Grid reference, relevant location map, and photograph of tripod location provided
Photomontage	Image	Clear of foreground objects, though identifiable features may be required in coastal locations; check with planning authority.
	Conditions	Visibility sufficiently good. Enhancement or rendering cannot compensate for photographs that have been taken in poor light or weather conditions. Photos may need to be re-taken if the images are not adequate.
	Photomontage	A3 single frame photomontage with a HFOV = 27 degrees VFOV = 18.2 degree, with principal distance of 812.5mm. This will be cropped from the 50mm single camera frame. (There may be rare occasions where it is necessary to produce a 53.5 degree planar projection photomontage to illustrate the development. This should have a HFOV of 53.5 degrees, VFOV = 18.2 degrees and be 820mm in length.)
	Baseline photograph	A3 single frames from viewpoints agreed with determining authority. The preferred option is A3, image size , HFOV 27 degrees. Where this would not provide adequate context, an A3 image with HFOV of 39 degrees may be used.
	Principal distance	Printed on photomontages
Maps	Viewpoint map	To include overall viewpoint location map (combined with ZTV). Generally, A3 will suffice. In addition, a thumbnail location map provided on each photomontage.

Production of images

The proposed development needs to be accurately located within the baseline photograph. An accurate GPS position, taken when the photography was carried out, should be sufficient. Where there are few topographic features to facilitate a match, then man-made features may need to be used but these are harder to identify accurately from maps. Adjustments should be made until a satisfactory match between topographic or other features across the image to ensure there are no errors of scale.

Lighting conditions in the photomontages should be reasonably faithful to that in the baseline photograph. Consequently, the date and time at which the photographs were taken should be recorded by the photographer or assessor.

Fig: 1

- Map of 'Zone of Theoretical Visual Influence' identifies the proposal's extent of visibility
- Key viewpoints are selected



Legend

- Proposed Cage Grid
- Proposed Moorings Extent
- Proposed Feed Barge

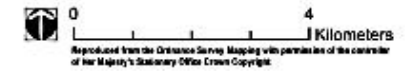
Zone of Theoretical Visibility

- Pens and Barge Theoretically Visible

Viewpoints

VPNUM, VPNAME

- 1 Track from Onziebust, Wyre
- 2 Stromness Taing, Wyre
- 3 Track to Bay of Vady
- 4 Minor Road, Egilsay
- 5 Knitchen Hill
- 6 Tingwall Pier
- 7 Rousay Ferry
- 8 Enyas Hill
- 9 Westray Ferry
- 10 Aiker Ness
- 11 Rd Junction to Woodwick
- 12 Shapinsay core path



WYRE FISH FARM
Landscape / Seascape Visual Impact Assessment

ZTV and viewpoint locations

Fig No. LVXX

HM 667-LV02 ZTV and viewpoints-RevA

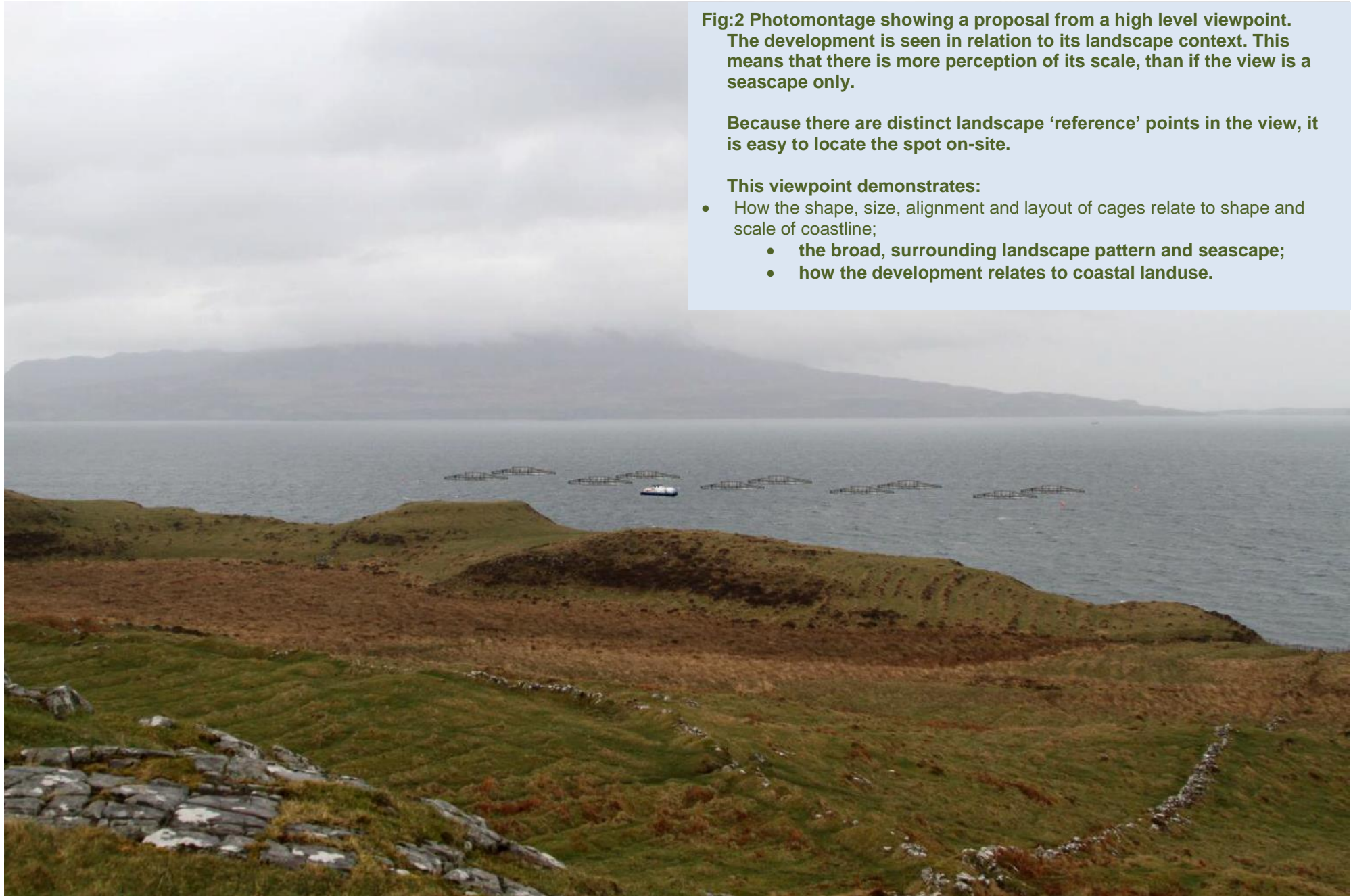


Fig:2 Photomontage showing a proposal from a high level viewpoint. The development is seen in relation to its landscape context. This means that there is more perception of its scale, than if the view is a seascape only.

Because there are distinct landscape 'reference' points in the view, it is easy to locate the spot on-site.

This viewpoint demonstrates:

- How the shape, size, alignment and layout of cages relate to shape and scale of coastline;
 - **the broad, surrounding landscape pattern and seascape;**
 - **how the development relates to coastal landuse.**

References

Landscape Institute Advice Note 01/11. *Photography and photomontage in landscape and visual assessment*. (Available at: <http://www.landscapeinstitute.org>).

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Useful links

draft

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Scottish Natural Heritage
Great Glen House
Leachkin Road
Inverness IV3 8NW

www.snh.gov.uk



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