

CHAPTER 16: SEASCAPE, LANDSCAPE AND VISUAL AMENITY

Technical Summary

A number of visual impacts on the seascape of the Angus coastline have been identified from assessment of the Seagreen Project. During the construction phase of Project Alpha and Project Bravo the impacts on seascape character and landscape character, associated with the high intensity lighting required for night time working, are predicted to be not significant. Installation of the export cables is predicted to have significant impact as the works move progressively towards the shore, however, this will be limited to a relatively short period of time.

For Project Alpha two significant impacts on seascape character have been assessed and two significant impacts on visual amenity. No significant impacts are assessed for Project Bravo.

The Seagreen Project is predicted to result in a number of cumulative visual impacts, including those described for Project Alpha, and also on recreational pursuits, vantage points and tourist attractions. The Seagreen Project is also predicted to combine with a number of other onshore and offshore wind farms as well as other projects to produce cumulative and in-combination impacts. The majority of these cumulative impacts are not significant however significant impacts on four seascape character units and two viewpoints have been assessed cumulatively with neighbouring offshore wind farm sites.

INTRODUCTION

- 16.1. This chapter of the Environmental Statement (ES) describes the impact of the Seagreen Project on the existing landscape and seascape character, as well as providing an assessment of the visual impacts of the Seagreen Project within the Zone of Theoretical Visibility (ZTV).
- 16.2. The aspects of the Seagreen Project considered in this chapter are Project Alpha, Project Bravo, the Transmission Asset Project and the meteorological masts, as described in Chapter 5: Project Description in this ES. Throughout this chapter, this assessment will be referred to as a Seascape, Landscape and Visual Impact Assessment (SLVIA). The assessment considers impacts upon:
 - seascape / landscape character and quality; and
 - visual amenity caused by change in the appearance of the landscape or seascape as a result of the Seagreen Project.
- 16.3. This assessment does not consider the onshore cables and substation works from mean high water springs (MHWS) to the point of connection to the electrical network at Tealing Substation, as this will be considered under a separate planning application and associated ES to be submitted to Angus Council under the Town and Country Planning (Scotland) Act 1997 (as amended).
- 16.4. With specific reference to the Department of Trade and Industry (DTI) publication '*Guidance on the Assessment of the Impact of Offshore Wind Farms: Seascape and Visual Impact Report*' (2005) (referred to hereafter as the DTI guidance on SVIA), this assessment considers:
 - direct impacts or physical changes to seascape (for example through development on the coastal edge);

- indirect impacts on the character and quality of the seascape (for example through the development of offshore wind turbine generators (WTGs), substation(s) and meteorological mast(s) causing changes in the perception of the seascape);
- direct impacts on the visual amenity of visual receptors (for example, changes in available views of the sea and their content due to the development of OWFs); and
- indirect impacts on visual receptors in different places (for example an altered visual perception leading to changes in public attitude, behaviour and how they value or use a place).

- 16.5. The SLVIA has been prepared by Pegasus Environmental (part of the Pegasus Planning Group).
- 16.6. All figures (Figures 16.1 to 16.56) can be found in ES Volume II: Figures, Part 2. Appendices K1 to K4 can be found in ES Volume III: Appendices.

CONSULTATION

- 16.7. Detailed consultation has taken place between the Forth and Tay Offshore Wind Developer Group (FTOWDG), Scottish Natural Heritage (SNH), Marine Scotland and local authorities (including Angus Council, Fife Council, East Lothian Council and Scottish Borders Council), on issues relating to seascape, landscape and visual amenity. The nature and extent of these consultations is outlined below.
- 16.8. The FTOWDG was formed to agree on collaborative studies and data collection and where possible to agree on consistent methodologies for impact assessment. It represents the developers of the three offshore wind farms currently proposed in the area (The Seagreen Project, Neart na Gaoithe and Inch Cape).
- 16.9. The FTOWDG undertook consultation through two meetings with SNH, Marine Scotland and local authorities (including Angus Council, Fife Council, East Lothian Council and Scottish Borders Council) on 15th June and 26th July 2011. The key outcome of this consultation was agreement on a list of viewpoints, which was adopted by all developers for the purposes of SLVIA. These viewpoints are listed in Appendix K1.
- 16.10. A series of discussion documents were prepared by FTOWDG, most recently on the Approach to Assessment of Landscape, Seascape and Visual Cumulative Effects (FTOWDG, 2011). This set out a methodology and approach to the assessment of cumulative impacts, which will form the basis for SLVIA for all FTOWDG developments.
- 16.11. A Regional Seascape Character Assessment, including an appraisal of sensitivity to offshore wind farm development, was undertaken by the landscape consultants representing the developers of FTOWDG. This document is included in Appendix K2, and will serve as a baseline for assessing impacts on seascape character for all FTOWDG developments. Seascape character is discussed further in the Sections 'Assessment Methodology' and 'Impact Assessment – Operation'.
- 16.12. The assessment methodology including extent of the study area, viewpoint selection and significance matrices have been agreed with SNH, through email correspondence on 21 September 2011.
- 16.13. Table 16.1 summarises the issues that were highlighted by the consultees in the Scoping Opinion received from Marine Scotland in January 2011 and indicates which sections of the chapter addresses each issue.

Table 16.1 Summary of consultation and issues

Date	Consultee	Issue	Relevant chapter paragraph
January 2011	SNH & Joint Nature Conservation Committee (JNCC)	SNH recommend that SLVIA is carried out in accordance with best practice guidance documents.	16.20 – 16.21
January 2011	SNH & JNCC	<p>SNH make the following recommendations:</p> <p>Wind farm design should be resolved through an iterative EIA process, ensuring that the schemes in this development cluster are complementary and respect design principles;</p> <p>That there is a liaison meeting between the FTOWDG and SNH to discuss SLVIA for each proposal, and cumulatively, prior to work being commissioned;</p> <p>That Chartered Landscape Architects, preferably a team of two, carry out (cumulative) SLVIA;</p> <p>That developers, preferably co-ordinated through FTOWDG, make contact with Natural England in respect of cross-border impacts; and</p> <p>That a cumulative SLVIA is co-ordinated jointly via FTOWDG.</p>	Undertaken during the FTOWDG process
January 2011	SNH & JNCC	<p>In respect of this Round 3 zone, potential cumulative landscape and visual impacts will arise for each individual wind farm proposal in the zone with:</p> <p>a. Other offshore wind farm proposals in the same zone. (Zone 2)</p> <p>b. Other offshore wind farm proposals in the same region. (The outer Firths of Forth & Tay)</p> <p>c. Other onshore wind farms approved / in the planning system.</p>	16.357 – 16.436
January 2011	SNH & JNCC	For the cumulative visual impact assessment, SNH recommend an initial ZTV for cumulative study out to a radius of 50km, noting that onshore patterns of wind farm development will be relevant to the study.	16.357 – 16.436
January 2011	SNH & JNCC	Viewpoints should be selected after negotiation with Marine Scotland, SNH and the relevant planning authorities and public consultation.	16.9, 16.12, 16.39 – 16.47, 16.80, 16.138 – 16.143
January 2011	SNH & JNCC	Viewpoint selection should be based on the identification of potentially sensitive receptors (people, places and activities) and potentially significant views, locations or landscapes, taking into account the likely impacts of the development. Viewpoints will ideally be the same for EIA assessment as they will be for Cumulative Impact Assessment. Viewpoints should be selected to cover a range of view types and viewers.	16.9, 16.12, 16.39 – 16.47, 16.80, 16.138 – 16.143

Date	Consultee	Issue	Relevant chapter paragraph
January 2011	SNH & JNCC	Any (cumulative) SLVIA report should provide the following information to reference each visualisation: the precise location of the viewpoint (including 12 figure OS grid reference and a brief description), its orientation to and distance from the proposed development, the viewpoint height, nature of view (width of view in degrees and bearing of key foci within view) and conditions of assessment – including date, time of day, weather conditions and visual range. It is helpful if this information is presented alongside each visualisation including a small insert map (based on a 1:50,000 OS base map) to show the viewpoints detailed location and direction.	16.357 – 16.436
January 2011	SNH & JNCC	The characteristics visible from each viewpoint that are sensitive to wind farm development should be described and assessed, particularly in relation to the changes the development would cause. Factors such as season, weather, air clarity, movement, orientation to prevailing winds, elevation of the wind farm in relation to the viewer, and any screening elements may be relevant. The design and layout of the turbines and other components of the wind farm, as it would appear from each viewpoint, should also be described and assessed.	16.220 – 16.334
January 2011	SNH & JNCC	Details of the types of receptors, and an assessment of their sensitivity, should be included.	16.53 – 16.62, 16.68 – 16.188

ASSESSMENT METHODOLOGY

16.14. This section describes the methodology used to carry out the SLVIA. This methodology has been specifically devised by Pegasus Environmental for the seascape, landscape and visual impact assessment of offshore wind farms, and has been agreed with SNH, through email correspondence, on 21st September 2011. The methodology accords with guidance given in the 2005 DTI publication, ‘Guidance on the Assessment of the Impact of Offshore Wind Farms: Seascape and Visual Impact Report’. Project Alpha and Project Bravo are assessed separately and are presented as two assessments in this chapter. Detailed information about each wind farm is described in Chapter 5: Project Description of this ES.

Distinction between Seascape, Landscape and Visual Impacts

- 16.15. The published Landscape Institute guidelines on Landscape and Visual Impact Assessment (LVIA) (Landscape Institute and the Institute of Environmental Management and Assessment, 2002) relate primarily to onshore developments. The guidelines differentiate between landscape and visual impacts and suggest that they should be assessed separately, although the procedure for assessing each of these elements is closely linked.
- 16.16. DTI guidance on Seascape and Visual Impact Assessment (SVIA) introduces a new term, namely ‘seascape’. In order to differentiate between landscape and seascape impacts, it is first necessary to define these two terms. The DTI guidance on SVIA defines seascape as *“the coastal landscape and adjoining areas of open water, including views from the land to sea, from sea to land and along the coastline”*, and describes *“the effect on landscape at the confluence of sea and land”*.

- 16.17. Essentially the term seascape is therefore an extension of the landscape concept to take account of the open water beyond the mainland. The DTI guidance states that “*Every seascape therefore has three defined components:*
- *an area of sea (the seaward component);*
 - *a length of coastline (the coastline component); and*
 - *an area of land (the landward component). ”*
- 16.18. By contrast, the landscape starts at the coastline and includes all areas inland even where there are no views or direct experience of the sea.
- 16.19. The following distinction between landscape, seascape and visual impacts is used in this chapter and has been adapted from the Landscape Institute and DTI guidance:
- landscape impacts relate to the impacts of the Seagreen Project on the physical and perceptual characteristics of the landscape and its resulting character and quality;
 - seascape impacts relate to the impacts of the Seagreen Project on the physical and perceptual characteristics of the seascape and its resulting character and quality; and
 - visual impacts relate to the impacts of the Seagreen Project on views experienced by visual receptors (e.g. residents, footpath users, tourists, boat users etc) and on the visual amenity experienced by those people. As per the Guidelines for Landscape and Visual Impact Assessment (Landscape Institute, 2002), visual amenity is defined as “*the value of a particular area or view in terms of what is seen*”

Published Guidance

- 16.20. This SLVIA has been undertaken in accordance with current best practice as outlined in the following published guidance documents:
- DTI in association with the Countryside Agency, Countryside Council for Wales and Scottish Natural Heritage (2005). Guidance on the Assessment of the Impact of Offshore Wind Farms: Seascape and Visual Impact Report;
 - Landscape Institute and the Institute of Environmental Management and Assessment (2002). Guidelines for Landscape and Visual Impact Assessment, 2nd Edition; and
 - Swanwick, C (2002) Landscape Character Assessment – Guidance for England and Scotland. The Countryside Agency and Scottish Natural Heritage.
- 16.21. Elements of best practice have also been adapted from the following documents:
- Horner + Maclellan and Envision (2006) Visual Representation of Wind Farms – Good Practice Guidance. Report for Scottish Natural Heritage, The Scottish Renewables Forum and the Scottish Society of Directors of Planning;
 - Hill, M, Briggs, J, Minto, P, Bagnall, D, Foley, K, Williams, A. (2001) Guide to Best Practice in Seascape Assessment. The Countryside Council for Wales, Brady Shipman Martin and University College Dublin;

- Scott, K.E., Anderson, C., Dunsford, H., Benson, J.F. and MacFarlane, R. (2005) An assessment of the sensitivity and capacity of the Scottish seascape in relation to offshore wind farms. Scottish Natural Heritage Commissioned Report No.103 (ROAME No. F03AA06);
- Scottish Natural Heritage (2008) Guidance on Landscape/ Seascape Capacity for Aquaculture. Natural Heritage Management;
- University of Newcastle (2002) Visual Assessment of Wind Farms Best Practice. Scottish Natural Heritage Commissioned Report F01AA303A;
- Scottish Natural Heritage (2003) Guidance on Cumulative Effects of Wind Farms. Version 2 revised 13.04.05;
- Landscape Institute (2011) Photography and Photomontage in Landscape and Visual Impact Assessment. Advice Note 01/ 11;
- Landscape Institute and the Institute of Environmental Management and Assessment (2002) Guidelines for Landscape and Visual Impact Assessment, 2nd Edition;
- Countryside Council for Wales (2004) Studies to Inform Advice on Offshore Renewable Energy Developments: Visual Perception versus Photomontage; and
- DECC (2009) UK Offshore Energy Strategic Environmental Assessment: Future Leasing for Offshore Wind Farms and Licensing for Offshore Oil and Gas Storage (OESEA2), Environmental Report.

Types of Impact Considered

- 16.22. The SLVIA assesses both the long term impacts relating to the operational lifetime of the Seagreen Project and also the short term impacts associated with its construction and decommissioning. Where appropriate, the SLVIA also considers any residual impacts once the Seagreen Project has been decommissioned and removed.
- 16.23. The SLVIA not only assesses the impacts associated with the Wind Turbine Generators (WTGs) but also any related impacts resulting from any offshore meteorological mast(s), offshore substation(s), the Export Cable Route (ECR) and landfall.
- 16.24. The SLVIA also assesses cumulative impacts caused by the WTGs of the Seagreen Project (Project Alpha and Project Bravo) and in conjunction with other existing, consented and proposed offshore and onshore wind farm sites within the study area, which is described in Section 'Cumulative Impact Assessment'. A detailed methodology relating to the assessment of landscape, seascape and visual cumulative impacts, prepared on behalf of the FTOWDG, can be found in Appendix K1 of ES Volume III: Appendices. The cumulative assessment methodology presented in Appendix K1 has been developed by specialist landscape consultants (SLR Consulting, Land Use Consultants and Pegasus Planning Group) appointed by the three FTOWDG developers Repsol, Mainstream and Seagreen. The approach set out has been adopted by each of the developers' consultants in writing the relevant cumulative sections of each developer's ES. The cumulative methodology has been agreed with the local authorities, SNH and Marine Scotland on 15th June and 26th July 2011, as per Section 'Consultation'.
- 16.25. ZTVs and visualisations produced as part of the seascape/ landscape and visual impact assessment process were also available to assist in the assessment of impacts on cultural heritage and archaeological resources (Chapter 17: Archaeology and Cultural Heritage of this ES).

Design Sensitivity Analysis

- 16.26. In July 2011, a 'Design Sensitivity Analysis' was undertaken by SLR Consulting on behalf of FTOWDG, with input from LUC and Pegasus Planning Group. Generic layouts for each of the three proposed offshore wind farms (Neart na Gaoithe, Inch Cape and the Seagreen Project) were compared in terms of their potential impacts. The results of the Design Sensitivity Analysis were provided to SNH, Marine Scotland, and local authorities.
- 16.27. For each of the three developments, three different turbine dimension scenarios were provided by the respective developers, as follows:
- maximum height of turbine, with related maximum spacing requirements;
 - intermediate height of turbines, with intermediate spacing requirement; and
 - minimum height of turbine, with minimum spacing requirements.
- 16.28. Layouts were generated on the basis of these turbine dimension scenarios based on three different generic design concepts, as follows:
- regular grid;
 - offset grid; and
 - series of arcs.
- 16.29. A range of wireframe visualisations were generated, illustrating views of the various scenarios from each of these design viewpoints. These wireframes were reviewed and ranked independently by three landscape architects, associated with the FTOWDG developers, according to which layouts demonstrated the most balance, coherence and greatest degree of 'legibility', and avoided serried ranks of turbines extending from the viewpoint.
- 16.30. The analysis concluded that an offset grid layout was the most visually preferable of the three layout scenarios, in the greatest number of views. However, the consultants agreed that the preference was not strong, and that different layouts appear better in some views than others.

Overview of Assessment Methodology

- 16.31. The overall approach to the SLVIA can be summarised as having the following elements:
- baseline studies including desk study, field visits for seascape character assessment, photography and study area appraisal, and consultation with statutory and non-statutory consultees;
 - assessing the sensitivity of the seascape, landscape and visual receptors;
 - predicting impacts on landscape, seascape and visual receptors and assessing their magnitude, including consideration of mitigation where appropriate;
 - evaluating the significance of impacts; and
 - cumulative impact assessment.
- 16.32. The SLVIA follows an established procedure for determining the significance of impacts. The sensitivity of the baseline seascape and landscape resource and visual amenity is cross referenced against the magnitude of change associated with the Seagreen Project. The criteria used to determine sensitivity, magnitude of change and significance are discussed later in this section.

Definition of Study Area

- 16.33. The initial step in the SLVIA is the establishment of the study area, which covers the area within which the Seagreen Project may have a significant impact upon the seascape, landscape and visual resource. The study area for the SLVIA includes the Project Alpha Site and the Project Bravo Site (Figure 16.1 and Figure 16.18), and extends out to cover a 50 kilometre (km) radius from the boundaries of the sites. Graphic information, including Zone of Theoretical Visibility (ZTV) figures (Figure 16.2 and Figure 16.19), have been produced to cover a study area with 50km radius buffer, as agreed with SNH (see Table 16.1). The study area is not intended to provide a boundary beyond which Project Alpha and Project Bravo will not be seen, but rather to define the area within which to assess the potential significant landscape and visual impacts of the sites.
- 16.34. The above study areas also include the ECR and a minimum of a 2km radius around its boundary, and are therefore considered appropriate for assessing potential seascape, landscape and visual impacts associated with the Transmission Asset Project. No separate figures have been produced for the Transmission Asset Project study area.

Desk Study

- 16.35. A desk study was undertaken to help identify landscape / seascape character and potential visual receptors of the Seagreen Project. The following sources of information were reviewed:
- Ordnance Survey (OS) maps at 1:250 000, 1:50 000, 1:25 000 and 1:10 000 scales;
 - admiralty and navigation charts;
 - aerial photographs;
 - historical OS maps;
 - Tourist information leaflets;
 - inventories of designated landscapes;
 - Met Office data;
 - records of Scheduled Monuments (SAMs) Listed Buildings, Registered Parks and Gardens etc;
 - adopted and emerging draft national, regional and local planning policies and documents; and
 - local landscape character assessments.

Assessment Tools

- 16.36. In order to illustrate the potential impacts of Project Alpha and Project Bravo, a number of assessment tools have been used and presented in the SLVIA including ZTV plans, wireframes and photomontages. The methodology for undertaking and presenting these is explained in detail in Appendix K1 of ES Volume III Appendices.
- 16.37. A zone of theoretical visibility (ZTV) was generated, each for Project Alpha and Project Bravo (Figure 16.2 and Figure 16.19). The ZTV is the area within which a proposed development is theoretically visible, and therefore where it may have an impact upon visual amenity and/ or landscape character. Theoretical visibility does not imply visual impact. The ZTV illustrates the 'bare earth' situation, not taking into account the screening effects of vegetation, buildings, or other local features that may prevent or reduce visibility.

It is based on a digital terrain model derived from the Ordnance Survey 'Landform Panorama' 50m DTM data, which provides height data for each point on a 50m by 50m grid, and has a stated accuracy of $\pm 3\text{m}$. It is important to remember that while the ZTV does indicate the band of turbine numbers that is visible, there is still potentially a wide range of variation within these groupings. ResoftWindfarm software was used for the calculation of the ZTV. The software incorporates earth curvature and atmospheric refraction in calculating intervisibility.

- 16.38. The methodology for production of the visualisations was based on the *Guidelines for Landscape and Visual Impact Assessment* (Landscape Institute, 2002) and the SNH guidance *Visual Representation of Wind Farms: Good Practice Guidance* (H+M and Envision, 2006). Further information about the approach is provided below.

Location of Viewpoint and Photography

- 16.39. The location of the viewpoint was recorded in the field in accordance with page 63, paragraph 111, Table 8 of the SNH guidance (H+M and Envision, 2006).
- 16.40. The camera used for the photography is a Nikon D70s digital SLR with a fixed 35mm focal length lens (equivalent to a 52.5mm focal length lens on a 35mm film camera). These focal lengths are in accordance with recommendations detailed in the SNH guidance.
- 16.41. A tripod with vertical and horizontal spirit levels was used to provide stability and to ensure a level set of adjoining images. A panoramic head was used to ensure the camera rotated about the no-parallax point of the lens in order to eliminate parallax errors between the successive images and enable accurate stitching of the images. (Parallax is the difference between what is seen through the viewfinder and what the camera records on film). The camera was moved through increments of 15 degrees and rotated through a full 360 degrees at each viewpoint. 24 photographs were taken for each 360 degree view. This enabled a 90 degree angle, centred on the view towards the proposed wind turbines, to be cut from the overall 360 degrees in accordance with page 63, paragraph 121, of the SNH guidance.

Weather Conditions

- 16.42. Weather conditions and visibility were considered an important aspect of the field visits for the photography. Where possible, visits were planned around clear days with good visibility. Viewpoint locations were then visited according to the time of day to ensure that the sun lit the scene from behind, or to one side of the photographer as far as possible. South facing viewpoints can present problems particularly in winter when the sun is low in the sky. Photographs facing into the sun were avoided where possible to prevent the wind turbines appearing as silhouettes. Adjustments to lighting of the turbines were made in the rendering software to make the turbines appear realistic in the view under the particular lighting and atmospheric conditions present at that time.

Wireframes

- 16.43. The software package ReSoftWindFarm was used to model and view the proposed turbines from selected viewpoints in wireframe format. Ordnance Survey Landform Panorama data (equivalent to 1:50,000 scale mapping) was used to model the landform seen in the wireframe view. Turbine locations, type and size, and viewpoint location coordinates were entered. The wireframes for Project Alpha and Project Bravo were produced at a 75 degree field of view whilst the cumulative wireframes were produced at a 90 degree field of view to cover a 360 degree view.

Photomontages

- 16.44. The presentation of fully rendered photomontages involved a number of additional stages as follows.
- 16.45. The software rendered the turbines based on sunlight conditions and the position of the sun in the sky at the time the photograph was taken. Blade angle and orientation adjustments were also made so as to represent a realistic situation before rendering the image. Fixed features on the ground, for example buildings and roads, were located in the wireframe model and used as markers to help line up the wireframe ground model with the photograph.
- 16.46. The final stage required the rendered turbines to be blended into the actual view. This was carried out using Photoshop software and allowed the turbines to be located behind any foreground elements that appeared in the original photograph.
- 16.47. The photographs and other graphic material such as wireframes and photomontages used in this assessment are for illustrative purposes only and, whilst useful tools in the assessment, are not considered to be completely representative of what will be apparent to the human eye. The assessments are carried out from site observations rather than from photographs.

Assessment Criteria

- 16.48. The purpose of the SLVIA is to evaluate the likely significance of impact from the Seagreen Project on seascape, landscape and visual amenity (defined in paragraph 16.19) within the study area to assist the determining authority to consider the impact of Project Alpha, Project Bravo and the Transmission Asset Project.
- 16.49. The assessment uses a worst case scenario to ensure that a precautionary approach has been taken to the assessment. Section 'Assessment of Impacts – Worst Case Scenario' sets out worst case parameters for the Seagreen Project, within the range of parameters proposed in Chapter 5: Project Description of this ES. These parameters have been used in the impact assessments presented in this chapter. If the Seagreen Project is built with parameters less than the worst case parameters, impacts will be lesser in magnitude than have been assessed in impact assessment sections of this chapter.
- 16.50. In addition to considering the worst case Seagreen Project parameters, the assessments presented in the impact assessment sections of this chapter consider the worst case receptors, within each category. For example, for residential receptors, settlements are considered and assessed although in practice only a very small proportion of residential properties within an assessed settlement would receive the predicted worst case impacts; others would receive lesser impacts or no impacts at all. This is in accordance with the precautionary principle and forms the basis of EIA guidance. Where potentially significant impacts are predicted, additional detail is provided about the anticipated extent of the impacts. In the interests of providing a concise ES chapter focused as appropriate on the potentially significant effects, this level of detail is not provided for the impacts assessed as not significant.
- 16.51. The offshore components of Project Alpha and Project Bravo will have no direct impact on any landscape features. However, the cable landfall, part of the Transmission Asset Project, has the potential to affect physical landscape features.

16.52. Unlike some of the other technical assessments within this ES, there are no quantifiable, technical thresholds in SLVIA to determine whether impacts are significant or not. SLVIA therefore relies upon clearly defined criteria which must be applied transparently using the informed professional judgement of the assessor. Essentially, the sensitivity of the baseline seascape, landscape and visual amenity is assessed against the magnitude of change associated with the proposed development. The following criteria have been used to determine sensitivity, magnitude of change and significance.

Sensitivity of Landscape Character

16.53. The sensitivity of a landscape character receptor is an expression of its ability to accommodate the development. This is dependent on the value, quality and existing landscape character of the receptor, which is summarised as follows:

- the value of a landscape character receptor is a reflection of its importance in terms of any designations that may apply, or as a landscape resource. The higher the value of a receptor the greater its sensitivity to the development;
- the quality of a landscape character receptor is a reflection of its attributes, such as sense of place and scenic quality, and the extent to which these attributes have remained intact; and
- the existing landscape character of the receptor is considered in the evaluation of sensitivity as it determines the degree to which the receptor may accommodate the influence of the development.

16.54. Landscape sensitivity has been described as high, medium or low based on criterion in Table 16.2.

Seascape Sensitivity

16.55. DTI guidance on SVIA sets out a procedure for determining the overall sensitivity of seascape units as defined during baseline studies. The procedure dictates that seascape sensitivity is determined by a combination of factors including seascape quality and value, the sensitivity of the seascape unit to a particular type of change (in this case an offshore wind farm and its transmission assets) and the seascape's capacity to accommodate this type of change.

16.56. Seascape sensitivity has been determined for each of the seascape unit identified in the Study Area and described as high, medium or low based on the criterion in Table 16.2.

Visual Receptor Sensitivity

16.57. Visual receptor sensitivity cannot be easily quantified, as different people, even within a single receptor type or group, have different viewing expectations. The sensitivity of an individual receptor to an offshore wind farm depends on a number of factors such as the nature of the viewer (e.g. resident, tourist, someone at work), their viewing expectations and the duration of view. It is acknowledged that some viewers may consider wind turbines to be unattractive, while others are content with wind turbines as part of the landscape.

16.58. Based on the type of visual receptors identified within the study area, visual receptor sensitivity has been described as high, medium or low based on the criteria in Table 16.2.

Table 16.2 Sensitivity of Receptor

Sensitivity of Receptor	Landscape/Seascape Resource	Visual Resource / Amenity
High	A seascape or landscape of particularly distinctive character, where its key characteristics have limited resilience to changes of the type proposed. These may include a landscape or seascape designated for its scenic quality.	Locations frequented by viewers with proprietary interest and prolonged viewing opportunities such as principal views from residential buildings, scenic drives, designated viewpoints, picnic areas and users of national and regional recreational routes.
Medium	A seascape or landscape of notable character or where its key characteristics have some / moderate resilience to changes of the type proposed. These are areas that exhibit positive character but which may have evidence of alteration to / degradation of features resulting in areas of more mixed character.	Locations frequented by viewers with a moderate interest in their environment such as people engaged in outdoor sporting facilities and people travelling through the landscape on minor (B) or unclassified roads, and trains.
Low	A seascape or landscape which is of low / poor scenic quality where its key characteristics are such that they are resilient to changes of the type proposed.	Locations frequented by viewers with a passing interest in their surroundings and whose interest is not specifically focussed on the scenery, e.g. at working premises or at locations on roads or railways passed through when travelling.

Magnitude of Change on Landscape Character

- 16.59. Professional judgement, informed by best practice guidance and consultation, has been used as appropriate to determine the magnitude of change on existing landscape character using the criteria in Table 16.3 as guidance.

Magnitude of Change on Seascape Character

- 16.60. Seascape impacts arise out of a change in the character or quality of the seascape and the resulting perception of the seascape. The magnitude of change in the seascape as a result of an offshore wind farm is inextricably linked to how visible the WTGs are in the seascape. Determining the magnitude of change on seascape units requires an understanding of how prominent the WTGs are likely to be.
- 16.61. The magnitude of change on seascape units has been described as high, medium, low or negligible/ none based on the criteria in Table 16.3.

Magnitude of Change on Visual Amenity

- 16.62. Visual impacts are caused by the introduction of new elements into the views of a landscape or the removal of elements in the existing view. Clearly justified professional judgement has been used to determine the magnitude of change using the criteria in Table 16.3 as guidance only.

Table 16.3 Magnitude of Change of Receptor

Magnitude of Change	Landscape/Seascape Resource	Visual Resource / Amenity
High	Considerable additional change in seascape or landscape key characteristics, either occupying an extensive horizontal or vertical field of view.	Location affected by substantial additional changes in view, which may be visible for a long duration, facing the change, or which may be in stark contrast with the existing view, or obstruction of a substantial part or important elements of views towards the development area.
Medium	Moderate additional changes in seascape or landscape key characteristics, either occupying a more limited horizontal or vertical field of view.	Location affected by moderate additional changes in views, or visible for a moderate duration, perhaps at a slight angle, where changes may be in contrast with the existing view, or obstruction of a noticeable part or elements of views towards the development area.
Low	A small additional change in key characteristics of the seascape or landscape, either occupying a small horizontal or vertical field of view.	Location affected by slight additional changes in views or visible for a short duration, perhaps at an oblique angle, or which may blend to an extent with the existing view.
Negligible	No perceptible additional change in key characteristics of the seascape or landscape.	Location affected by an additional change which is barely visible, or visible for a very short duration, perhaps at an oblique angle, or which may blend with the existing view, usually at some distance from the development.

Significance of Impact

- 16.63. The ultimate purpose of the SLVIA is to evaluate the significance of impact on the seascape, landscape and visual amenity within the study area. The significance of the seascape, landscape and visual impacts are determined by considering the sensitivity of the seascape, landscape or view with the magnitude of change. In determining the significance of residual impacts all mitigation measures are taken into account.
- 16.64. Table 16.4 is adapted from DTI (2005) guidance on SVIA and demonstrates the general relationship between sensitivity and magnitude, but is given for illustrative purposes only (i.e., it is not applied rigidly to determine the significance of an impact upon any given receptor, but is moderated by assessor professional judgement). The DTI guidance acknowledges that *“in some instances a particular parameter may be considered as having a determining effect on the analysis”* indicating that there may be occasions where the combination of sensitivity and magnitude does not necessarily equate to the significance rating set out in Table 16.4. For example, the magnitude of change in a view may be so negligible that it could not have any greater than a minor impact on even a very highly sensitive receptor.
- 16.65. At all times, professional judgement has been used to determine the overall significance of impacts (informed by best practice guidance, stakeholder consultations and judgements made regarding sensitivity and magnitude).

Table 16.4 Significance of Impacts

		Magnitude of Change			
		High	Medium	Low	Negligible
Landscape and Visual Sensitivity	High	Major	Major/ Moderate	Moderate/ Minor	Minor/ Moderate
	Medium	Major/ Moderate	Moderate	Minor/ Moderate	Minor
	Low	Moderate / Minor	Minor/ Moderate	Minor	Negligible
			Significant		
			Potentially Significant		
			Not Significant		

- 16.66. It is important to note that Tables 16.3 and 16.4 relating to magnitude of change and significance of impacts have not been applied to the assessment during construction and decommissioning phase for Project Alpha, Project Bravo and the Transmission Asset Project. However, professional judgment has been used to establish the potential level of visibility of all elements during the construction and decommissioning phase and the significance of their impacts. Impacts during these phases are short-term and temporary, with continuous movement of the works.
- 16.67. Table 16.5 provides definitions of the significance of the potential impacts resulting from the Seagreen Project. It summarises key considerations and it should be recognised that this is a continuous scale and that clear or defined thresholds do not exist between categories.

Table 16.5 Definitions of Assessment of Impacts

Impact	Landscape/Seascape Resource	Visual Resource / Amenity
Major	The proposed additional changes would considerably alter key or defining characteristics/ reasons for designation	The proposed additional changes would considerably alter visual amenity as experienced from the location
Moderate	The proposed additional changes would noticeably alter key or defining characteristics/ reasons for designation	The proposed additional changes would noticeably alter or detract from visual amenity as experienced from the location
Minor	The proposed additional changes would slightly alter key or defining characteristics/ reasons for designation	The proposed additional changes would slightly alter visual amenity as experienced from the location
Negligible	The proposed additional changes would have a barely noticeable or indiscernible impact upon key or defining characteristics/ reasons for designation	The proposed additional changes would have a barely noticeable or indiscernible impact and would not alter visual amenity as experienced from the location

EXISTING ENVIRONMENT

16.68. The existing environment is described in the following sections, covering Project Alpha, Project Bravo and the Transmission Asset Project. For the purposes of the physical environment, the Project Alpha and Project Bravo sites may be considered as offshore. Whilst the Transmission Asset Project has elements which are offshore, the primary effects are associated with the near shore environment, particularly where the Export Cable makes its landfall.

Project Alpha

16.69. The baseline study establishes the existing seascape, landscape and visual conditions of Project Alpha and its study area (Figure 16.1). This study helps to gain an understanding of what makes the seascape and landscape distinctive, what its important components or characteristics are, and how it is changing prior to the introduction of Project Alpha. The baseline study is instrumental in the identification of the seascape and landscape character receptors and visual receptors and views to be included in the assessment.

16.70. At its closest point, Project Alpha is located approximately 27km east of the coastline. Figures 16.1 to 16.17, presented in ES Volume II, Part 2, relate to Project Alpha.

16.71. The baseline study is presented in five sections as follows:

- relevant landscape designations and policy;
- landscape character;
- seascape character;
- physical and human influences on the landscape/ seascape; and
- visual receptors and views.

Relevant Landscape Designations and Policy

16.72. Various nationally and regionally designated areas and features are located within the study area and have been considered in the assessment. There are three ways in which such designations are relevant to the assessment:

- the presence of a designation can give an indication of a recognised value that may increase the sensitivity of a landscape character receptor or viewpoint, and may therefore affect the significance of the impact on that receptor or viewpoint;
- the presence of a relevant designation can lead to the selection of a viewpoint within the designated area, as the viewpoint will provide a representative outlook from that area; and
- designated areas may be included as landscape receptors so that the impacts of the wind farm on these features of the landscape that have been assigned particular value can be specifically assessed. If necessary, impacts on certain designated areas can then be avoided or reduced through the re-design of the wind farm as part of the assessment process.

16.73. All statutory and non-statutory landscape designations are high sensitivity receptors. There are no statutory designated areas (National Parks and National Scenic Areas) within the 50km study area. Non statutory and other designations are described in the following sections.

Historic Gardens and Designed Landscapes (HGDL)

16.74. Historic Gardens and Designed Landscapes (HGDL) are an important consideration in the assessment. The Inventory of Gardens and Designed Landscapes in Scotland is a list of nationally important sites that meet the criteria published in the Scottish Historic Environment Policy (SHEP) (Historic Scotland, 2011). There are currently 386 gardens in the Inventory (October 2010), of which 14 sites lie within the study area and are illustrated in Figure 16.5. These are as follows:

- Glenbervie House;
- Arbuthnott House;
- Fasque House;
- The Burn;
- Dunninald;
- Carig House;
- House of Dun;
- Kinnard Castle;
- Brechin Castle;
- House of Pitmuies;
- Guthrie Castle;
- The Guynd;
- Edzell Castle; and
- Cambo.

16.75. The SHEP, states that, where relevant, policies will inform planning authorities' consideration of individual planning applications. Regulation 25 and paragraph 5(4) (a) of Schedule 5 of The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2008 requires planning authorities to consult Scottish Ministers on 'development which may affect a historic garden or designed landscape'. Historic Scotland's opinions on such applications will be a material consideration in the planning authority's determination of the case. HGDLs are assessed as being of high sensitivity.

16.76. The closest of any of the HGDLs to Project Alpha is Arbuthnott House (in Angus), located 34km to the west of the Project Alpha site. An assessment of the impacts on the visual setting of registered HGDLs has been carried out and is presented in paragraph 16.242 of this chapter. Chapter 17: Archaeology and Cultural Heritage in this ES assesses the impact on the setting of cultural heritage features within the study area.

16.77. The HGDLs within the study area are covered by the Aberdeenshire, Angus and Fife Councils. The relevant policies covered by the Local Plans, which protect the HGDL and its setting are described in Appendix K3 which can be found in ES Volume III: Appendices.

Special Landscape Areas (SLA)

- 16.78. Where landscapes are highly valued locally, to ensure that the landscape is not damaged by inappropriate development, planning authorities often assign these landscapes a local designation. These designations play an important role in developing an awareness of the landscape qualities that make particular areas distinctive, which give communities a sense of place. The names used for such local landscape designations currently vary from one local authority to another. For example, they have been termed 'Areas of Great Landscape Value', 'Special Landscape Areas', 'Sensitive Landscape Character Areas' and 'Areas of Landscape Significance' by different authorities within Scotland. However, recent guidance published by SNH and Historic Scotland suggests that the name be standardised to Special Landscape Area (SLA) which for the purpose of this assessment is the adopted terminology.
- 16.79. There are four SLAs within the study area illustrated in Figure 16.5: three (Areas of Landscape Significance) in Aberdeenshire and one (Area of Great Landscape Value) in Fife.
- 16.80. Project Alpha is located a minimum distance of 27km from the nearest SLA. SLAs may influence the location of a representative viewpoint or may add to the value of the landscape character receptor or view and thus increase its sensitivity. The planning policies that cover this designation refer to development within or adjacent to the designated area and it is therefore only, when the site itself is covered by such a designation, or immediately next to the designation, that the policy is applicable. The impacts of the development on the landscape character and visual amenity of SLAs can be judged from the assessment of landscape character areas and representative viewpoints taken from within these areas.
- 16.81. The SLAs within the study area are covered by the Aberdeenshire and Fife Councils. The relevant policies covered by the Local Plans, which protect the SLAs, are described in Appendix K3 which can be found in ES Volume III: Appendices.

Landscape Character

- 16.82. Landscape character is the distinct and recognisable pattern of elements that consistently occurs in a particular type of landscape, and how this pattern is perceived. Impacts on landscape character arise either through the introduction of new elements, that physically alter the existing pattern, or through visibility of a development, which may alter the way in which the pattern is perceived.
- 16.83. Landscape character information is based on a combination of the desk and site surveys, and the relevant SNH Landscape Character Assessment documentation, which comprises the following:
 - South and Central Aberdeenshire Landscape Character Assessment (Environmental Resources Management, 1998);
 - Landscape Character Assessment of Aberdeen (Nicol I. et al, 1996);
 - Tayside Landscape Character Assessment (Land Use Consultants, 1999); and
 - Fife Landscape Character Assessment (David Tyldesley and Associates, 1999).
- 16.84. These reviews divide the landscape into tracts of land that are referred to as landscape character types and areas. The boundaries and descriptions of the landscape character types and areas provided are based upon the published information and confirmed in the desk study and site appraisal.

- 16.85. The study area extends over four council areas, namely; Aberdeenshire, Aberdeen City, Angus and Fife.
- 16.86. Within Aberdeenshire, five landscape character areas have been identified in the study area, and are illustrated on Figure 16.3. These are:
 - area 8: Howe of The Mearns;
 - area 9: Garvock and Glenbervie;
 - area 12: Central Wooded Estates;
 - area 13: Kincardine Plateau; and
 - area 18: The Mounth.
- 16.87. Within Aberdeen City, five landscape character areas have been identified in the study area, and are illustrated on Figure 16.3. These are:
 - area 21: Countesswells/ Milltimber/ Kennerty;
 - area 22: Dee Valley;
 - area 24: Kincorth and Tullos Hills;
 - area 26: Den of Leggart; and
 - area 27: Loirston.
- 16.88. Within Angus Council, seven landscape character types have been identified in the study area, and are illustrated on Figure 16.3. These are:
 - type 1: Highland Glens (1b: Mid Highland Glens);
 - type 3: Highland Summits and Plateaux;
 - type 5: Highland Foothills;
 - type 10: Broad Valley Lowland;
 - type 12: Low Moorland Hills;
 - type 13: Dipslope Farmland; and
 - type 15: Lowland Loch Basin.
- 16.89. Within Fife Council, one landscape character type has been identified in the study area, and is illustrated on Figure 16.3.
 - type C6: Lowland Open Sloping Farmland.
- 16.90. The sensitivity of the landscape to offshore wind farm development, as represented by the landscape character types and areas, has been assessed for the purposes of this SLVIA.
- 16.91. It should be noted that the coastal edges of the study area have been separated out as Regional Seascape Units and assessed separately. Therefore the coastal elements of the landscape character types and areas which lie on the coast are reduced, potentially reducing their sensitivity to offshore development.

16.92. In total, eighteen landscape character types and areas have been identified within the study area. The key characteristics and sensitivities of these are described in Table 16.6.

Table 16.6 Landscape Character Types/ Areas within Study Area

Landscape Character Type / Area	Relevant Key Characteristics	Sensitivity to offshore wind turbine development (refer to criteria in Table 16.2)
South and Central Aberdeenshire Landscape Character Assessment (SNH Review No. 102)		
Area 8: Howe of the Mearns	<ul style="list-style-type: none"> • Almost uniformly flat; • Intensive agriculture within large geometric fields; • Corridor for road and rail links; • Mature beech woodlands and straight beech avenues; and • Expansive views framed by surrounding upland. 	<p>Medium</p> <p>An agricultural area, where the sea forms a backdrop rather than a key part of the landscape.</p>
Area 9: Garvock and Glenbervie	<ul style="list-style-type: none"> • Large scale landscape with open rolling ridges; • Large fields of arable land and pasture and red soils; • Radio masts prominent on high points; • Numerous archaeological remains; and • Long distance views across Howe of the Mearns to The Mounth. 	<p>Medium</p> <p>Although coastal views are a characteristic of this landscape, these views tend to be restricted to the more open areas. Elsewhere, coastal influence is limited, and the potential for offshore development to impact upon overall character is therefore reduced.</p>
Area 12: Central Wooded Estates	<ul style="list-style-type: none"> • Rolling landscape of low hills and wide valleys; • Strong wooded structure associated with numerous estate policies; • Clumps of trees atop mounds and hillocks; • Mixed farmland with varying size and pattern of fields; • Numerous towns and villages; and • Long views across open farmland contrast with sudden enclosure by woodland as one passes through area. 	<p>Low</p> <p>A rural landscape of strong character, which is not primarily influenced by coastal views.</p>
Area 13: Kincardine Plateau	<ul style="list-style-type: none"> • Undulating landform falling gently towards coast; • Pasture and marginal farmland; • Exposed mounds and hills with windblown trees; and • Gradual transition between strong moorland character to west and coastal character to east. 	<p>Low</p> <p>Although there are views out to other landscapes, the key characteristics of this type are not vulnerable to changes in these views.</p>
Area 18: The Mounth	<ul style="list-style-type: none"> • Smooth rolling landform and rounded summits; • Substantial highland outcrop forming prominent undulating ridge that dominates views south of Aberdeen; • Numerous old routeways which are now used as footpaths for walkers; and • Wild and exposed character with commanding views into tranquil farmed lowland of Howe of the Mearns. 	<p>Low</p> <p>Although there are views out to other landscapes, the key characteristics of this type are not vulnerable to changes in these views.</p>

Landscape Character Type / Area	Relevant Key Characteristics	Sensitivity to offshore wind turbine development (refer to criteria in Table 16.2)
Landscape Character Assessment of Aberdeen (SNH Review No. 80)		
Area 21: Countesswells/ Milltimber/ Kennerty	<ul style="list-style-type: none"> The topographical variety; The extent and variety of woodland and trees; Suburban edges are generally visually contained by planting; Stone dykes as well as fences as field boundaries; and Distant views to hills. 	Low A landscape of strong character, which is not primarily influenced by coastal views.
Area 22: Dee Valley	<ul style="list-style-type: none"> The large-scale valley landform that stretches from the countryside into the city; The extent and variety of woodland The contrast between developed north bank and rural south bank; and Views of River Dee. 	Low A landscape of strong character, which is not primarily influenced by coastal views.
Area 24: Kincorth and Tullos Hills	<ul style="list-style-type: none"> Hill topography forms a distinctive edge to the city and screens industrial development; Open character and dominated by heath vegetation; and Wide views over the city. 	Low A landscape of strong character, which is not primarily influenced by coastal views.
Area 26: Den of Leggart	<ul style="list-style-type: none"> Shallow valley landform; Stone dykes diving land into small fields; Sparse traditional settlement; and Views northwards to the city. 	Medium Coastal views are not a specific characteristic of this landscape, although several areas lie close to the coast
Area 27: Loirston	<ul style="list-style-type: none"> Presence of Loirston Loch; Presence of nearby large scale industrial development; Major roads traversing the area; Open character of the landscape, with few trees and little variety of vegetation; and Frequently abrupt edge of the urban area. 	Medium Coastal views are not a specific characteristic of this landscape, although several areas lie close to the coast
Tayside Landscape Character Assessment (SNH Review No. 122)		
Type 1: Highland Glens (1b: Mid Highland Glens)	<ul style="list-style-type: none"> Concentration of agricultural activity on narrow, but distinct valley floor; Predominance of rough grazing, bracken, heather moorland on valley slopes; Rapids, gorges and waterfalls where bands of harder rocks occur; Moderately settled; Proliferation of forts and castles; and Substantial areas of commercial coniferous forestry. 	Low Coastal views are a feature of only limited parts of this landscape type. The presence of offshore features is unlikely to affect the experience of the wooded valleys, due to the limited nature of views.
Type 3: Highland Summits and Plateaux	<ul style="list-style-type: none"> Distinct summits and ranges, separated by fault line lochs; the hills are sharply defined and often craggy; Vegetation patterns closely reflect altitude and exposure; Most of the area managed as open moorland; Little or no settlement; Extensive plantations; and One of the remotest and wildest landscapes in the UK. 	Low Although there are views out to other landscapes, the key characteristics of this type are not vulnerable to changes in these views.

Landscape Character Type / Area	Relevant Key Characteristics	Sensitivity to offshore wind turbine development (refer to criteria in Table 16.2)
Type 5: Highland Foothills	<ul style="list-style-type: none"> Complex geological structure resulting from their position along the line of the Highland Boundary Fault; Glacial deposits; Steep whale backed hills and south-west to north-east valleys; Winding, gorge-like main river valleys; and Complex, sometimes disorientating landscape with glimpses of Highland and lowland. 	<p>Low</p> <p>Although there are views out to other landscapes, the key characteristics of this type are not vulnerable to changes in these views.</p>
Type 12: Low Moorland Hills	<ul style="list-style-type: none"> Eastern outliers of the Sidlaws; Combination of low, rounded hills and craggy, ridged upland; Moorland character evident in areas of heather and gorse; Extensive woodland; and Panoramic views. 	<p>Low</p> <p>Although the sea is visible from the tops of some of these hills, it does not form a characteristic of the landscape</p>
Type 13: Dipslope Farmland	<ul style="list-style-type: none"> Extensive area of land, generally sloping from north-west to south-east; Dominated by productive agricultural land; Low woodland cover, except on large estates and river corridors; and Limited visual impact of Dundee and Arbroath. 	<p>Medium</p> <p>An agricultural area, where the sea forms a backdrop rather than a key part of the landscape.</p>
Type 15: Lowland Loch Basin	<ul style="list-style-type: none"> Broad basins formed where sandstones have been eroded away leaving harder enclosing rocks; Extensive mudflats; Rich natural heritage; Dominance of water, sky and distant shores; and Framed views. 	<p>High</p> <p>Coastal influence and views of the sea are a key characteristic of this landscape, and offshore development has the potential to affect its character.</p>
Fife Landscape Character Assessment (SNH Review No. 113)		
Type C6: Lowland Open Sloping Farmland	<ul style="list-style-type: none"> Predominantly large, open, sloping arable fields, often with no boundaries or with mainly wire fences, low hedges and little vegetation cover; Sometimes extensive seaward and landward views owing to elevation and openness; Distant or occasional views of the sea, the Firths or the estuaries; Views across or to the Coastal Hills or the Lowland Hills and Valleys; General lack of tree cover; Some dominant point features mainly buildings, structures or tree groups; and A large scale, open or exposed landscape where the character is strongly influenced by the weather conditions and views of the sky. 	<p>Medium</p> <p>Although coastal views are a characteristic of this landscape, these views tend to be restricted to the more open areas. Elsewhere, coastal influence is limited, and the potential for offshore development to impact upon overall character is therefore reduced.</p>

Seascape Character

16.93. Seascape characterisation begins by identifying the spatial extent of the seascape units. The 2001 Guide to Best Practice in Seascape Assessment (Hill et al, 2001) defines seascape units based on physical size from major seascape units through intermediate sized seascape units down to micro seascape units.

National Seascape Units

16.94. National Seascape Units are defined as an extensive section of the coast with an overriding defining characteristic such as coastal orientation or landform, defined by major headlands of national significance. The SNH Commissioned Report No. 103 (Scott, K.E. et al, 2005) divides the Scottish coastline into 33 indicative National Seascape Areas. These areas were assessed for their sensitivity to a fixed scenario for offshore wind energy development.

16.95. There are three National Seascape Units in the study area which are illustrated in Figure 16.3:

- area 2: Firth of Forth;
- area 3: East Fife/ Firth of Tay; and
- area 4: North East Coast.

16.96. The key characteristics and sensitivities are summarised in Table 16.7 below:

Table 16.7 National Seascape Units

National Seascape Unit / Area	Key Characteristics	Sensitivity (as defined in Report No. 103) (Scott, K.E. et al, 2005)
Area 2: Firth of Forth	Semi-open character in outer Firth within a broad bay but with views funnelled towards open sea. Inner Firth forms a narrow plane of water, strongly contained by hills.	Medium
Area 3: East Fife / Firth of Tay	Medium to large scale overall. Containment of hills reduces scale in Inner Firth, flatter coastal landform and greater expanse of open sea increases scale in Outer Firth.	Medium
Area 4: North East Coast	Long, east-facing generally 'straight' coastline with many small indentations and few significant headlands and with open views out to North Sea.	Low – Medium

Regional Seascape Units

16.97. As part of the collaborative approach to impact assessment being undertaken by the FTOWDG, a common seascape character baseline has been prepared which ensures consistency between SLVIAs for the offshore wind farms in the Firth of Forth and Tay area.

16.98. The Seascape Character Assessment (SCA) was undertaken following discussions between FTOWDG, SNH and local authorities (including Angus Council, Fife Council, East Lothian Council and Scottish Borders Council). The SCA has been developed jointly by the landscape consultants representing the developers in the FTOWDG. The methodology and approach was developed by the three landscape consultants and subsequently agreed with SNH. In order to streamline the characterisation process, each landscape consultancy was assigned responsibility for regional units across separate areas. This characterisation, which includes descriptions of all the regional units and their sensitivities, is set out in Appendix K2 which can be found in ES Volume III: Appendices.

- 16.99. Regional Seascape Units are a subdivision of the national units and are defined by regional headlands, islands and coastal features.
- 16.100. Nine regional units have been identified within the study area. These are illustrated in Figure 16.3 and the descriptions and sensitivities of each are set out in Appendix K2 which can be found in ES Volume III: Appendices.
- SA2: Greg Ness to Cove Bay (Sensitivity: Medium);
 - SA3: Cove Bay to Milton Ness (Sensitivity: Medium);
 - SA4: Montrose Bay (Sensitivity: High);
 - SA5: Long Craig (Sensitivity: Medium);
 - SA6: Lunan Bay (Sensitivity: High);
 - SA7: Lang Craig to The Deil's Heid (Sensitivity: High);
 - SA8: Arbroath to Monifieth (Sensitivity: Medium);
 - SA12: St Andrews to Fife Ness (Sensitivity: High); and
 - SA13: East Neuk of Fife (Sensitivity: High).

Physical and Human influences on the landscape/ seascape within the study area

Geology, Soils, Landform and Topography

- 16.101. The coastal landscape within the study area is defined and heavily influenced by its underlying geology and topography.
- 16.102. The north-west of the study area gently slopes towards the coastal edge, where it generally gives way to low-lying cliffs or steep slopes above the sea. The shoreline is rocky and there are no areas of sandy foreshore exposed at low tide, aside from the small shingle beach at Cove Bay to the south of Aberdeen. The Grampian foothills to the north-west form a distant backdrop to the coastal zone, which gently slopes to the coastline. At the local scale, the coastline has many small coves and inlets with sea caves and natural arches, being seen together with shingle beaches, rock platforms, and other natural features of the coastal environment.
- 16.103. The west of the study area is a predominantly gently sloping and low-lying seascape, and is mostly flat around Montrose Bay, where there is a strong horizontal emphasis. Vertical elements are provided by the dunes, the cliffs and coniferous plantations in some areas. South of Usan, the coastal edge gains in height with steep slopes between the shoreline and the fields above. The cliffs of Rickle Craig are approximately 50m high, although sloping down to the natural harbour at Boddin and the promontory of Boddin Point. The low lying coastline between Arbroath and Monifieth has a strong horizontal emphasis, heightened on the coastal edge by extensive rocky platforms, interspersed with lengths of sandy beach.
- 16.104. The south-west of the study area includes a small area of Fife. The area is a mix of relatively straight, but indented coastal edge, marked by low cliffs, rocky platforms and the occasional sandy bay, giving way to an undulating agricultural hinterland.

Land Cover and Vegetation

- 16.105. To the north-west of the study area, there is a contrast between rocky coastline, interspersed with small coves and shingle beaches, and adjacent agricultural land. Agricultural land extends almost to the coastal edge. As this is primarily grazing land, it

creates a buffer zone between the developed land to the west and the coastline itself. Tree cover is largely restricted to the occasional shelterbelt, as well as wooded areas around farmhouses and small settlements. Intensively managed farmland extends to the coastal edge, thus limiting the sense of naturalness. This contrasts with the coastline and sea itself, which has a strong sense of the natural environment, particularly where the waves crash against rugged cliffs.

- 16.106. The west of the study area is a contrast of flat and gently sloping agricultural hinterland with rocks, small beaches, dunes and grassland. Coniferous plantations extend to the south of the River North Esk. Woodland and shelterbelts surround the village of Lunan. There are limited areas of grassland at the top of cliffs supporting rare plant species.
- 16.107. To the south-west of the study area, the diverse coastal edge comprises small sandy bays, extensive wave-cut rock platforms, low cliffs and narrow, wooded dens with gently undulating agricultural landscape sloping down to the coastal edge. Landward areas of agricultural fields are intensively managed but field boundaries and features are poorly maintained.

Buildings, Settlement and Infrastructure

- 16.108. Parts of the coastline within the study area are developed, including major towns, such as Carnoustie, Arbroath, Montrose and Stonehaven.
- 16.109. In the north-west of the study area, industrial buildings form a backdrop to the coastal zone. South of this infrastructure is Cove Bay, a mainly residential suburb of Aberdeen. There are a number of small to medium sized towns, including Portlethen, Newtonhill and Stonehaven, all of which function primarily as commuter towns to Aberdeen. These are interspersed with frequent smaller fishing and harbour settlements, often situated at the top of slopes overlooking the coast. Outside of the settlements, development is limited.
- 16.110. There is movement in this area associated with the Dundee to Aberdeen railway line and the coastal road which runs between Aberdeen and Cove Bay. Due to the area's relatively close proximity to Aberdeen, shipping movements associated with the harbour, together with planes and helicopters using Aberdeen Airport, are also intermittently apparent.
- 16.111. The west of the study area is occupied by the larger coastal towns of Montrose, Arbroath and Carnoustie. Montrose has an important commercial port for the offshore oil and gas industry, and is also home to industrial development, both around the port and on the northern outskirts of the town. Some of the smaller villages in the area include St Cyrus, Lunan and Auchmithie. The seascape is influenced locally by the presence of Montrose and Arbroath Links and the resort facilities along the beachfront. The A92 runs through the area, although the coast itself is not always visible from the road. Aside from motor vehicles, there are some movements of shipping and also recreational users of the beach and sea as well as recreational users of the Links.
- 16.112. Large scale development is limited to the south-west of the study area. Kingbarns is the only small village in the area. A disused airfield and occasional larger scale commercial development are located south-west of Fife Ness, which has a small lighthouse. Within the coastal zone, there is movement associated with the golf courses and coastal footpaths, as well as movement associated with agricultural work in the surrounding fields.

Principal Visual Receptors and Views

- 16.113. Potential visual receptors of Project Alpha are located both onshore, and offshore, although the vast majority of views are likely to be experienced from the coastline. Visual receptors have been identified within 50km of the site boundary.

16.114. Likely viewers (principal visual receptors) include:

- residents living in any of the settlements or individual residences across the area which lies within the Project Alpha ZTV;
- tourists visiting, staying in, or travelling through this part of Scotland;
- recreational users of the landscape, including those using golf courses, cycle routes and footpaths;
- recreational users of the marine environment, including those involved in yachting, and passengers on ships;
- travellers (tourists, workers, visitors or local people) using transport (road and rail) routes passing through the study area;
- people working in the countryside or in any of the towns, villages or settlements residences across the area which lies within the Project Alpha ZTV;
- people travelling by aeroplane above the study area; and
- people working in the marine environment, such as fishermen and crews of ships.

16.115. Settlements, transport and recreational routes and beaches are described briefly below and their locations are shown in Figure 16.7.

Settlements

16.116. There are many settlements in the study area, from which there are principal visual receptors due to the sensitivity of residential viewers.

16.117. Aberdeen is situated just outside the northern edge of the study area. The main towns in the study area include Stonehaven, Montrose, Arbroath, Brechin, Carnoustie, Portlethen, Inverbervie and Laurencekirk. A number of key villages include Newtonhill, Glenbervie, Gourdon, Fettercairn, Johnshaven, St Cyrus, Hillside, Inverkeilor, Friockheim and Kingbarns.

16.118. The sensitivity of settlements to visual impacts is characterised by the sensitivity of residential properties within those settlements. Therefore, as per Table 16.2, all settlements are assessed as high sensitivity receptors.

Route corridors – roads, railways, cycle routes and footpaths

16.119. There are numerous route corridors, many of which are associated with urban development, while others provide access to the wider countryside. It is not possible or necessary to assess the potential impacts of Project Alpha on every route individually, however, some of the key routes have been considered in the assessment, and these serve as illustrations of likely impacts on more minor routes in similar locations. Two principal criteria have been considered in determining the inclusion of routes in the assessment; firstly, the extent to which the route traverses the study area or extends across a notable part of it; and secondly, the importance of the route in terms of recognition, signage, traffic volume and usage.

- 16.120. Using these criteria, two major roads are considered to be appropriate for inclusion as receptors: the A92 and the A90. Other key receptor routes include: the A957, A935, A934, A933, A937, A930, B979, B9077, B967, B966, B974, B9120, B9134, B9113, B965, B961, B9127 and B9128. As per Table 16.2, all motorways and A roads are assessed as low sensitivity receptors as the views are transient and fast moving, whilst B roads and unclassified roads are assessed as medium sensitivity receptors.
- 16.121. One National Cycle Network Sustrans route traverses primarily along the coastline: National Cycle Network 1 (NCN1), which extends along the Angus and Aberdeenshire coastline to Aberdeen. As per Table 16.2, users of cycle routes are high sensitivity receptors as these routes are nationally important and designated routes, and whose attention is focused on the landscape.
- 16.122. The study area includes one mainline railway (East Coast Mainline Railway), connecting Aberdeen with Dundee, via Carnoustie, Arbroath and Montrose. As per Table 16.2, users on railways are medium sensitivity receptors.
- 16.123. There is a long distance footpath in the study area, known as the Fife Coastal Path. It runs throughout the Fife coastline from Largo Bay to Tayport. As per Table 16.2, users of long distance footpaths are high sensitivity receptors as these routes are nationally important and designated routes, and whose attention is focused on the landscape.
- 16.124. Users of aeroplanes over the study area (including on approach to or departure from Aberdeen and Dundee airports) are considered as low sensitivity receptors.

Recognised vantage points

- 16.125. Elevated locations along the coast act as formal vantage points which have a good view out to sea. These are at Fife Ness, Newtonhill and St Cyrus (Beach Road). There are also beach level locations at Arbroath, Montrose, Carnoustie, Stonehaven, Lunan, Johnshaven and Inverbervie which act as informal vantage points out to sea.
- 16.126. In addition, there are various car parks off the A92, which are located on top of cliffs and act as informal vantage points out to sea.
- 16.127. Further inland, there are hilltop viewpoints at Drumtochy Forest and Durriss Forest, and other locations which enable coastal and marine views.
- 16.128. All the above identified vantage points will have a high sensitivity to change as viewers at these locations tend to pause and take in the view and often focus on the horizon.

Recreational receptors

- 16.129. Apart from informal recreational activities such as walking and cycling, there are a small number of other recreational activities that take place along the coast. There are several golf courses within the study area which have several clubs using them and comprise more than one course at each links. These include Stonehaven Golf Club in Aberdeenshire, Montrose Golf Links, Arbroath Golf Links and Carnoustie Golf Links, in Angus, and the Crail Golfing Society in Fife. Golf courses are assessed as having a medium sensitivity to change as the focus of golfers is on the sport rather than the surroundings.
- 16.130. There are no country parks within the study area.

Tourist attractions

- 16.131. Many of the tourist attractions within the study area are located in the settlements of the Project Alpha study area. Within these settlements there are numerous hotels, cafes, bars and tourist shops as well as specialist attractions such as museums and visitor centres. Where there is direct visibility of aspects of Project Alpha from these, they are assessed as having a high sensitivity.

- 16.132. One of the other attractions for tourists is the coast's beaches that allow direct views out to sea and have a high sensitivity to change. These include the beaches of St Cyrus, Montrose, Lunan Bay, Arbroath, Elliot, East Haven, Carnoustie, Barry Sands North, Buddon Sands, Cambo and Balcomie, as shown on Figure 16.7.
- 16.133. Within the study area, there are numerous camp sites and caravan parks, many of which are oriented towards the sea and have a high sensitivity to change. The key ones include Wairds Park Caravan Site and East Bowstrips Caravan Park to the north of Montrose and Seaton Estate Holiday Village in Arbroath.

Marine receptors

- 16.134. In addition to the land based potential visual receptors, there are also people out at sea who may have views in the direction of Project Alpha.
- 16.135. The seascape is relatively busy, traversed by commercial and recreational vessels, many of which are associated with ports and harbours in the Firths of Tay and Forth outside the study area (see Chapter 15: Shipping and Navigation). No commercially operated pleasure cruises have been identified along this section of the coast.
- 16.136. The Bell Rock Lighthouse is situated approximately 17.5km from Arbroath, and 22.5km from St Andrews on the Fife coast and approximately 28km from Project Alpha. It is approximately 35m in height. It is a well-preserved and operational lighthouse built between 1806 and 1811, and is the oldest surviving rock built lighthouse in Britain. The lighthouse was automated in 1988. From its location there are wide views over the surrounding seascape with the coasts of Angus, Fife, the Lothians and the Scottish Borders in the distance. However, due to the distance from the shore, the Bell Rock Lighthouse is rarely seen from the land, as anything more than a small white feature or as an intermittent light during the night. In anything but clear weather conditions, the Bell Rock Lighthouse is not visible from the land. Although, there are a limited number of boat trips a year to the lighthouse, landing is almost unlikely and unadvisable because it is automated and unmanned, therefore any views would be transient to visitors, who would have a medium sensitivity to change.

Viewpoints

- 16.137. A combination of desk studies, site visits and an interpretation of the ZTVs identified eight viewpoints that were regarded to be representative of the range of views towards Project Alpha from the coastline. They are not intended to cover every single view possible, but are intended to be representative of a range of receptor types (e.g., residents, walkers, tourists, road users, etc.), and also different directions and distances from the Project Alpha site.
- 16.138. The viewpoints used for this assessment were selected according to the following criteria:
- being publicly accessible;
 - having a reasonably high potential number of viewers or being of particular importance to the viewer(s) affected;
 - providing a representative range of viewing distances (i.e., short, medium and long distance views) and elevations;
 - representing a range of viewing experiences (i.e., static views, for example from settlements, designated viewpoints or car parks, and points along sequential views, for example from public highways and walking and cycling routes); and
 - representing a range of visual receptor types (i.e., residential, recreational, and travelling people).

- 16.139. Viewpoints for the SLVIA have been considered and agreed by meeting and subsequent email correspondence with Scottish Natural Heritage (SNH) on 21st September 2011.
- 16.140. The viewpoint assessment has been used to inform and illustrate the assessment of impacts on seascape and landscape character and the assessment of impacts on views.
- 16.141. The locations of the Project Alpha viewpoints are illustrated in Figure 16.9. Table 16.8 lists the viewpoints and provides information on their location, reasons for selection, and distance from the Project Alpha site.
- 16.142. All except two viewpoints are at coastal locations close to or within settlements which already have moderate levels of street lighting or residual lighting pollution from the settlement. The two viewpoints where views would be obtained from more natural viewpoints are Fife Ness (VP8) and White Caterthun Hill Fort (VP3). In both cases visitors are likely have returned home before full nightfall. The viewpoint receptors are therefore considered to have low sensitivity to night-time lighting at the Project Alpha site.

Table 16.8 Project Alpha Viewpoints

No.	Viewpoint Name	Easting	Northing	Council Area	Distance to Project Alpha (km)	Receptor	Reason for inclusion	Maximum Sensitivity of Receptor
1	Garron Point (Stonehaven Golf Club)	388587	787597	Aberdeenshire	38	Golfers	A links golf course, located on a headland which enables unobscured views south along the coast	Medium
2	Beach Road, Kirkton, St Cyrus	375195	764644	Aberdeenshire	32	Visitors, walkers	Car park offering beach access, and wide elevated views over Montrose Bay, on a coastal footpath	High
3	White Caterthun Hill Fort	354818	766084	Angus	52	Visitors	Inland location, offering views over Strathmore and the Angus coast beyond, signposted and interpreted historic site	High
4	Montrose	372689	757962	Angus	33	Residents, visitors	Main car park/access point for the Montrose Bay beach and coast, promenade enables views across the seascape	High
5	Braehead of Lunan	368987	752602	Angus	35	Cyclists, residents, road users	Representative of views from a hamlet, located on NCN1, enabling views south over Red Head	High
6	Arbroath	365910	741080	Angus	40	Walkers, residents	Elevated location above car park, on way marked coastal footpath	High
7	Carnoustie	356249	734093	Angus	49	Residents, visitors	Recently upgraded promenade with car parking and beach access.	High
8	Fife Ness, Lochaber Rock	363842	709766	Fife	50	Walkers, visitors	Easternmost point of Fife, unobstructed views across the outer Firth and Tay, on the Fife Coastal Path	High

Project Bravo

16.143. At its closest point, Project Bravo is located approximately 38km east of the coastline. Figures 16.18 to 16.33 of ES Volume II, Part 2 relate to Project Bravo.

- the baseline study is presented in five sections as follows:
- relevant landscape designations and policy;
- landscape character;
- seascape character;
- physical and human influences on the landscape/ seascape; and
- visual receptors and views.

Relevant Landscape Designations and Policy

16.144. There are no statutory designated areas (National Parks and National Scenic Areas) within the 50km study area. Other designated areas include:

Historic Gardens and Designed Landscapes (HGDL)

16.145. There are currently 386 gardens in the Inventory (October 2010), of which 6 sites lie within the study area and are illustrated in Figure 16.22. These are as follows:

- Arbuthnott House;
- Dunninald;
- Carig House;
- House of Dun;
- Kinnard Castle; and
- The Guynd.

16.146. The planning context of HGDLs is set out in paragraph 16.75 of this chapter. HGDLs are assessed as being of high sensitivity.

16.147. The closest of any of the HGDLs to the Project Bravo site is Dunninald (in Angus) located 41km to the west. Chapter 17: Archaeology and Cultural Heritage in this ES assesses the impact on the setting of cultural heritage features within the study area.

16.148. The HGDLs within the study area are covered by the Aberdeenshire, Angus and Fife Councils. The relevant policies covered by the Local Plans, which protect the HGDL and its setting are described in Appendix K3 which can be found in ES Volume III: Appendices.

Special Landscape Areas (SLA)

16.149. SLAs are described in general terms in paragraph 16.78 of this chapter. There are two Special Landscape Areas within the study area illustrated in Figure 16.22.

16.150. Project Bravo is located a minimum distance of 41km from the nearest SLA. SLAs may influence the location of a representative viewpoint, or may add to the value of the landscape character receptor or view and thus increase its sensitivity. They are not, however, included as specific landscape receptors in the assessment. This is because the planning policies that cover this designation are relevant to development within or

adjacent to the designated area and it is therefore only when the site itself is covered by such a designation, or immediately next to the designation, that the policy is applicable. The impacts of the development on the landscape character and visual amenity of SLAs can be judged from the assessment of landscape character areas and representative viewpoints taken from within these areas.

16.151. The SLAs within the study area are covered by Aberdeenshire Council. The relevant policies covered by the Local Plans, which protect the SLAs are described in Appendix K3 which can be found in ES Volume III: Appendices.

Landscape Character

16.152. An introduction to landscape character is provided in paragraphs 16.82 to 16.84 of this chapter. The study area extends over two council areas, namely Aberdeenshire and Angus.

16.153. Within Aberdeenshire, two landscape character areas have been identified in the study area, and are illustrated on Figure 16.20. These are:

- area 8: Howe of The Mearns; and
- area 9: Garvock and Glenbervie.

16.154. Within Angus Council, four landscape character types have been identified in the study area, and are illustrated on Figure 16.20. These are:

- type 10: Broad Valley Lowland;
- type 12: Low Moorland Hills;
- type 13: Dipslope Farmland; and
- type 15: Lowland Loch Basin.

16.155. The sensitivity of the landscape to offshore wind farm development, as represented by the landscape character types and areas, has been assessed for the purposes of this SLVIA.

16.156. It should be noted that the coastal edges of the study area have been separated out as Regional Seascape Units and assessed separately. Therefore the coastal elements of the landscape character types and areas which lie on the coast are reduced, potentially reducing their sensitivity to offshore development.

16.157. In total, six landscape character types / areas have been identified within the study area. The key characteristics of these are described in Table 16.9.

Table 16.9 Landscape Character Types/ Areas within Study Area

Landscape Character Type / Area	Relevant Key Characteristics	Sensitivity to offshore wind turbine development (refer to criteria in Table 16.2)
South and Central Aberdeenshire Landscape Character Assessment (SNH Review No. 102)		
Area 8: Howe of the Mearns	Almost uniformly flat; Intensive agriculture within large geometric fields; Corridor for road and rail links; Mature beech woodlands and straight beech avenues; and Expansive views framed by surrounding upland.	Medium An agricultural area, where the sea forms a backdrop rather than a key part of the landscape.
Area 9: Garvock and Glenbervie	Large scale landscape with open rolling ridges; Large fields of arable land and pasture and red soils; Radio masts prominent on high points; Numerous archaeological remains; and Long distance views across Howe of the Mearns to The Mounth.	Medium Although coastal views are a characteristic of this landscape, these views tend to be restricted to the more open areas. Elsewhere, coastal influence is limited, and the potential for offshore development to impact upon overall character is therefore reduced.
Tayside Landscape Character Assessment (SNH Review No. 122)		
Type 12: Low Moorland Hills	Eastern outliers of the Sidlaws Combination of low, rounded hills and craggy, ridged upland Moorland character evident in areas of heather and gorse Extensive woodland Panoramic views	Low Although the sea is visible from the tops of some of these hills, it does not form a characteristic of the landscape
Type 13: Dipslope Farmland	Extensive area of land, generally sloping from north-west to south-east Dominated by productive agricultural land Low woodland cover, except on large estates and river corridors Limited visual impact of Dundee and Arbroath	Medium An agricultural area, where the sea forms a backdrop rather than a key part of the landscape.
Type 15: Lowland Loch Basin	Broad basins formed where sandstones have been eroded away leaving harder enclosing rocks Extensive mudflats Rich natural heritage Dominance of water, sky and distant shores Framed views	High Coastal influence and views of the sea are a key characteristic of this landscape, and offshore development has the potential to affect its character.

Seascape Character

16.158. Seascape characterisation is summarised in paragraph 16.94 of this chapter.

National Seascape Units

16.159. National Seascape Units are described in paragraph 16.94 of this chapter. There are two National Seascape Units in the study area which are illustrated in Figure 16.20:

- area 3: East Fife / Firth of Tay; and
- area 4: North East Coast.

16.160. The key characteristics and sensitivities are summarised in Table 16.10 below:

Table 16.10 National Seascape Units

National Seascape Unit / Area	Key Characteristics	Sensitivity (as defined in Report No. 103)
Area 3: East Fife / Firth of Tay	Medium to large scale overall. Containment of hills reduces scale in Inner Firth, flatter coastal landform and greater expanse of open sea increases scale in Outer Firth.	Medium
Area 4: North East Coast	Long, east-facing generally 'straight' coastline with many small indentations and few significant headlands and with open views out to North Sea.	Low – Medium

Regional Seascape Units

16.161. The Seascape Character Assessment and Regional Seascape Units are described in paragraphs 16.97 to 16.100 of this chapter.

16.162. Six regional units have been identified within the study area. These are illustrated in Figure 16.20 and the descriptions and sensitivities of each are set out in Appendix K2 which can be found in ES Volume III: Appendices.

- SA3: Cove Bay to Milton Ness (Sensitivity: Medium);
- SA4: Montrose Bay (Sensitivity: High);
- SA5: Long Craig (Sensitivity: Medium);
- SA6: Lunan Bay (Sensitivity: High);
- SA7: Lang Craig to The Deil's Heid (Sensitivity: High); and
- SA8: Arbroath to Monifieth (Sensitivity: Medium).

Physical and Human Influences on the Landscape / Seascape

16.163. The characteristics of the physical and human influences on the landscape/ seascape for Project Bravo are the same as described for Project Alpha in paragraphs 16.102 to 16.113 of this chapter.

Principal Visual Receptors and Views

16.164. Potential visual receptors of Project Bravo are located both onshore and offshore, although the vast majority of views are likely to be experienced from the coastline. Visual receptors have been identified within 50km of the site boundary. Likely viewers (visual receptors) are described in general in paragraph 16.115 of this chapter. These are described briefly below and are all illustrated in Figure 16.24.

Settlements

16.165. Settlements were identified as set out in paragraph 16.117 of this chapter. The main towns in the study area include Stonehaven, Montrose, Arbroath, Carnoustie, Inverbervie and Laurencekirk. A number of key villages include Johnshaven, St Cyrus, Hillside, Inverkeilor and Friockheim. As per Table 16.2, all settlements are assessed as high sensitivity receptors because of the presence of residential receptors within each settlement.

Route corridors – roads, railways, cycle routes and footpaths

16.166. There are numerous route corridors, many of which are associated with urban development, while others provide access to the wider countryside. It is not possible or necessary to assess the potential impacts of Project Bravo on every route individually, however, some of the key routes have been considered in the assessment, and these serve as illustrations of likely impacts on more minor routes in similar locations. Two principal criteria have been considered in determining the inclusion of routes in the assessment; firstly, the extent to which the route traverses the study area or extends across a notable part of it; and secondly, the importance of the route in terms of recognition, signage, traffic volume and usage.

16.167. Using these criteria, one major road is considered to be appropriate for inclusion as a receptor: the A92. Other key receptor routes include: the A90, A935, A934, A933, A937, B967, B9120, B965 and B9127. As per Table 16.2, all motorways and A roads are low sensitivity receptors as the views are transient and fast moving, whilst B roads and unclassified roads are medium sensitivity receptors.

16.168. One National Cycle Network Sustrans route traverses primarily along the coastline: National Cycle Network 1 (NCN1), which extends along the Angus and Aberdeenshire coastline to Aberdeen. As per Table 16.2, users of cycle routes are high sensitivity receptors as these routes are nationally important and designated routes, and whose attention is focused on the landscape.

16.169. The study area includes one mainline railway (East Coast Mainline Railway) connecting Aberdeen with Dundee, via Carnoustie, Arbroath and Montrose. As per Table 16.2, users on railways are medium sensitivity receptors.

16.170. Users of aeroplanes over the study area (including on approach to or departure from Aberdeen and Dundee airports) are considered as low sensitivity receptors.

Recognised vantage points

16.171. Elevated locations along the coast act as local vantage points out to sea. There are recognised vantage points at Fife Ness and St Cyrus. There are also beach level locations at Arbroath, Montrose, Carnoustie, Stonehaven, Lunan, Johnshaven and Inverbervie which act as informal vantage points out to sea.

16.172. In addition, there are various car parks off the A92, which are located on top of cliffs and act as informal vantage points out to sea.

16.173. All the above identified vantage points will have a high sensitivity to change as users at these locations tend to pause and take in the view and often focus on the horizon.

Recreational receptors

16.174. Apart from informal recreational activities such as walking and cycling, there are a small number of other recreational activities that take place along the coast. There are several golf

courses within the study area which have several clubs using them and comprise more than one course at each link. These include Stonehaven Golf Club in Aberdeenshire, Montrose Golf Links and Arbroath Golf Links. Golf courses have a medium sensitivity to change as the focus of golfers is on the sport rather than the surroundings.

16.175. There are no country parks within the study area.

Tourist attractions

16.176. The tourist attractions identified within Project Bravo study area are the same as per Project Alpha described in paragraphs 16.132 to 16.134 of this chapter. The principal beaches within the Project Bravo study area are shown and listed on Figure 16.24.

Marine receptors

16.177. Marine receptors are described in paragraphs 16.135 to 16.137 of this chapter. As for Project Alpha, the Bell Rock Lighthouse is within the Project Bravo study area. The Lighthouse is situated approximately 17.5km from Arbroath, and 22.5km from St Andrews on the Fife coast and approximately 31km west from Project Bravo.

Viewpoints

16.178. Viewpoint selection for Project Bravo was the same as for Project Alpha, set out in paragraphs 16.138 to 16.141 of this chapter, except that VP3 has been omitted as it lies outside the study area of Project Bravo and therefore there are seven viewpoints for Project Bravo.

16.179. The locations of the Project Bravo viewpoints are illustrated in Figure 16.26. Table 16.11 below lists the viewpoints and provides information on their location, reasons for selection, and distance from the site.

16.180. For the purposes of consistency, the viewpoint numbers are the same as per Project Alpha. However, VP3 has been discounted as it lies outside the study area of Project Bravo

16.181. All except one viewpoint is at coastal locations close to or within settlements which already have moderate levels of street lighting or residual lighting 'pollution' from the settlement. Fife Ness (VP8) is the only viewpoint where views would be obtained from a more 'natural' viewpoint. In this case, visitors are likely to have returned home before full nightfall. The viewpoint receptors are therefore considered to have low sensitivity to night-time lighting at the Project Bravo site.

Table 16.11 Project Bravo Viewpoints

No.	Viewpoint Name	Easting	Northing	Council Area	Distance to Project Bravo (km)	Receptor	Reason for inclusion	Maximum Sensitivity of Receptor
1	Garron Point (Stonehaven Golf Club)	388587	787597	Aberdeenshire	50	Golfers	A links golf course, located on a headland which enables unobscured views south along the coast	Medium
2	Beach Road, Kirkton, St Cyrus	375195	764644	Aberdeenshire	43	Visitors, walkers	Car park offering beach access, and wide elevated views over Montrose Bay, on a coastal footpath	High
4	Montrose	372689	757962	Angus	42	Residents, visitors	Main car park/access point for the Montrose Bay beach and coast, promenade enables views across the seascape	High
5	Braehead of Lunan	368987	752602	Angus	43	Cyclists, residents, road users	Representative of views from a hamlet, located on NCN1, enabling views south over Red Head	High
6	Arbroath	365910	741080	Angus	45	Walkers, residents	Elevated location above car park, on way marked coastal footpath	High
7	Carnoustie	356249	734093	Angus	52	Residents, visitors	Recently upgraded promenade with car parking and beach access.	High
8	Fife Ness, Lochaber Rock	363842	709766	Fife	52	Walkers, visitors	Easternmost point of Fife, unobstructed views across the outer Firth and Tay, on the Fife Coastal Path	High

Transmission Asset Project

Infrastructure within the Project Alpha and Project Bravo site boundaries

16.182. Part of the transmission asset infrastructure will be placed within the site boundaries of Project Alpha and / or Project Bravo. The baseline environment within these areas is therefore as described above.

Export Cable Route (ECR) corridor

16.183. The export cables will connect Projects Alpha and Bravo to the onshore electricity network and will make landfall on the Angus coastline, at Carnoustie. The export cable will be approximately between 70km in length from the offshore substation platform to the landfall point.

16.184. The nearest landscape designation is The Guynd HGDL, located approximately 7km to the north of the nearest part of the ECR corridor (at the landfall point). HGDLs are assessed as being of high sensitivity.

16.185. The Tayside Landscape Character Assessment (Land Use Consultants, 1999) indicates that the landfall area lies within Character Type 14 – Coast and Area 14A – Coast with Sand, with a medium sensitivity to change. The key characteristics of this area are:

- areas of marine alluvium and windblown sand along lower sections of coast;
- sand dunes inland;
- ever-changing landscape of shifting sands, erosion and deposition and tidal fluctuation;
- golf courses; and
- limited settlement.

16.186. The Seascape Character Assessment prepared by the landscape consultants of FTOWDG (Appendix K2 of ES Volume III: Appendices) indicates that the landfall area lies within Character Area SA8: Arbroath to Monifieth, of medium sensitivity. The description of this character area is set out in Appendix K2 which can be found in ES Volume III: Appendices.

16.187. In summary, the landfall area is low lying and has a strong horizontal emphasis, heightened on the coastal edge by extensive rocky platforms interspersed with lengths of sandy beach. Low dunes and coniferous plantations add small scale vertical elements in some areas. Generally the seascape has quite a simple pattern. The presence of the rock platform and sandy beaches adds some subtlety of form to the intertidal zone but these are small scale variations in patterning. There are also few man-made focal points on the coast. Inland, there are various overhead lines which are prominent within the flat, low-lying landscape. Shipping movements are less prominent but this is nevertheless a relatively busy seascape. There is commercial and recreational activity associated with Arbroath Harbour to the north, both inland and at sea, and recreational activity along the whole of the coastline, including water-based sports and activities such as sailing. The area is highly modified in urban areas and agricultural land and golf courses form much of the immediate hinterland.

ASSESSMENT OF IMPACTS – WORST CASE SCENARIO

- 16.188. For the purpose of the SLVIA, a worst case scenario for the Seagreen Project is provided in Tables 16.12a – 16.12c. For each Project parameter, the worst case scenario comprises the design options that provide the maximum potential visibility, namely turbine height and rotor diameter over the largest geographical spread.
- 16.189. The ‘worst case’ scenarios for Project Alpha, Project Bravo and the Transmission Asset Project are defined in detail in Tables 16.12a to 16.12c. As previously stated the OSPs have been considered only within the detailed assessments for Project Alpha and Project Bravo respectively. The outcome of the OSP assessments is then cross referenced where appropriate when describing the potential effects of the Transmission Asset Project.
- 16.190. To identify the potential worst case scenario for Project Alpha and Project Bravo, two options were tested from two viewpoints on the coast at Arbroath (VP6) and Fife Ness (VP8):
- the maximum height of turbines and associated spacing requirements (5 x rotor diameter); and
 - the minimum height of turbines and associated spacing requirements.
- 16.191. The assessment reported in this ES follows the Rochdale Envelope approach, in which a number of scenarios were identified during the EIA process and a design sensitivity analysis undertaken to identify the worst case scenario for each environmental receptor. This approach is described in Chapter 5: Project Description of this ES. This SLVIA considers the impacts of the Seagreen Project based on the worst case scenario.
- 16.192. The sensitivity analysis concluded that there was little perceptible difference in the appearance of the two design scenarios and that it would be logical to use the tallest WTGs for the SLVIA, given that a greater height of WTG would be most visible from the higher land based viewpoints. This SLVIA, therefore, assesses the impacts of 75 7MW WTGs, for each of Project Alpha and Project Bravo, with nominal hub and blade tip heights of 126.2m and 209.7m above sea level (Above Ordnance Datum) respectively, laid out in a curved grid (see Figure 16.1A).
- 16.193. The above layout has been selected as the worst case scenario for the SLVIA due to the following key reasons which are further described in Tables 16.12a to 16.12c:
- larger turbines will give rise to greater impacts due to the increased horizontal or vertical field of views from land based receptors; and
 - from the point of view of an observer standing on the foreshore at sea level, the distance to the true horizon is approximately 4.7km. At this point smaller objects would become invisible due to the curvature of the earth. However, taking in to consideration the potential maximum height of the turbines (209.7m), the wind farm will potentially be visible from a distance greater than 50km from shore.

Table 16.12 a Worst case scenario for Project Alpha assessment

Impact	Worst case scenario	Justification
Construction		
Impacts on seascape, landscape and visual amenity	<p>Maximum construction window to be complete within 18 months of the 36 month offshore substructure and foundations activity programme (from the 3rd Quarter 2016 to the 3rd Quarter 2019), assuming annual working, with the greatest number of structures (75 WTCs, 3 met masts and 5 offshore platforms) resulting in the maximum level of construction activity over this period.</p> <p>Construction vessels comprising foundation installation via Heavy Lift Vessel (HLV) / 6-leg jack-up barge, grouting vessel, foundation transportation vessel, substation installation vessel, cabling installation vessel and jetting ROV, rock dump barge and support vessels present within the site within 18 months of the 36 month offshore substructure and foundations and offshore cabling activities programme (from the 3rd Quarter 2016 to the 3rd Quarter 2019), assuming annual working window of 12 months.</p> <p>Construction activity with 24 hr operations, 2 rigs operating at the same time.</p> <p>355km of array cabling installed using jetting ROV to install cables to an average maximum depth of 1.5m, width of 3.0m excavated at a rate of 237.5m/hr within 18 months of the 36 month offshore cabling activity programme (from the 3rd Quarter 2016 to the 3rd Quarter 2019), assuming annual working window of 12 months.</p>	<p>The worst case scenario is represented by the maximum number of construction vessels and foundations present within the site at any one time which could result in worst-case visual impact.</p> <p>Installation of array cables at a rate of 237.5m/hr within 18 months of the 36 month offshore cabling activity programme (from the 3rd Quarter 2016 to the 3rd Quarter 2019), assuming annual working window of 6 months from April to September is a longer duration of construction activities to a faster rate of installation via ploughing or cutting (see Chapter 5: Project Description of this ES).</p>
Operation		
Impacts on seascape, landscape and visual amenity	75 WTCs with a maximum tip height of 209.7m within the Project Alpha Site. Up to three meteorological masts (209.7m) and 3 offshore substation platforms (OSPs). Marking and lighting of structures will comply with IALA 2008 standards.	The greatest visual impact and, therefore, worst case scenario is driven by the tallest WTCs over the largest geographical spread. No other combinations of tip height and turbine density (and therefore, layout) offer any increased visibility.
Decommissioning		
Impacts on seascape, landscape and visual amenity	Removal of all structures. Similar to that of construction phase in regards to vessel activity.	The removal of all structures will result in temporary presence of the maximum number of construction vessels present within the site at any one time.

Table 16.12b Worst case scenario for Project Bravo assessment

Impact	Worst case scenario	Justification
Construction		
As per Project Alpha in Table 16.12a	As per Project Alpha in Table 16.12a	As per Project Alpha in Table 16.12a
Operation		
As per Project Alpha in Table 16.12a	As per Project Alpha in Table 16.12a – but up to 2 offshore substation platforms (OSPs)	As per Project Alpha in Table 16.12a
Decommissioning		
As per Project Alpha in Table 16.12a	As per Project Alpha in Table 16.12a	As per Project Alpha in Table 16.12a

Table 16.12c Worst case scenario for Transmission Asset Project assessment

Impact	Worst case scenario	Justification
Construction		
Impacts on seascape, landscape and visual amenity	<p>Up to six export cables (HVAC) to be installed along a 70km export cable corridor, installed using jetting ROV to install cables to an average maximum depth of 1.5m, width of 3.0m excavated at a rate of 237.5m/hr within 24 months of the 36 month offshore cabling activity programme (from the 3rd Quarter 2016 to the 3rd Quarter 2019), assuming annual working window of 6 months.</p> <p>Vehicular disturbance from vehicles associated with intertidal cable installation activities.</p> <p>Construction activity with 24 hr operations, 2 rigs operating at the same time.</p> <p>Deconstruction of the sea defences at the landfill and excavation of a trench to accommodate ducts with backhoe dredger.</p>	<p>Six 275kv HVAC cables represent the worst case scenario as all other electrical connection options result in a reduced number of cables (4 220kv HVAC cables; 4 550MW HVDC) and therefore result in a reduced number of construction vessels and shorter construction duration (see Chapter 4: Project Description).</p> <p>Installation of export cables within a total construction period of 9 months (see Chapter 5: Project Description of this ES).</p> <p>Represents the highest potential for visual impacts associated with the maximum number of construction vessels present within the site at any one time.</p> <p>The method of installation at the landfill would potentially cause a greater impact than directional drilling, because of increased surface disruption leading to increased potential for seascape, landscape and visual impacts.</p>
Operation		
No impacts on seascape, landscape and visual amenity as the export cable route will not be visible during the operation phase	No impacts on seascape, landscape and visual amenity as the export cable route will not be visible during the operation phase	No impacts on seascape, landscape and visual amenity as the export cable route will not be visible during the operation phase
Decommissioning		
The removal of all transmission assets will result in temporary presence of the maximum number of construction vessels present within the site at any one time.	The removal of all transmission assets will result in temporary presence of the maximum number of construction vessels present within the site at any one time.	The removal of all transmission assets will result in temporary presence of the maximum number of construction vessels present within the site at any one time.

Impact	Worst case scenario	Justification
Operation		
Impacts on seascape, landscape and visual amenity	Export cable will be buried underground during operation.	No impacts on seascape, landscape and visual amenity as the export cable route will not be visible during the operation phase
Decommissioning		
Impacts on seascape, landscape and visual amenity	Removal of all structures. Similar to that of construction phase in regards to vessel activity.	The removal of all transmission assets will result in temporary presence of the maximum number of construction vessels present within the site at any one time.

IMPACT ASSESSMENT – CONSTRUCTION PHASE

16.194. It is important to note that the matrices (Tables 16.3 and 16.4) described in the methodology of this chapter relating to magnitude of change and significance have not been applied to the assessment of the construction phase for Project Alpha, Project Bravo and the Transmission Asset Project. However, professional judgment has been used to establish the potential level of visibility of all elements during the construction phase and to assess the significance of their impact.

Project Alpha

Potential Impact

16.195. Potential sources of impact upon the seascape, landscape and visual amenity during the construction phase include:

- the presence and movement of construction vessels at sea;
- temporary 24 hour construction lighting; and
- erection of the WTGs, meteorological masts and construction of the offshore substation(s).

Physical impacts on landscape elements during construction

16.196. Primary structures (WTGs, substructure/ foundations, offshore platforms and meteorological masts) of Project Alpha will have no physical impacts on landscape elements as they are located offshore.

Impacts on landscape / seascape character during construction

16.197. Impacts on the seascape / landscape character as a result of the offshore WTGs will increase incrementally as they are erected. Impacts resulting from the WTGs themselves are treated as operational / permanent impacts. These impacts are assessed in Section 'Impact Assessment – Operation' of this chapter.

16.198. The construction vessels out at sea, operating within the Project Alpha site, are not likely to be visible from coastal foreshores and beaches along the coast, although they may be visible from vantage points at St Cyrus, Newtonhill and Fife Ness, elevated sections of settlements including Arbroath, St Cyrus, Newtonhill, Inverbervie, Gourdon, Stonehaven, and Portlethen Village, and hilltop viewpoints at Drumtochy Forest and Durris Forest within the study area. Project Alpha is located 27km from the nearest section of the coastline and when viewed from a height of 1.7m AOD (the average height of a person) along the coastal foreshores and beaches, any construction vessels less than 42m high (i.e. above sea level) will not be visible as they will lie beyond the horizon due to the curvature of the earth (a further discussion regarding the impacts of the curvature of the earth on visibility is provided in Table 16.13). For viewers from greater elevations, more of the construction vessels will be visible, however at distances of more than 27km, the construction vessels will be barely visible and there will be no additional change in any key characteristics of the landscape or seascape receptors. The construction activities during the day, associated with the erection of the WTGs, meteorological masts and offshore substations, within the Project Alpha site will therefore have a minor, reversible and temporary impact and **not significant** on the few, high sensitivity seascape and landscape character receptors.

- 16.199. Due to the 24 hour construction activities, there will be activities taking place during the night. At this time, night time lighting will be a key feature associated with the construction activities. The lighting associated with the presence and movement of the construction vessels within the Project Alpha site is likely to be visible on clear nights (without any haze) from vantage points at St Cyrus, Newtonhill and Fife Ness, elevated sections of settlements including Arbroath, St Cyrus, Newtonhill, Inverbervie, Gourdon, Stonehaven, and Portlethen Village within the study area, across a more limited part of the horizon. However, the lighting will not add a new feature to the seascape and landscape character due to the presence of occasional shipping movements out at sea and existing lighting on the coastline as identified in the key characteristics of a number of seascape and landscape character areas. The construction activities during the night associated with the erection of the WTGs, meteorological masts and OSPs within the Project Alpha site will therefore have at most a minor, reversible and temporary impact and **not significant** on these few, high sensitivity seascape and landscape character and visual receptors. These impacts will occur only for elevated receptors with no intervening vegetation, built-form or landform.

Impacts on landscape designations during construction

- 16.200. With regards to landscape designations, Arbuthnott House (in Angus) is the nearest designation located 34km inland from the nearest part of Project Alpha. The construction activities will have a negligible impact and **not significant** on all the identified landscape designations within the study area due to limited and intervening visibility caused by vegetation, landform and built-form.

Impacts on visual amenity during construction

- 16.201. Impacts on the visual amenity as a result of Project Alpha will increase incrementally as the WTGs are erected. Impacts resulting from the WTGs themselves are treated as operational. These impacts are assessed in Section 'Impact Assessment – Operation' of this chapter.
- 16.202. Movements of vessels during the day associated with Project Alpha construction will be minor, reversible and temporary and **not significant** as the area is already moderately busy with shipping activity. As mentioned in paragraph 16.199, the minor temporary impacts will be from vantage points at St Cyrus, Newtonhill and Fife Ness, elevated sections of settlements including Arbroath, St Cyrus, Newtonhill, Inverbervie, Gourdon, Stonehaven, and Portlethen Village, small sections of the A92, National Cycle Route 1 and East Coast Railway Line, and hilltop viewpoints at Drumtochy Forest and Durris Forest within the study area.
- 16.203. During the night, the lighting associated with the presence and movement of construction activities within the Project Alpha site, will be visible from elevated positions within the study area that have an unobstructed view to the sea towards the Project Alpha site. However, the lighting will not add a new feature to the visual amenity due to the presence of occasional shipping movements out at sea and existing lighting on the coastline as identified in the key characteristics of a number of seascape and landscape character areas. Residents of elevated sections of coastal settlements, including Arbroath, St Cyrus, Newtonhill, Inverbervie, Gourdon, Stonehaven, and Portlethen Village, who have a view out to sea will be the main receptor affected during the night as most of the other visual receptors are not active, although the views experienced by residents will be mitigated by existing lighting within the settlements itself. These receptors are assessed as low sensitivity receptors at night-time as the vast majority have lights on in their houses and curtains / blinds drawn too. The construction activities during the night associated with the erection of the WTGs, meteorological masts and offshore substations, within the Project Alpha site will therefore have a minor, reversible and temporary visual impact and **not significant**.

Mitigation

- 16.204. There are no practicable mitigation measures which would reduce the potential for construction impacts upon the landscape / seascape and on views as the construction activities are short-term and temporary in nature.

Residual Impact

- 16.205. Views of boat movements are not considered to be out of place in this moderately busy seascape, where large numbers of boats are moving in and out of the Forth and Tay. There may be locally concentrated activity, but this is not considered to have the potential to give rise to significant impacts on seascape or landscape character, or on views.
- 16.206. The visibility of partially-completed turbines, or the partially-completed wind farm, will never exceed the visibility of the operational turbines. As such, impacts arising from the construction phase of Project Alpha will be significantly less than those arising from the operational phase.
- 16.207. As there have been no significant potential impacts identified for Project Alpha within the SLVIA during construction, and because there are no proposed mitigation measures to reduce the identified impacts, the residual impacts are assessed the same as the potential impacts.

Project Bravo

Potential Impact

- 16.208. It is important to note that Project Bravo is located 38km from the nearest section to the coastline and therefore the potential impacts arising from the construction phase of Project Bravo will be similar to or less than those arising from the construction phase of Project Alpha. No significant potential construction impacts are predicted.

Mitigation

- 16.209. As for Project Alpha, set out in paragraph 16.205 of this chapter, there are no practicable mitigation measures which would reduce the potential for construction impacts upon the landscape / seascape and on views.

Residual Impact

- 16.210. As there have been no significant potential impacts identified for Project Bravo within the SLVIA during construction, and because there are no proposed mitigation measures to reduce the identified impacts, the residual impacts are assessed the same as the potential impacts.

Transmission Asset Project

Potential Impacts

Infrastructure within the Project Alpha and Project Bravo site boundaries

- 16.211. The potential impacts of the construction of the transmission asset infrastructure within the site boundaries of Project Alpha and/ or Project Bravo (OSP's, array cables, export cables) will be the same as or less than for Project Alpha and Project Bravo, as assessed above, and there will be no significant impacts.

ECR Corridor

16.212. Potential sources of impacts upon the seascape, landscape and visual amenity during the construction phase of the ECR corridor for the Carnoustie landfall include:

- vessels laying cables to the landfall and laying the export cable route;
- excavation of the intertidal area for cable-laying;
- presence and movement of construction vessels along the route of the export cable; and
- use of 24 hour temporary construction lighting at landfall and on cable laying vessels.

16.213. The activities during the day associated with the landfall works and cable laying will be visible from a relatively close distance around the works. Receptors in the vicinity of these works, which may experience temporary visual impacts include: a small number of residents on the south-east edge of Carnoustie, particularly those facing the sea, visitors at East Haven, Carnoustie and Barry Sands beaches, users of the Carnoustie Golf Club, an approximately 2km stretch southbound of the National Cycle Route 1 between East Haven and Carnoustie, and an approximate 6km stretch southbound of the East Coast Railway Line between Arbroath and Carnoustie. The presence and movement of the construction vessels out to sea will be visible along with the baseline occasional shipping movements in a moderately busy seascape, although there will be increased activity at the landfall works at Carnoustie where construction vessels and equipment will also be based for a minimum of 9 months. As result, reversible, temporary and up to moderate and **potentially significant** impacts will arise within 500m of the landfall works and cable laying near the landfall and will affect users of the Golf Club and a small number of residents on the south-east edge of Carnoustie. At greater distances, as the works move away from the coast, impacts will reduce to minor and **not significant**.

16.214. During the night, the lighting associated with the presence and movement of construction activities of the cable-laying and landfall works will be visible from the coastline. The cable laying rig, which is illuminated, will be visible along the stretch of the ECR corridor; however, it will be most visible closest to the shore. The lighting of the construction activities will be visible along with the occasional shipping movements and existing lighting along the coastline from coastal towns and lighthouses. A small number of residents on the south-east edge of Carnoustie, who have a view out to sea, will be the main receptor affected during the night as most of the other visual receptors are not active. However, residential receptors are assessed as low sensitivity receptors at night-time as the vast majority have lights on in their houses and curtains / blinds drawn too. As result, up to reversible, temporary and minor visual impacts will therefore arise within 500m of the landfall works and cable laying near the landfall and will affect a small number of residents on the south-east edge of Carnoustie. These impacts will reduce to negligible and **not significant** as the cable laying rig moves away from the coast.

Mitigation

Infrastructure within the Project Alpha and Project Bravo site boundaries

16.215. The mitigation for the infrastructure within the Project Alpha and Project Bravo site boundaries during construction will be the same as per paragraphs 16.205 and 16.210 of this chapter.

ECR Corridor

16.216. The construction activities close to residential receptors would be restricted to daylight or normal working hours. If there is night-time lighting less than approximately 2km to the shore, best practice measures would be applied to ensure the lighting is not directed towards the shore (e.g. using boats between the works and shore only).

Residual Impact

Infrastructure within the Project Alpha and Project Bravo site boundaries

16.217. As per Project Alpha and / or Project Bravo construction phase above.

ECR Corridor

16.218. As the mitigation measures identified above in paragraph 16.217 are limited to reduce any significant seascape, landscape and visual impacts of the ECR corridor, the residual impacts are assessed the same as per the potential impacts.

IMPACT ASSESSMENT – OPERATION

Project Alpha

Potential Impact

16.219. Potential sources of impact upon the seascape, landscape and visual amenity during the operational phase include:

- the presence and blade movement of offshore WTGs of Project Alpha;
- the presence of meteorological masts and OSPs; and
- operational night time lighting.

Impacts on landscape elements during operation

16.220. The primary structures (WTGs, substructure/ foundations, offshore platforms and meteorological masts) of Project Alpha will have no physical impact on landscape elements as they are located offshore.

Impacts on seascape character during operation

16.221. The impacts of an offshore wind farm on seascape character are inextricably linked to the visibility of the WTGs from each seascape character area. Ostensibly, the WTGs of Project Alpha can only have an impact on seascape character if they are visible. Determining the magnitude of change on seascape character areas therefore requires an understanding of how prominent the WTGs are likely to be.

ZTV analysis

16.222. The ZTV showing the theoretical visibility of the worst case scenario layout is illustrated in Figure 16.2. The ZTV illustrates the theoretical extent of where the turbines will be visible from, assuming 100% visibility. It does not account for any screening that vegetation or the built environment may provide. Therefore, the actual extents of visibility are likely to be much less extensive. The areas of greatest theoretical visual impact arising from the Project Alpha, lie within the North Sea and immediate coastal regions of Aberdeenshire, Angus and Fife. This extends slightly further on land due to the elevated topography. The ZTV takes no account of adverse weather and atmospheric conditions which will curtail the viewing distances to various extents.

- 16.223. It can be inferred from the ZTV, that Project Alpha will theoretically be visible from the coastline and therefore have the potential to affect seascape character. The extent of the ZTV is prominent along the coastline, gradually decreasing inland from the coast, with limited theoretical visibility between 40-50km, even on hilltops and elevated areas. Figure 16.4 illustrates the theoretical visibility of Project Alpha in relation to the Landscape and Seascape Character Areas identified in the study area. The extent of theoretical visibility, can however, not be taken in isolation as an indicator of magnitude of change on the seascape character. Various other factors need to be taken into account, which will determine the prominence of the WTGs of Project Alpha.
- 16.224. Given the distance between the Project Alpha Site and the nearest section of coastline (i.e. over 27km), a number of factors that limit visibility over long distances must be taken into account.

Curvature of the Earth

- 16.225. The first of these factors is the impact that the curvature of the earth has upon views over long distances. The potential impact of the curvature of the earth on visibility of the WTGs is explained in Table 16.13.

Table 16.13 Effects of curvature of the earth on WTG visibility

Distance from Project Alpha	Amount of WTG visible to a viewer at 1.7m AOD (beach level) (based on 209.7m turbine (approximately 210m), with 167m rotor diameter)		Amount of WTG visible to a viewer at 50m AOD (sea cliff/ headland) (based on 209.7m turbine (approximately 210m), with 167m rotor diameter)	
	Height (tip height)	Components Visible	Height (tip height)	Components Visible
10km	208m	Tower, hub and blades	210m	Tower, hub and blades
15km	203m	Most of tower, hub and blades	210m	Tower, hub and blades
20km	195m	Most of tower, hub and blades	210m	Tower, hub and blades
25km	183m	Upper two-thirds of tower, hub and blades	210m	Tower, hub and blades
30km	168m	Upper half of tower, hub and blades	210m	Tower, hub and blades
35km	150m	Upper half of tower, hub and blades	206m	Most of tower, hub and blades
40km	128m	Upper third of tower, hub and blades	199m	Most of tower, hub and blades
45km	103m	Blades above hub only	189m	Upper two thirds of tower, hub and blades
50km	74m	Tips of blades visible only	175m	Upper two thirds of tower, hub and blades

Climatic visibility

16.226. The second factor that would greatly limit views of the wind farm is climatic visibility. Climatic and atmospheric conditions affect visibility and this is most pronounced in coastal locations. Daily visibility records are available from the Met Office, which detail the extent of visibility over a defined period. Table 16.14 presents visibility assumptions for Project Alpha.

Table 16.14 Visibility assumptions (Adapted from local Met Office Visibility Data 2001-2010, Leuchars)

Distance	Percentage of the year when nearest WTGs would be visible	Equivalent number of days per year
0km	100%	365
0.1 – 5km	92%	336
5.1 – 10km	83%	303
10.1 – 15km	74%	270
16.1 – 20km	64%	234
20.1 – 25km	54%	197
25.1 – 30km	42%	153
30.1 – 35km	37%	135
35.1 – 40km	24%	88
40.1 – 45km	20%	73
45.1 – 50km	10%	36
>50.1km	8%	29

16.227. Based on the assumptions presented in Table 16.14, it can be concluded that at any point along the coast (every point of which is over 27km from Project Alpha), the nearest WTGs of Project Alpha will be visible for approximately 42% of each year (equivalent to 153 days per year). Between 25 - 30km, the WTGs that will be visible will comprise the upper two-thirds of the tower, hub and blades. Conversely therefore, it can be concluded that there will be no views of the WTGs from anywhere along the coast for approximately 58% of the year (equivalent to 211 days per year). The photomontages presented in this ES (Figures 16.10 to 16.17), therefore, represent the very worst case scenario, as the baseline photographs were taken on one of the clearest days of 2011.

16.228. The figures in Table 16.14 indicate that the Project Alpha WTGs will be visible on good weather days (typically high pressure with no haze in the sky) and is acknowledged that these are the days more likely to attract larger visitor numbers to the coast.

16.229. Tables 16.15 and 16.16 combine all the various factors that will dictate how prominent the WTGs will be from within the National and Regional Seascape Character Areas and provides an overall rating for the magnitude of change on each Seascape Character Area.

Table 16.15 Magnitude of Change on National Seascape Character Areas

Magnitude indicator	National Seascape Character Unit		
	Area 2: Firth of Forth	Area 3: East Fife/ Firth of Tay	Area 4: North East Coast
Distance between Project Alpha Site and nearest landward section of seascape unit.	48km (Fife Ness)	37km (Arbroath)	27km (Inverbervie)
Number of WTGs visible where there are clear views of the site	44	75	75
Coverage of theoretical visibility within seascape unit	Seascape unit in study area within ZTV	Majority of seascape unit covered by ZTV	Majority of seascape unit covered by ZTV
Woodland cover within seascape unit	Limited woodland cover	Limited woodland cover. Small coverage near Elliot.	Overall limited cover. Occasional woodland near the coast between Arbroath and Aberdeen.
Extent of built visual barriers (e.g. buildings)	None/ very few (Lighthouse at Fife Ness)	Moderate amount of infrastructure around Arbroath and Camoustie, including residential and industrial developments. Arbroath Harbour.	Moderate amount of infrastructure around the coastal settlements including Montrose, Stonehaven, St Cyrus, Johnshaven, Inverbervie. This includes ports, harbours and the occasional lighthouse.
Maximum horizontal angle of view occupied by WTGs on the horizon	15° (Fife Ness)	25° (North Arbroath)	32° (Inverbervie)

Magnitude indicator	National Seascape Character Unit		
	Area 2: Firth of Forth	Area 3: East Fife/ Firth of Tay	Area 4: North East Coast
Vertical angle of view occupied by the WTGs when viewed at 1.7m above beach level from nearest landward location within the seascape unit	< 0.05°	< 0.15°	< 0.15°
Amount of WTG visible on the horizon when viewed from nearest landward location within the seascape unit (at beach level)	Blades above hubs only visible	Upper half to third of tower, hubs and blades visible	Upper half to two-thirds of tower, hubs and blades visible
Percentage of the year when the nearest WTGs would be visible from seascape unit	<10% of the year Less than 36 days per year	<24% of the year Less than 88 days per year	<42% of the year Less than 153 days per year
Amount of navigational lights visible (15 amsl) when viewed from nearest landward location within the seascape unit (at beach level)	Low	Low	Low
Overall magnitude of change	Negligible	Low	Medium
Notes	Due to distance and atmospheric effects, the presence of the turbines will only be noticeable on very clear days, and is unlikely to result in changes to the perception of the seascape.	Due to distance and atmospheric effects, the turbines will be visible around 24% of the year (less than 88 days a year), and their presence is likely to be noticeable in this seascape, however they will appear very small and will be visible only on very clear days. Their presence would only lead to a small additional change in the key characteristics of the seascape.	Although there is some local screening in this area, the turbines will be a presence in views to the east and will be noticeable in views on many days in the year.

Table 16.16 Magnitude of Change on Regional Seascape Character Areas

Regional Seascape Character Unit/ Area									
Magnitude indicator	SA2: Greg Ness to Cove Bay	SA3: Cove Bay to Milton Ness	SA4: Montrose Bay	SA5: Long Craig	SA6: Lunan Bay	SA7: Lang Craig to The Deil'sHeid	SA8: Arbroath to Monifieth	SA12: St Andrews to Fife Ness	SA13: East Neuk of Fife
Distance between Project Alpha and nearest landward section of seascape unit.	47km -South Aberdeen	27km - Inverbervie	29km - St Cyrus	31km - Montrose	32km – Boddin Point, Dunninald	33km – Lang Craig	38.5km - Arbroath	48km – Fife Ness	48km – Fife Ness
Number of WTGs visible where there are clear views of the site	45	75	75	75	75	75	75	44	44
Coverage of theoretical visibility within seascape unit	Majority of seascape unit covered by ZTV. Occasional gaps in visibility due to landform	Majority of seascape unit covered by ZTV	Majority of seascape unit covered by ZTV	Majority of seascape unit covered by ZTV	Majority of seascape unit covered by ZTV	Majority of seascape unit covered by ZTV	Majority of seascape unit covered by ZTV	Majority of seascape unit covered by ZTV	Majority of seascape unit covered by ZTV

Regional Seascape Character Unit/ Area									
Magnitude indicator	SA2: Greg Ness to Cove Bay	SA3: Cove Bay to Milton Ness	SA4: Montrose Bay	SA5: Long Craig	SA6: Lunan Bay	SA7: Lang Craig to The Deil's Heid	SA8: Arbroath to Monifieth	SA12: St Andrews to Fife Ness	SA13: East Neuk of Fife
Woodland cover within seascape unit	None/ very little	Moderate woodland cover north and north-east of Stonehaven, north of Inverbervie, Benholm,	Considerable amount of woodland near Kinnaber& Montrose Golf Club	Very little	Moderate woodland around Lunan and Braehead of Lunan	Little near Arbroath and inland	Moderate woodland in Elliot with little around Arbroath and Carnoustie	Little woodland to east of Kingbarns	None/ very little
Extent of built visual barriers (e.g. buildings)	Substantial amount of buildings within Cove Bay	Moderate amount of built infrastructure around Portlethen, Newtonhill and Stone haven	Moderate amount of built infrastructure around Montrose and buildings within St Cyrus	None/ very few. Scurdie Ness lighthouse	Very few	Few buildings in and around Auchmitie	Substantial amount of buildings in and around Arbroath, Carnoustie and Monifieth	Very few. Fife Ness lighthouse	Crail raceway. Fife Ness lighthouse
Maximum horizontal angle of view occupied by WTCs on the horizon	23°	32°	23°	23°	24°	25°	25°	15°	15°

Regional Seascape Character Unit/ Area									
Magnitude indicator	SA2: Greg Ness to Cove Bay	SA3: Cove Bay to Milton Ness	SA4: Montrose Bay	SA5: Long Craig	SA6: Lunan Bay	SA7: Lang Craig to The Deil'sHeid	SA8: Arbroath to Monifieth	SA12: St Andrews to Fife Ness	SA13: East Neuk of Fife
Vertical angle of view occupied by the WTGs when viewed at 1.7m above beach level from nearest landward location within the seascape unit	< 0.15°	< 0.15°	< 0.15°	< 0.15°	< 0.15°	< 0.15°	< 0.12°	<0.05°	<0.05°
Amount of WTG visible on the horizon when viewed from nearest landward location within the seascape unit (at beach level)	Blades above hubs only visible	Upper half to two-thirds of tower, hubs and blades visible	Upper half to two-thirds of tower, hubs and blades visible	Upper half of tower, hub and blades visible	Upper half of tower, hub and blades visible	Upper half of tower, hub and blades visible	Upper half to third of tower, hubs and blades visible	Blades above hubs only visible	Blades above hubs only visible
Percentage of the year when the nearest WTGs would be visible from seascape unit	<10% of the year Less than 36 days per year	<42% of the year Less than 153 days per year	<42% of the year Less than 153 days per year	<37% of the year Less than 135 days per year	<37% of the year Less than 135 days per year	<37% of the year Less than 135 days per year	<24% of the year Less than 88 days per year	<10% of the year Less than 36 days per year	<10% of the year Less than 36 days per year

Regional Seascape Character Unit/ Area									
Magnitude indicator	SA2: Greg Ness to Cove Bay	SA3: Cove Bay to Milton Ness	SA4: Montrose Bay	SA5: Long Craig	SA6: Lunan Bay	SA7: Lang Craig to The Deil'sHeid	SA8: Arbroath to Monifieth	SA12: St Andrews to Fife Ness	SA13: East Neuk of Fife
Amount of night time navigational lights visible (15 amsl) when viewed from nearest landward location within the seascape unit (at beach level)	Low	Medium	Medium	Low	None/ very low	Low	Low	Low	Low
Overall magnitude of change	Negligible	Medium	Medium	Low	Low	Low	Low	Negligible	Negligible
Notes	Due to distance and atmospheric effects, the presence of the turbines will only be noticeable on clear days, and is unlikely to result in changes to the perception of the seascape.	Although there is some local screening in this area, the turbines will be a presence in views to the east and will be noticeable in views.	Although there is some local screening in this area, the turbines will be a presence in views to the east and will be noticeable in views.	Due to distance and atmospheric effects, the turbines will be visible on around 37% of days, and their presence is likely to be noticeable in this undeveloped seascape. However, their presence would only lead to very small changes to the perception of the seascape.	Due to distance and atmospheric effects, the turbines will be visible on around 37% of days, and their presence is likely to be noticeable in this undeveloped seascape. However, their presence would only lead to very small changes to the perception of the seascape.	Due to distance and atmospheric effects, the turbines will be visible on around 37% of days, and their presence is likely to be noticeable in this undeveloped seascape. However, their presence would only lead to very small changes to the perception of the seascape.	Although there is some local screening and localised development, the presence of turbines is likely to be noticeable in this seascape. Much of this coast is oriented to look southeast, and the turbines will therefore be peripheral in many views.	Due to distance and atmospheric effects, the presence of the turbines will only be noticeable on clear days, and is unlikely to result in changes to the perception of the seascape.	Due to distance and atmospheric effects, the presence of the turbines will only be noticeable on clear days, and is unlikely to result in changes to the perception of the seascape.

Summary of operational impacts on seascape character

- 16.230. Tables 16.15 and 16.16 demonstrate that there will be no greater than a medium magnitude of change on any of the seascape areas and units within the study area. This conclusion is based on the assumption that the offshore WTGs are located at a distance of over 27km from the shore and will be experienced as part of a panoramic seascape within each of the seascape areas and units. Therefore, and notwithstanding the fact that the seascape in this section of the coast is of high or medium - low sensitivity to change, there will be no greater than a moderate and **potentially significant** impact on the seascape character within any of the seascape areas and units identified.
- 16.231. There are two potentially significant impacts identified on SA3: Cove Bay to Milton Ness and SA4: Montrose Bay. All other impacts are assessed as not significant.
- 16.232. Table 16.17 summarises the significance of impacts on the seascape units identified within the study area.

Table 16.17 Seascape Impact Summary Table

	Sensitivity to change	Magnitude of change	Significance of impact (combination of significance matrix and professional judgement)
National Seascape Unit			
Area 2: Firth of Forth	Medium	Negligible	Minor – Not significant
Area 3: East Fife/ Firth of Tay	Medium	Low	Minor/ moderate – Not significant
Area 4: North East Coast	Low - Medium	Medium	Minor/ moderate – Not significant
Regional Seascape Character Areas			
SA2: Greg Ness to Cove Bay	Medium	Negligible	Minor – Not significant
SA3: Cove Bay to Milton Ness	Medium	Medium	Moderate – Potentially significant
SA4: Montrose Bay	High	Medium	(Moderate) – Potentially significant
SA5: Long Craig	Medium	Low	Minor/ moderate – Not significant
SA6: Lunan Bay	High	Low	Moderate/ minor – Not significant
SA7: Land Craig to The Deil's Heid	High	Low	Moderate/ minor – Not significant
SA8: Arbroath to Monifieth	Medium	Low	Minor/ moderate – Not significant
SA12: St Andrews to Fife Ness	High	Negligible	Minor/ moderate – Not significant
SA13: East Neuk of Fife	High	Negligible	Minor/ moderate – Not significant

Impacts on landscape character during operation

- 16.233. The sensitivity of the landscape, as represented by LCTs, to offshore wind farm development, has been assessed for the purposes of this LVIA in Section 'Existing Environment' in this chapter.
- 16.234. Project Alpha lies over 27km away offshore from any of the landscape character types within the study area; therefore there will be no direct impacts on landscape character. However, the indirect impacts as a result of Project Alpha on landscape character are described below.
- 16.235. Within Aberdeenshire, the ZTV (Figure 16.4) indicates that theoretical visibility of Project Alpha is gained primarily from the following landscape character areas:
- area 8: Howe of The Mearns;
 - area 9: Garvock and Glenbervie;
 - area 13: Kincardine Plateau; and
 - area 18: The Mounth.
- 16.236. Within Aberdeen City, the ZTV (Figure 16.4) indicates that theoretical visibility of Project Alpha is gained primarily from the following landscape character areas:
- area 26: Den of Leggart; and
 - area 27: Loirston.
- 16.237. Within Angus Council, the ZTV (Figure 16.4) indicates that theoretical visibility of Project Alpha is gained primarily from the following landscape character types:
- type 1: Highland Glens (1b: Mid Highland Glens);
 - type 5: Highland Foothills;
 - type 10: Broad Valley Lowland;
 - type 12: Low Moorland Hills;
 - type 13: Dipslope Farmland; and
 - type 15: Lowland Loch Basin.
- 16.238. Within Fife Council, the ZTV (Figure 16.4) indicates that theoretical visibility of Project Alpha is gained primarily from the following landscape character type:
- type C6: Lowland Open Sloping Farmland.
- 16.239. None of the above landscape character types and areas have full visibility of Project Alpha. Although theoretical visibility is possible, inter-visibility will be significantly affected by intervening landform, built-form and tree cover not identified in the ZTV. Where visibility exists, it will be at long distance (over 27km) and is likely to occur only in very good viewing conditions (less than approximately 153 days a year). As a result of this and given the geographical separation of the landscape areas / types and Project Alpha, the magnitude of change is considered low in very good visibility but generally negligible or none. As such, the indirect impacts of Project Alpha will be no greater than a minor impact on the landscape character types / areas identified, and therefore **not significant**.

16.240. The conclusion of no significant impacts was the result of a variety of factors including distance from Project Alpha, limited relationships with the sea, and ultimately lack of intervisibility with the Project Alpha WTGs.

Impacts on landscape designations during operation

Historic Gardens and Designed Landscapes (HGDL)

16.241. Of the 14 Historic Gardens and Designed Landscapes in the study area, 8 are theoretically visible as per Figure 16.6. In reality, due to the enclosed setting of the HGDLs, intervening vegetation and local ridgelines in the wider landscape, there would be limited visibility out towards Project Alpha. Given the distant nature and limited extent of potential views towards the proposed WTGs, the anticipated magnitude and overall significance of operational impact on the setting of Historic Gardens and Designed Landscapes in the study area is considered to be negligible. The overall significance of operational impact upon the intrinsic character of the HGDLs within the study area will therefore be negligible and **not significant**.

Special Landscape Areas (SLA)

16.242. There will be no direct changes to the SLAs, and no impacts on the defining elements, characteristics or attributes of the SLAs. Impacts will be to distant views of Project Alpha from limited parts of the SLAs.

16.243. There will be little inter-visibility between the proposed WTGs of Project Alpha and the SLAs within the study area due to the screening effects of coastal embankments, intervening vegetation and local ridgelines in the wider landscape. There may however, be some areas of limited visibility from the SLAs on the coastline (a minimum of 27km) and a few elevated areas of the SLAs beyond 35km from Project Alpha. Where these distant views of the WTGs can be seen, the WTGs will appear very small on a distant horizon. Given the distant nature and limited extent of potential views towards the proposed WTGs, the anticipated magnitude and overall significance of operational impact on SLAs in the study area is considered to be negligible. The overall significance of operational impact upon the intrinsic character of the SLAs within the study area will therefore be negligible and **not significant**.

Impacts on visual amenity during operation

16.244. This section sets out the likely impacts of Project Alpha on views and the visual amenity of the study area. Impacts on principal visual receptors will arise from the presence of the offshore wind turbines in certain views.

16.245. Photomontages have been prepared to illustrate the impact of Project Alpha on 8 of the assessment viewpoints:

- VP1 - Garron Point (Stonehaven Golf Club);
- VP2 - Beach Road, Kirkton, St Cyrus;
- VP3 - White Caterthun Hill Fort;
- VP4 – Montrose;
- VP5 - Braehead of Lunan;
- VP6 – Arbroath;
- VP7 – Carnoustie; and
- VP8 - Fife Ness, Lochaber Rock.

- 16.246. Locations of the viewpoints can be seen in Figure 16.9. The impacts of Project Alpha on each of the assessment viewpoints are summarised in Table 16.18.
- 16.247. As per Table 16.18, moderate and **potentially significant** impacts have been predicted at two out of eight viewpoints (VP2 and VP5). Both the viewpoints are assessed as high sensitivity. These are located between 32km and 35km from Project Alpha. Moderate and **potentially significant** impacts have been predicted at locations with important connections to the open sea, but where the turbines will be distant, and at locations where the turbines will not be central to the view.
- 16.248. Minor and **not significant** impacts have been predicted at four viewpoints (VP1, VP3, VP4 and VP6). These are located between 33km and 52km from Project Alpha. These include locations of medium (VP1) and high (VP3, VP4, VP6) sensitivity locations at distances, where turbines will not be a substantial feature of the view.
- 16.249. Although VP5 is located 3km closer to Project Alpha than VP4, which is assessed as having a moderate impact, VP4 is assessed as having a minor impact primarily due to the presence of Scurdie Ness lighthouse which is the dominant vertical element in the view and overrides the presence of the turbines located at 33km from VP4.
- 16.250. A negligible and **not significant** is predicted at the remaining two viewpoints (VP7 and VP8), which are located at the foreshore at approximately 50km from Project Alpha, due to the limited visibility of Project Alpha in the views.
- 16.251. Based on an analysis of the representative assessment viewpoints, a number of statements can be made about the impacts of Project Alpha on the visual amenity of the different visual receptor groups within the study area.

Table 16.18 Viewpoints Assessment Summary Table

VP	Name	Sensitivity	Distance to nearest WTG of Project Alpha (km)	Horizontal angle of view occupied by wind farm array (degrees)	No of blade tips visible	Percentage of year when nearest WTG would be visible (based on visibility assumptions)	Magnitude of Change in the view	Significance of impact when visible (Bold-combination of significance matrix and professional judgement)	Further comments
1	Garron Point (Stonchaven Golf Club)	Medium Moderately used viewpoint for golf club users	38	25°	75	< 24% (less than 88 days a year)	Low	Minor/ Moderate (Minor) – Not significant	On less than a quarter of days in a year, Project Alpha will be visible to the right of a 180 degree view, occupying around 25 degrees of the view. Looking south, Project Alpha will sometimes appear backlit by the sun. The upper third of the turbine towers, all hubs and blades will appear on the far horizon at 38km.
2	Beach Road, Kirkton, St Cyrus	High Popular recreational destination with beach access. Wide open, immediate and elevated sea views.	32	30°	75	< 37% (less than 135 days a year)	Medium	Major/ Moderate (Moderate) – Potentially significant	On around a third of days in a year, Project Alpha will appear in the centre of the view, occupying around 30 degrees of the view. The man-made appearance, upright form and movement of the turbines will contrast with this simple view, and the coastal foreshore. Looking south, Project Alpha will sometimes appear backlit by the sun. Most of the turbine towers, all hubs and blades will appear on the far horizon at 32km.

VP	Name	Sensitivity	Distance to nearest WTG of Project Alpha (km)	Horizontal angle of view occupied by wind farm array (degrees)	No of blade tips visible	Percentage of year when nearest WTG would be visible (based on visibility assumptions)	Magnitude of Change in the view	Significance of impact when visible (Bold-combination of significance matrix and professional judgement)	Further comments
3	White Catherthun Hill Fort	High Well-used panoramic viewpoint. Inland location where sea is a small distant element in a wide view.	52	21°	75	< 8% (less than 29 days a year)	Low	Moderate/ Minor (Minor) – Not significant	On less than a tenth of days in a year, Project Alpha will be visible in the distant horizon occupying 21 degrees of the view of a 360 degree view. The man-made appearance of the wind farm will contrast with the horizontal plain of the sea. The upper two thirds of the turbine towers, all hubs and blades will appear on the far horizon at 52km from an elevated point of 292m.
4	Montrose	High Popular recreational destination on the foreshore. Wide open, immediate sea views.	33	29°	75	< 37% (less than 135 days a year)	Low	Moderate/ Minor (Minor) – Not significant	On around a third of days in a year, Project Alpha will be visible to the right of a 180 degree view, occupying around 29 degrees of the view. The turbines will be visible in context of Scurdie Ness lighthouse which is dominant in the view. The upper third the turbine towers, all hubs and blades will appear on the far horizon at 33km.

VP	Name	Sensitivity	Distance to nearest WTG of Project Alpha (km)	Horizontal angle of view occupied by wind farm array (degrees)	No of blade tips visible	Percentage of year when nearest WTG would be visible (based on visibility assumptions)	Magnitude of Change in the view	Significance of impact when visible (Bold-combination of significance matrix and professional judgement)	Further comments
5	Braehead of Lunan	High Residential receptors with proprietary interest and prolonged viewing opportunities. Open coastal views	35	24°	75	< 24% (less than 88 days a year)	Medium	Major/ Moderate (Moderate) – Potentially significant	The sea is visible at a distance beyond the fields, silhouetting the forms of the pine trees and experienced as a backdrop to this. On up to a quarter of days in a year, Project Alpha will appear in the centre of the view, occupying around 24 degrees of the view. Most of the turbine towers, all hubs and blades will appear on the far horizon at 35km.
6	Arbroath Signal Tower	High Visitors have an interest in the view, as seen from within the building and wider Arbroath promenade rather than from the tower. Important visual link to the Bell Rock Lighthouse.	40	24°	75	< 24% (less than 88 days a year)	Low	Moderate/ Minor (Minor) – Not significant	On up to a quarter of days in a year, Project Alpha will be visible to the left of the view, near the headland, occupying 24 degrees of the view. It will appear to the left of Bell Rock, approximately half the distance from Project Alpha. Half of the turbine towers, all hubs and blades will appear on the far horizon over 40km. The lines of the right hand side of the turbines merge into each other.

VP	Name	Sensitivity	Distance to nearest WTG of Project Alpha (km)	Horizontal angle of view occupied by wind farm array (degrees)	No of blade tips visible	Percentage of year when nearest WTG would be visible (based on visibility assumptions)	Magnitude of Change in the view	Significance of impact when visible (Bold-combination of significance matrix and professional judgement)	Further comments
7	Carnoustie	High Recreational receptors have an interest in the view. Open views towards the sea	49	21°	60	< 8% (less than 29 days a year)	Negligible	Minor/ Moderate (Negligible impact) – Not significant	On less than a tenth of days in a year, Project Alpha will be visible to the left of a 180 degree view, occupying around 21 degrees of the view. Only blade tips appear on the far horizon at 49 km. The man-made appearance of the wind farm will contrast with the horizontal, even sea.
8	Fife Ness, Lochaber Rock	High Recreational and nearby residential receptors have an interest in the view. Open marine views.	50	15°	44	< 8% (less than 29 days a year)	Negligible	Minor/ Moderate (Negligible impact) – Not significant	On less than a tenth of days in a year, Project Alpha will be visible to the left of a 180 degree view, occupying around 15 degrees of the view. Only blade tips appear on the far horizon at 50 km. The man-made appearance of the wind farm will contrast with the horizontal, even sea.

Visual impacts on residential receptors

- 16.252. All residential visual receptors considered in the assessment are located over 27km from Project Alpha. As per the analysis in the viewpoint assessment section above, up to moderate visual impacts could be anticipated at residential properties in coastal settlements that have uninterrupted views out to sea within 35km, including Johnshaven, Inverbervie and St Cyrus (VP2). Moderate impacts will only occur where the turbines are clearly visible from a property with an existing open sea view. Where visibility occurs, up to upper half of turbine towers, all hubs and blades of Project Alpha WTGs will be visible on less than 50% of days in a year i.e. approximately between 135 – 153 days a year. The man-made appearance, upright form and movement of the turbines will contrast with the existing views. Residential receptors are of high sensitivity and the magnitude of change will be medium to low on residential properties with uninterrupted sea views in the above identified settlements within 35km, giving rise to an overall moderate and **potentially significant** visual impact.
- 16.253. Settlements located beyond 35km from Project Alpha will experience up to minor and **not significant** visual impacts, at residential properties with uninterrupted sea views. Minor impacts will only occur where the turbines will not form a substantial feature of the view. Some of these settlements include Montrose (VP4), Inverkeilor, Stonehaven, Newtonhill, Hillside and Arbroath (VP6). Where visibility from residential properties at these settlements occurs, up to half of turbine towers, all hubs and blades of Project Alpha WTGs will be visible on less than 24% of days in a year i.e. approximately less than 88 days a year.
- 16.254. A negligible and **not significant** impact is predicted on settlements including Carnoustie (VP7), Brechin, Fettercairn, Glenbervie, Laurencekirk, Portlethen and Kingbarns, either due to being outwith the ZTV or with very limited visibility of the turbines (up to blade tips only on the distant horizon).

Visual impacts on recreational walking and cycle routes

- 16.255. Users of the Fife Coastal Path walk around the coast of Fife Ness (VP8) will be located at least 48km from Project Alpha at its closest point, and will only experience views of the WTGs at an oblique angle, between Fife Ness and Kingbarns, on less than 10% of days in a year i.e. approximately only 36 days a year. Where visibility between Fife Ness and Kingbarns occurs, both northbound and southbound, only the blade tips of the turbines will be visible and will be negligible to the user of the footpath. Although the sensitivity of the footpath users is high, and based on the above factors, a negligible and **not significant** impact is therefore predicted on users of the Fife Coastal Path.
- 16.256. Sustrans National Cycle Route 1 enters the study area from the south-west at Carnoustie and heads north-east along the coast towards Portlethen. Northbound and southbound users of the cycle route, along the coast, will have uninterrupted views of Project Alpha at an oblique angle, between Montrose and north of Inverbervie. The man-made appearance, upright form and movement of the turbines will contrast with the existing views. The turbines that will be visible will comprise up to upper half the tower, hubs and blades. There will be intermittent visibility between Carnoustie and Arbroath, and between north of Inverbervie and Stonehaven, with very limited visibility between Fife Ness and Kingbarns. Limited visibility occurs due to built-form, vegetation and local landform. The route lies outside the ZTV between Arbroath and Inverkeilor. It is represented in different places by VP2, VP4, VP6, VP7 and VP8. Users of this route will be located at least 27.5km from Project Alpha and will experience views of the WTGs at an oblique angle, on less than 42% of days (i.e. less than approximately 153 days a year). Considering the high sensitivity of the cycle route and the varying magnitude of change, up to moderate and **potentially significant** impacts are predicted on a small section of the route between Montrose and north of Inverbervie, where users have uninterrupted views of Project Alpha whilst the rest of the route within the study area will experience up to minor and **not significant** impacts.

Visual impacts on roads and railways

- 16.257. There will be distant, intermittent views of Project Alpha from the A92, southbound, between Stonehaven and Inverkeilor, and northbound between Arbroath and Carnoustie. Where the road passes through towns and villages (Montrose, St Cyrus, Johnshaven, Inverbervie) views will be very limited due to built-form, landform and vegetation. At its closest point, users of this route will be located at least 28km from Project Alpha and will experience transitory views of the WTGs (up to upper half of towers, hubs and blades) at an oblique angle on less than approximately 153 days a year. The road passes through and near VP1, VP2, VP5 and VP6. Considering the low sensitivity of the A road (as cars on it are fast moving and it is not a recreational route), and the factors above, the overall significance of impact on the visual amenity of users travelling along the A92 will be up to a minor and **not significant** impact.
- 16.258. There will be distant, intermittent but limited views of Project Alpha southbound from the A90, only between Aberdeen and Stonehaven, and eastbound to the west of Brechin. The rest of the route lies out-with the ZTV, and there will be no views due to landform, built-form and vegetation. At its closest point, users of this route will be located at least 35km from Project Alpha and will experience transitory views of the WTGs (up to upper half of towers, hubs and blades) at an oblique angle on less than approximately 88 days a year. Considering the low sensitivity of the A road (as cars on it are fast moving and it is not a recreational route), and the low magnitude of change, the overall significance of impact on the visual amenity of users travelling along the A90 will be up to a minor and **not significant** impact.
- 16.259. There will be distant, intermittent but limited views from the A935 eastbound between Brechin and Montrose, A933 south of Brechin, A937 southbound near Hillside, A930 eastbound near Carnoustie, B979 southbound near Stonehaven, B967 eastbound near Inverbervie, B9120 southbound between Laurencekirk and St Cyrus, B9113 eastbound near Friockheim, B961 northbound near Friockheim, B9127 eastbound near Arbroath, and B9128 southbound near Carnoustie. All of these routes are located at least 33km from Project Alpha and will experience transitory views of the WTGs (up to upper half of towers, hubs and blades) on less than approximately 88 days a year. Considering the low sensitivity of the A road (as cars on it are fast moving and they are not recreational routes) and the low magnitude of change, the overall significance of impact on the visual amenity of users travelling along these routes will be up to a minor and **not significant** impact.
- 16.260. There will be no views from the A957, A934, B9077, B966, B974, B9134 and B965, primarily due to landform, built-form and vegetation and therefore no impact is predicted.
- 16.261. On very clear days, there will be glimpses of Project Alpha from the East Coast Mainline Railway, northbound between Carnoustie and Arbroath, northbound and southbound between Hillside and Inverkeilor, and southbound between Aberdeen and Stonehaven. Users of the railways will be located at least 32.5km from Project Alpha and experience transitory views of the WTGs (up to upper half of towers, hubs and blades) on less than approximately 135 days per year. Trains on this stretch are all high speed long distance services. Up to minor and **not significant** impacts are predicted on users of the railway route.

Visual impacts on recognised vantage points and tourist attractions

- 16.262. Elevated locations along the coast act as local vantage points out to sea. All of these locations are over 30km away from Project Alpha and will experience views of the WTGs (up to upper half of towers, hubs and blades) on the distant horizon on less than approximately 135 days. As per the analysis in the viewpoint assessment section, up to moderate and **potentially significant** visual impacts could be anticipated at some local vantage points, with uninterrupted views out to sea within 35km, including St Cyrus and Inverbervie Bay. Users at these locations tend to pause and take in the view and often focus on the horizon such that they are more likely than other receptors to notice the turbines. Project Alpha will therefore be noticeable at these locations, during good visibility conditions. Other locations beyond 35km will experience up to minor and **not significant** impacts, including Arbroath and Newtonthill, whilst locations at Carnoustie and Fife Ness will experience a negligible and **not significant** impact.
- 16.263. Informal vantage points (car parks) at locations up to 35km away from Project Alpha, including Inverbervie Bay, St Cyrus, Johnshaven and Lunan will experience views of the WTGs (up to upper half of towers, hubs and blades) on the distant horizon on less than approximately 135 days. Users at these locations tend to pause and take in the view and often focus on the horizon of the areas such that they are more likely than other receptors to notice the turbines. Project Alpha will be marginally more prominent at these locations and therefore up to moderate and **potentially significant** impacts are predicted. Locations beyond 35km will experience up to minor and **not significant** impacts.
- 16.264. There are a number of other recreational receptors including hill tops and golf courses within the study area; all located over 35km from Project Alpha. Although their sensitivity to change is medium or high, the magnitude of change will be low as discussed in the viewpoint assessment section. Therefore the overall significance of impact on the visual amenity of these receptors will be up to minor and **not significant**.

Visual impacts on other land based receptors

- 16.265. It is acknowledged that there are other receptor groups represented in the study area, such as shoppers and people at their place of work. It is considered that there will be a negligible and **not significant** impact on the visual amenity of these receptors due to their low sensitivity and limited visibility of Project Alpha.

Visual impacts on marine receptors

- 16.266. In addition to the land based potential visual receptors, there are also people out at sea who may have views in the direction of Project Alpha.
- 16.267. Recreational yachts and boats tend to sail near Arbroath Harbour (Arbroath Sailing and Boating Club) which tend to sail along the coastline and rarely venture far out to sea. Boat users may view the turbines for prolonged periods. The harbour is approximately 38km from Project Alpha, and will experience views of the WTGs (up to upper third of tower, hubs and tips) on less than approximately 88 days a year. Although their sensitivity to change is medium, the magnitude of change will be medium due to the above factors. Therefore, the overall significance of impact on the visual amenity of these receptors will be moderate and **potentially significant**. The impact will be potentially significant when boats are in close proximity to Project Alpha (less than 20km) but reduce to not significant as the boats draw away from Project Alpha.

- 16.268. There are a few fishing, commercial, and industrial vessels which frequent the waters in the study area and the WTGs will potentially be a fundamental change to views when in the vicinity. Smaller fishing vessels from the harbours may be more affected as they do not travel as fast or as far offshore as the larger ships and may have visibility of Project Alpha for the duration of their fishing trips. However, due to the fact that they will be focussed on their line of work and due to their generally transient nature, impacts would be reduced. Therefore the magnitude of impact is medium. As the workers on the boats and ships would have a generally low sensitivity to change, the significance of impact will be minor / moderate and therefore **not significant**.
- 16.269. The Bell Rock Lighthouse is located approximately 28km south-west of Project Alpha. Visitors to the lighthouse will experience transient views of the WTGs of Project Alpha in one direction. Although transient, visitors on boat trips may view the turbines for prolonged periods. The WTGs will not compete in scale with the lighthouse, nor will they surround it and will be visible within a small percentage of the seascape on approximately less than 153 days or less in a year. The magnitude of change will be medium. When combined with the medium sensitivity of the receptor, the overall significance of impact will be no greater than moderate and **potentially significant**. The views from the Arbroath Signal Tower to the lighthouse will not be affected by Project Alpha, as the turbines are located significantly further to the east of the lighthouse.

Visual impacts on aircraft passengers

- 16.270. From aircrafts passing over the study area, passengers may see the WTGs of Project Alpha in clear conditions. The turbines will form a passing feature in the view, and the magnitude of change is considered to be negligible; **no significant** impacts are predicted.

Night time visual assessment

- 16.271. The night-time visual scene of the study area is dependent on the perception of existing elements of light and the resultant relative darkness of a landscape or seascape. The landscape and seascape is perceived differently at night, between dusk and dawn. The strength of moonlight and thus the degree to which a landscape or seascape, is naturally lit, varies according to the phase of the moon and weather conditions.
- 16.272. Light can be accommodated within many night-time scenes, providing that the intensity of the light is at an acceptable level, relating to the degree of existing darkness or lightness of an area. The sensitivity of the existing night-time landscape and seascape is assessed based on the landscape and seascape character assessments, and the findings of night-time field survey. The sensitivity of a night time landscape or seascape, and its capacity to accommodate lighting depends on a variety of factors, including existing levels of lighting, inter-visibility, distance, atmospheric conditions, remoteness, scenic quality, and enclosure from landform, and vegetation, and settlement patterns.
- 16.273. The turbines of Project Alpha will comprise aviation lighting and marine lighting. These will be lit in accordance with the International Association of Lighthouse Authorities (IALA) standards, Civil Aviation Authority (CAA), Maritime Coastguard Agency (MCA) and the Royal Yachting Association (RYA) requirements as stated in Chapter 5: Project Description of this ES. As set out in the IALA standards, the WTG lighting will be flashing lights, to be visible to at least 5 nautical miles (approximately 9km). Aviation lighting on the WTGs and meteorological masts is likely to be red or infra-red (not visible). Project Alpha is a minimum of 27km from land-based receptors. While it is possible that these lights will be visible on-shore, the visual prominence will be diminished by distance. Lighting on other elements of Project Alpha will be close to sea level and will therefore not be visible from near-sea level, land-based receptors.

- 16.274. The WTGs and offshore structures of Project Alpha will introduce light to an area of seascape that is currently, predominantly unlit. However, the proposed lighting will be seen in context with other existing lighting within the study area. These include illumination from occasional shipping movements visible out at sea and some aircraft movements in the sky. Lighting is also associated with a number of ports and harbours including Stonehaven, Johnshaven, Montrose and Arbroath. Frequent settlements on the coastline provide illumination, increasing in extent around larger towns such as Stonehaven, Montrose, Arbroath and Carnoustie. There are also a number of lighthouses which have prominent lights at Girdle Ness, Scurdie Ness and Fife Ness. The lighting on the WTGs and offshore structures of Project Alpha would be visible on clear nights without any haze, on less than approximately 153 days a year.
- 16.275. With regards to the SLVIA viewpoints, even when lighting is discernible, the magnitude of change will therefore be at most medium, if viewed from a remote location with no adjacent development. When combined with the low sensitivity of these receptors at night time (see paragraph 16.143) the impact on sea views of the marine lighting would be minor / moderate and **not significant**.
- 16.276. All other visual receptors will not be active at night-time and are therefore assessed as low sensitivity receptors. Even when the lighting is discernible, the magnitude of change will be at most medium from receptors in a remote location with no adjacent development. When combined with the low sensitivity of these receptors at night time, the impact on sea views of the marine lighting would be minor / moderate and **not significant**.

Mitigation

- 16.277. The Electricity Works (Environmental Impact Assessment) Regulations 2000 (SI 2000/ 1927) require that where significant impacts are identified, mitigation measures must be considered. Guidance on SLVIA (DTI, 2005) for offshore wind farms discusses design considerations that can be taken into account when developing the layout for an offshore wind farm. However, this discussion was evidently intended for offshore sites much closer to the shore.
- 16.278. The guidance acknowledges that *"It is questionable how much design changes will mitigate the impacts of, for example, a 200 turbine wind farm located over 25km offshore"*. Bearing in mind that Project Alpha will contain fewer WTGs than this and be located at a distance of over 27km from the coast, it was not considered that the design of layout could be altered in any way to further reduce the impacts.
- 16.279. The need to consider the aesthetic aspect of the wind farm layout has been identified in discussions with SNH and other consultees. These discussions also identified the limitations of the approach set out in *Siting and Designing Windfarms in the Landscape* (SNH, 2009), when applied to an offshore wind farm.
- 16.280. The marine horizon is flat and typically uninterrupted, and therefore presents no opportunity to relate turbines to an underlying landform. All offshore wind farms are seen as rows of turbines, and regular patterns are therefore preferred, in contrast to the more organic layouts sought for onshore wind farms.

Residual Impact

- 16.281. Due to the above limitations for mitigation, the residual impacts are assessed the same as the potential impacts.

Project Bravo

Potential Impact

16.282. Potential sources of impact upon the seascape, landscape and visual amenity during the operational phase include:

- the presence and blade movement of offshore WTGs of Project Bravo;
- the presence of meteorological masts and OSPs; and
- operational night time lighting.

Impacts on landscape elements during operation

16.283. The primary structures (WTGs, substructure/ foundations, offshore platforms and meteorological masts) of Project Bravo will have **no physical impacts** on landscape elements as they are located offshore.

Impacts on seascape character during operation

16.284. The impacts of an offshore wind farm on seascape character are inextricably linked to the visibility of the WTGs from each seascape character area. Ostensibly, the WTGs of Project Bravo can only have an impact on seascape character if they are visible. Determining the magnitude of change on seascape character areas therefore requires an understanding of how prominent the WTGs are likely to be:

ZTV analysis

16.285. The ZTV showing the theoretical visibility of the worst case scenario layout is illustrated in Figure 16.19. The ZTV illustrates the theoretical extent of where the turbines will be visible from, assuming 100% visibility. It does not account for any screening that vegetation or the built environment may provide. Therefore the actual extents of visibility are likely to be much less extensive. The areas of greatest theoretical visual impact arising from the Project Bravo lie within the North Sea and immediate coastal regions of Aberdeenshire and Angus. This extends slightly further on land due to the elevated topography. The ZTV takes no account of adverse weather and atmospheric conditions which will curtail the viewing distances to various extents.

16.286. It can be inferred from the ZTV, that Project Bravo will theoretically be visible from the coastline at 38km at its closest point, and will therefore have the potential to affect seascape character. The extent of the ZTV is prominent along the coastline, gradually decreasing inland from the coast with limited theoretical visibility between 45-50km on hilltops and elevated areas. Figure 16.21 illustrates the theoretical visibility of Project Bravo in relation to the Landscape and Seascape Character Areas identified in the study area. The extent of theoretical visibility, however, cannot be taken in isolation as an indicator of magnitude of change on the seascape character. Two further factors need to be taken into account, which will determine the prominence of the WTGs of Project Bravo; firstly, the curvature of the earth and secondly, climatic visibility.

Curvature of the Earth

16.287. The potential impact of the curvature of the earth on visibility of the WTGs is explained in Table 16.19.

Table 16.19 Effects of curvature of the earth on WTG visibility

Distance from Project Bravo	Amount of WTG visible to a viewer at 1.7m AOD (beach level) (based on 209.7m turbine (approximately 210m), with 167m rotor diameter)		Amount of WTG visible to a viewer at 50m AOD (sea cliff/ headland) (based on 209.7m turbine (approximately 210m), with 167m rotor diameter)	
	Height (Tip height)	Components Visible	Height (Tip height)	Components Visible
10km	208m	Tower, hub and blades	210m	Tower, hub and blades
15km	203m	Most of tower, hub and blades	210m	Tower, hub and blades
20km	195m	Most of tower, hub and blades	210m	Tower, hub and blades
25km	183m	Upper two-thirds of tower, hub and blades	210m	Tower, hub and blades
30km	168m	Upper half of tower, hub and blades	210m	Tower, hub and blades
35km	150m	Upper half of tower, hub and blades	206m	Most of tower, hub and blades
40km	128m	Upper third of tower, hub and blades	199m	Most of tower, hub and blades
45km	103m	Blades above hub only	189m	Upper two thirds of tower, hub and blades
50km	74m	Tips of blades visible only	175m	Upper two thirds of tower, hub and blades

Climatic visibility

16.288. Table 16.20 presents visibility assumptions for Project Bravo.

Table 16.20 Visibility assumptions (Adapted from local Met Office Visibility Data 2001-2010, Leuchars)

Distance	Percentage of the year when nearest WTGs would be visible	Equivalent number of days per year
0km	100%	365
0.1 – 5km	92%	336
5.1 – 10km	83%	303
10.1 – 15km	74%	270
16.1 – 20km	64%	234
20.1 – 25km	54%	197
25.1 – 30km	42%	153
30.1 – 35km	37%	135
35.1 – 40km	24%	88
40.1 – 45km	20%	73
45.1 – 50km	10%	36
>50.1km	8%	29

- 16.289. Based on the assumptions presented in Table 16.20, it can be concluded that at any point along the coast (every point of which is over 38km from Project Bravo), the nearest WTGs of Project Bravo will be visible for approximately 24% of each year (equivalent to 88 days per year). At 38km, the WTGs that will be visible will comprise the upper third of the tower, hub and blades. Conversely therefore, it can be concluded that there will be no views of the WTGs from anywhere along the coast for approximately 76% of the year (equivalent to 277 days per year). The photomontages presented in this ES (Figures 16.27 to 16.33), represent the very 'worst case scenario', as the baseline photographs were taken on one of the clearest days of 2011.
- 16.290. The figures in Table 16.20 indicate that the Project Bravo WTGs will be visible on good weather days (typically high pressure with no haze in the sky) and is acknowledged that these are the days more likely to attract larger visitor numbers to the coast.
- 16.291. Tables 16.21 and 16.22 combine all the various factors that will dictate how prominent the WTGs will be from within the National and Regional Seascape Character Areas and provides an overall rating for the magnitude of change on each Seascape Character Area.

Table 16.21 Magnitude of Change on National Seascape Character Areas

Magnitude indicator	National Seascape Character Unit	
	Area 3: East Fife/ Firth of Tay	Area 4: North East Coast
Distance between Project Bravo Site and nearest landward section of seascape unit.	40km (Arbroath)	38km (Lang Craig)
Number of WTGs visible where there are clear views of the site	75	75
Coverage of theoretical visibility within seascape unit	Majority of seascape unit covered by ZTV	Majority of seascape unit covered by ZTV
Woodland cover within seascape unit	Limited woodland cover. Small coverage near Elliot.	Overall limited cover. Occasional woodland near the coast between Arbroath and Stonehaven.
Extent of built visual barriers (e.g. buildings)	Moderate amount of infrastructure around Arbroath and Carnoustie, including residential and industrial developments. Arbroath Harbour.	Moderate amount of infrastructure around the coastal settlements including Montrose, Stonehaven, St Cyrus, Johnshaven, Inverbervie. This includes ports, harbours and the occasional lighthouse.
Maximum horizontal angle of view occupied by WTGs on the horizon	19°	20°
Vertical angle of view occupied by the WTGs when viewed at 1.7m above beach level from nearest landward location within the seascape unit	< 0.10°	< 0.12°
Amount of WTG visible on the horizon when viewed from nearest landward location within the seascape unit (at beach level)	Upper third of tower, hub and blades visible	Upper half to third of tower, hub and blades visible
Percentage of the year when the nearest WTGs would be visible from seascape unit	<24% of the year Less than 88 days per year	<24% of the year Less than 88 days per year

Magnitude indicator	National Seascape Character Unit	
	Area 3: East Fife/ Firth of Tay	Area 4: North East Coast
Amount of navigational lights visible (15 amsl) when viewed from nearest landward location within the seascape unit (at beach level)	Low	Low
Overall magnitude of change	Negligible	Low
Notes	Due to distance and atmospheric effects, the presence of the turbines will only be noticeable on very clear days, and is unlikely to result in changes to the perception of the seascape.	Due to distance and atmospheric effects, the turbines will be visible around 24% of the year (less than 88 days a year), and their presence is likely to be noticeable in this seascape, however they will appear very small and will be visible only on very clear days. Their presence would only lead to a small additional change in the key characteristics of the seascape.

Table 16.22 Magnitude of Change on Regional Seascape Character Areas

Magnitude indicator	Regional Seascape Character Unit / Area					
	SA3: Cove Bay to Milton Ness	SA4: Montrose Bay	SA5: Long Craig	SA6: Lunan Bay	SA7: Lang Craig to The Deil's Heid	SA8: Arbroath to Monifieth
Distance between Project Bravo and nearest landward section of seascape unit.	41km - Johnshaven	40km - Montrose	38km - Long Craig	39km - Lunan	38km - Lang Craig	42km - Arbroath
Number of WTGs theoretically visible where there are clear views of the site (blade tip)	75	75	75	75	75	50
Coverage of theoretical visibility within seascape unit	Majority of seascape unit covered by ZTV	Majority of seascape unit covered by ZTV	Majority of seascape unit covered by ZTV	Majority of seascape unit covered by ZTV	Majority of seascape unit covered by ZTV	Majority of seascape unit covered by ZTV
Woodland cover within seascape unit	Moderate woodland cover north of Inverbervie, Benholm	Considerable amount of woodland near Kinnaber & Montrose Golf Club	Very little	Moderate woodland around Lunan and Braehead of Lunan	Little near Arbroath and inland	Moderate woodland in Elliot with little around Arbroath and Carnoustie
Extent of built visual barriers (e.g. buildings)	Moderate amount of built infra-structure around Stonehaven	Moderate amount of built infra-structure around Montrose and buildings within St Cyrus	None/ very few. Scurdie Ness lighthouse	Very few	Few buildings in and around Auchmitie	Substantial amount of buildings in and around Arbroath, Carnoustie and Monifieth
Maximum horizontal angle of view occupied by WTGs on the horizon	25°	25°	25°	21°	23°	17°

Magnitude indicator	Regional Seascape Character Unit / Area					
	SA3: Cove Bay to Milton Ness	SA4: Montrose Bay	SA5: Long Craig	SA6: Lunan Bay	SA7: Lang Craig to The Deil's Heid	SA8: Arbroath to Monifieth
Vertical angle of view occupied by the WTGs when viewed at 1.7m above beach level from nearest landward location within the seascape unit	<0.12°	<0.10°	<0.10°	<0.15°	<0.10°	<0.05°
Amount of WTG visible on the horizon when viewed from nearest landward location within the seascape unit (at beach level)	Blades above hub only visible	Upper third of tower, hub and blades visible	Upper half to third of tower, hub and blades visible	Upper half to third of tower, hub and blades visible	Upper half to third of tower, hub and blades visible	Blades above hub only visible
Percentage of the year when the nearest WTGs would be visible from seascape unit	<20% of the year Less than 73 days per year	<24% of the year Less than 88 days per year	<24% of the year Less than 88 days per year	<24% of the year Less than 88 days per year	<24% of the year Less than 88 days per year	<20% of the year Less than 73 days per year
Amount of navigational lights visible (15 amsl) when viewed from nearest landward location within the seascape unit (at beach level)	None/ very low	Low	Low	Low	Low	None/ very low
Overall magnitude of change	Negligible	Low	Low	Low	Low	Negligible
Notes	Due to distance and atmospheric effects, the presence of the turbines will only be noticeable on clear days, and is unlikely to result in changes to the perception of the seascape.	Due to distance and atmospheric effects, the turbines will be visible on around 24% of days, and their presence is likely to be noticeable in this undeveloped seascape. However, their presence would only lead to very small changes to the perception of the seascape.	Due to distance and atmospheric effects, the turbines will be visible on around 24% of days, and their presence is likely to be noticeable in this undeveloped seascape. However, their presence would only lead to very small changes to the perception of the seascape.	Due to distance and atmospheric effects, the turbines will be visible on around 24% of days, and their presence is likely to be noticeable in this undeveloped seascape. However, their presence would only lead to very small changes to the perception of the seascape.	Due to distance and atmospheric effects, the turbines will be visible on around 24% of days, and their presence is likely to be noticeable in this undeveloped seascape. However, their presence would only lead to very small changes to the perception of the seascape.	Due to distance and atmospheric effects, the presence of the turbines will only be noticeable on clear days, and is unlikely to result in changes to the perception of the seascape.

Summary of operational impacts on seascape character

- 16.292. Tables 16.21 and 16.22 demonstrates that there will be no magnitude of change greater than a low on any of the seascape areas and units within the study area. This conclusion is based on the assumption that the offshore WTGs are located at a distance at which they will be barely perceptible when considered in the panoramic seascape experienced within each of the seascape areas / units.
- 16.293. The WTGs of Project Bravo will be barely perceptible at the distances under consideration in this assessment (i.e. over 38km from the shore). Therefore, notwithstanding the fact that the seascape in this section of the coast is of high or medium - low sensitivity to change, there will be no greater than a minor impact on the seascape character within any of the seascape areas and units identified.
- 16.294. Table 16.23 summarises the significance of impacts on the seascape units identified within the study area.

Table 16.23 Seascape Impact Summary Table

National and Regional Seascape Unit / Area	Sensitivity to change	Magnitude of change	Significance of impact (combination of significance matrix and professional judgement)
National Seascape Unit			
Area 3: East Fife/ Firth of Tay	Medium	Negligible	Minor – Not significant
Area 4: North East Coast	Low - Medium	Low	Minor – Not significant
Regional Seascape Character Areas			
SA3: Cove Bay to Milton Ness	Medium	Negligible	Minor – Not significant
SA4: Montrose Bay	High	Low	Moderate/ minor – Not significant
SA5: Long Craig	Medium	Low	Minor/ moderate – Not significant
SA6: Lunan Bay	High	Low	Moderate/ minor – Not significant
SA7: Land Craig to The Deil's Heid	High	Low	Moderate/ minor – Not significant
SA8: Arbroath to Monifieth	Medium	Negligible	Minor – Not significant

Impacts on landscape character during operation

- 16.295. The sensitivity of the landscape, as represented by the LCTs, to offshore wind farm development, has been assessed for the purposes of this LVIA in Section 'Existing Environment' of this chapter..
- 16.296. Project Bravo lies over 38km away offshore from any of the landscape character types within the study area; therefore there will be no direct impacts on landscape character. However, the indirect impacts as a result of Project Bravo on landscape character are described below.

16.297. Within Aberdeenshire, the ZTV (Figure 16.21) indicates that theoretical visibility of Project Bravo is gained primarily from the following landscape character types / areas:

- area 8: Howe of The Mearns; and
- area 9: Garvock and Glenbervie.

16.298. Within Angus Council, the ZTV (Figure 16.21) indicates that theoretical visibility of Project Bravo is gained primarily from the following landscape character types / areas:

- type 10: Broad Valley Lowland;
- type 12: Low Moorland Hills;
- type 13: Dipslope Farmland; and
- type 15: Lowland Loch Basin.

16.299. None of the above landscape character types and areas have full visibility of Project Bravo. Although theoretical visibility is possible, inter-visibility will be significantly affected by intervening landform, built-form and tree cover not identified in the ZTV. Where visibility exists, it will be at long distance (over 39km) and is likely to occur only in very good viewing conditions (less than approximately 88 days a year). As a result of this and given the geographical separation of the landscape areas/ types and Project Bravo, the magnitude of change is considered low in very good visibility but generally negligible or none. As such the indirect impacts of Project Bravo will be no greater than a minor impact on the landscape character types/ areas identified, and therefore not significant.

16.300. The conclusion of no significant impacts was the result of a variety of factors including distance from Project Bravo, limited relationships with the sea, and ultimately lack of intervisibility with the Project Bravo WTGs.

Impacts on landscape designations during operation

Historic Gardens and Designed Landscapes (HGDL)

16.301. Of the 6 HGDLs in the study area, 4 are theoretically visible as per Figure 16.23. In reality, due to the enclosed setting of the HGDLs, intervening vegetation and local ridgelines in the wider landscape, there would be limited visibility out towards Project Bravo. Given the distant nature and limited extent of potential views towards the proposed WTGs, the anticipated magnitude and overall significance of operational impact on the visual setting of HGDLs in the study area is considered to be negligible. The overall significance of operational impact upon the intrinsic character of the HGDLs within the study area will therefore be negligible and **not significant**.

Special Landscape Areas (SLA)

16.302. There will be no direct changes to the SLAs, and no impacts on the defining elements, characteristics or attributes of the SLAs. Impacts will be to distant views of Project Bravo from limited parts of the SLAs.

16.303. There will be little inter-visibility between the proposed WTGs of Project Bravo and the SLAs within the study area due to the screening effects of coastal embankments, intervening vegetation and local ridgelines in the wider landscape. There may, however, be some areas of limited visibility from the SLAs on the coastline (a minimum of 41 km) from Project Bravo. Where these distant views of the WTGs can be seen, the WTGs will appear

as small elements in views on the far distant horizon. Given the distant nature and limited extent of potential views towards the proposed WTGs, the anticipated magnitude and overall significance of operational impact on the SLAs in the study area is considered to be negligible. The overall significance of operational impact upon the intrinsic character of the SLAs within the study area will therefore be negligible and **not significant**.

Impacts on visual amenity during operation

16.304. This section sets out the likely impacts of Project Bravo on views and the visual amenity of the study area. Impacts on visual receptors will arise from the presence of the offshore wind turbines in certain views.

16.305. Photomontages have been prepared to illustrate the impact of Project Bravo on 7 of the assessment viewpoints:

- VP1 - Garron Point (Stonehaven Golf Club);
- VP2 - Beach Road, Kirkton, St Cyrus;
- VP4 – Montrose;
- VP5 - Braehead of Lunan;
- VP6 – Arbroath;
- VP7 – Carnoustie; and
- VP8 - Fife Ness, Lochaber Rock.

16.306. Locations of the viewpoints can be seen in Figure 16.26. The impacts of Project Bravo on each of the assessment viewpoints are summarised in Table 16.24.

Table 16.24 Viewpoints Assessment Summary Table

VP	Name	Sensitivity	Distance to nearest WTG of Project Bravo (km)	Horizontal angle of view occupied by wind farm array (degrees)	No of blade tips visible	No of hubs visible	Percentage of year when nearest WTG would be visible (based on visibility assumptions)	Magnitude of Change in the view	Significance of impact when visible (Bold-combination of significance matrix and professional judgement)	Further comments
1	Garron Point (Stonehaven Golf Club)	Medium Moderately used viewpoint for golf club users	50	20°	75	75	< 8% (Less than 29 days a year)	Negligible	Minor – Not significant	On less than a tenth of days in a year, Project Bravo will be barely visible to the right of a 180 degree view, occupying around 20 degrees of the view. Looking south, Project Bravo will sometimes appear backlit by the sun.
2	Beach Road, Kirkton, St Cyrus	High Popular recreational destination with beach access. Wide open, immediate and elevated sea views.	43	23°	75	75	< 20% (Less than 73 days a year)	Low	Moderate/ minor (Minor) – Not significant	On less than a fifth of days in a year, Project Bravo will appear in the centre of the view, occupying around 23 degrees of the view. The man-made appearance, upright form and movement of the turbines will contrast with this simple view, and the coastal foreshore. Looking south, Project Bravo will sometimes appear backlit by the sun. The upper two-thirds of the turbine towers, all hubs and blades will appear on the far horizon at 43km.

VP	Name	Sensitivity	Distance to nearest WTG of Project Bravo (km)	Horizontal angle of view occupied by wind farm array (degrees)	No of blade tips visible	No of hubs visible	Percentage of year when nearest WTG would be visible (based on visibility assumptions)	Magnitude of Change in the view	Significance of impact when visible (Bold-combination of significance matrix and professional judgement)	Further comments
3	Montrose	High Popular recreational destination on the foreshore. Wide open, immediate sea views.	42	24°	75	31	< 20% (Less than 73 days a year)	Negligible	Minor/ Moderate – Not significant	On less than a fifth of days in a year, Project Bravo will be barely visible to the right of a 180 degree view, occupying around 24 degrees of the view. The turbines will be visible in context of Scurdie Ness lighthouse which is dominant in the view. Less than half of turbine hubs and most blades will appear on the far horizon at 42km.
4	Braehead of Lunan	High Residential receptors with proprietary interest and prolonged viewing opportunities. Open coastal views	43	23°	75	75	< 20% (Less than 73 days a year)	Low	Moderate/ minor – Not significant	On less than a fifth of days in a year, The sea is visible at a distance beyond the fields, silhouetting the forms of the pine trees and experienced as a backdrop to this. Project Bravo will appear in the centre of the view, occupying around 23 degrees of the view. The man-made appearance, upright form and movement of the turbines will contrast with this simple view, and the coastal foreshore. The upper two-thirds of the turbine towers, all hubs and blades will appear on the far horizon at 43km.

VP	Name	Sensitivity	Distance to nearest WTG of Project Bravo(km)	Horizontal angle of view occupied by wind farm array (degrees)	No of blade tips visible	No of hubs visible	Percentage of year when nearest WTG would be visible (based on visibility assumptions)	Magnitude of Change in the view	Significance of impact when visible (Bold-combination of significance matrix and professional judgement)	Further comments
5	Arbroath	High Visitors have an interest in the view, as seen from within the building and wider Arbroath promenade rather than from the tower. Important visual link to the Bell Rock Lighthouse.	45	17°	75	48	< 20% (Less than 73 days a year)	Low	Moderate/ minor – Not significant	On less than a fifth of days in a year, Project Bravo will be visible to the left of the view, near the headland, occupying 17 degrees of the view, It will appear to the left of Bell Rock, approximately half the distance from Project Bravo. Half the turbine hubs and most blades will appear on the far horizon at 45km.
6	Carnoustie	High Recreational receptors have an interest in the view. Open views towards the sea	52	8°	21	0	< 8% (Less than 29 days a year)	Negligible	Minor/ moderate – Not significant	On less than a tenth of days in a year, Project Bravo will be barely visible to the right of a 180 degree view, occupying around 8 degrees of the view. Less than half of turbine blades will appear on the far horizon at 52km.
7	Fife Ness, Lochaber Rock	High Recreational and nearby residential receptors have an interest in the view. Open marine views.	52	7°	17	0	< 8% (Less than 29 days a year)	Negligible	Minor/ moderate – Not significant	On less than a tenth of days in a year, Project Bravo will be visible to the centre of a 180 degree view, occupying around 7 degrees of the view. Less than a quarter of blade tips appear on the far horizon at 52km.

- 16.307. As per Table 16.24, minor and **not significant** impacts have been predicted at four out of seven viewpoints (VP1, VP2, VP5 and VP6). These viewpoints are assessed as high sensitivity and are located between 43km and 50km from Project Bravo. Minor impacts have been predicted where the turbines will not be a substantial feature of the view.
- 16.308. A negligible and **not significant** impact is predicted at the remaining three viewpoints (VP4, VP7 and VP8), which are located at the foreshore, due to the limited visibility of Project Bravo in the views.
- 16.309. Based on an analysis of the representative assessment viewpoints, a number of statements can be made about the impacts of Project Bravo on the visual amenity of the different visual receptor groups within the study area.

Visual impacts on residential receptors

- 16.310. All of the ten residential visual receptors considered in the assessment are located over 41km from Project Bravo. As per the analysis in the viewpoint assessment section above, up to minor visual impacts could be anticipated at residential receptors in coastal settlements that have uninterrupted views out to sea between 41km and 50km, including Stonehaven, Johnshaven, Inverbervie, Arbroath (VP6) and St Cyrus (VP2). Minor impacts will only occur on properties which have an open view of the sea. Where visibility occurs, up to two thirds of the turbine towers, all hubs and blades of Project Bravo WTGs will be visible on less than 24% of days in a year i.e. less than approximately 88 days a year. Residential receptors are of high sensitivity and the magnitude of change will be low on the above identified elevated settlements, giving rise to a minor and **not significant** visual impact.
- 16.311. A negligible and **not significant** impact is predicted at residential properties with uninterrupted sea views in foreshore or lower level settlements including Carnoustie (VP7), Montrose (VP4), Laurencekirk and Hillside, either due to being outwith the ZTV or with very limited visibility of the turbines (up to blade tips only on the distant horizon).

Visual impacts on cycle routes

- 16.312. Sustrans National Cycle Route 1 enters the study area from the southwest at Carnoustie and heads northeast along the coastline to Stonehaven. Northbound and southbound users of the cycle route, along the coast, will have distant, uninterrupted views of Project Bravo during the course of the route of varying visibility between Montrose and north of Inverbervie. The man-made appearance, upright form and movement of the turbines will contrast with the existing views. The turbines that will be visible will comprise up to upper half the tower, hubs and blades. There will be limited, intermittent visibility between Carnoustie and Arbroath, and between north of Inverbervie and Stonehaven. Limited visibility occurs due to built-form, vegetation and local landform. The route lies outside the ZTV between Arbroath and Inverkeilor. It is represented in different places by VP2, VP4, VP6 and VP7. Users of this route will be located at least 40km from Project Bravo and will experience views of the WTGs at an oblique angle, on less than 24% of days (i.e. less than approximately 88 days a year). As per the analysis in the viewpoint assessment section, up to minor visual impacts could be anticipated at locations, with uninterrupted views out to sea between 40km and 50km. Considering the high sensitivity of the cycle route and the low to negligible magnitude of change, up to overall minor and **not significant** impacts are predicted on the cycle route.

Visual impacts on roads and railways

- 16.313. There will be distant, intermittent views of Project Bravo from the A92, southbound, between Stonehaven and Inverkeilor, and northbound between Arbroath and Carnoustie, and between Montrose and Inverbervie. Where the road passes through towns and villages, views will be very limited due to built-form, landform and vegetation. At its closest point, users of this route will be located at least 41.5km from Project Bravo and will experience transitory views of the WTGs (up to upper two thirds of towers, hubs and blades) at an oblique angle on less than approximately 73 days a year. The road passes through and near VP1, VP2, VP4, VP5 and VP6. Considering the low sensitivity of the A road (as cars on it are fast moving and it is not a recreational route) due to the fast moving traffic, and the factors above, the overall significance of impact on the visual amenity of users travelling along the A92 will be up to a minor and **not significant** impact.
- 16.314. There will be no views of Project Bravo from the A90 and B965 due to landform, built-form and vegetation.
- 16.315. There will be distant, intermittent but limited views from the A935 eastbound near Montrose, A933 south of Brechin, A937 southbound near Hillside, B967 eastbound near Inverbervie, B9120 southbound between Laurencekirk and St Cyrus, and B9127 eastbound near Arbroath. All of these routes are located at least 42km from Project Bravo and will experience transitory views of the WTGs (up to upper two thirds of towers, hubs and blades) on approximately less than 73 days a year. Considering the low sensitivity of the roads (as cars on them are fast moving and they are not recreational routes) and the low magnitude of change, the overall significance of impact on the visual amenity of users travelling along these routes will be up to a minor and **not significant** impact.
- 16.316. On very clear days, there will be glimpses of Project Bravo, at an oblique angle, from the East Coast Mainline Railway northbound between Carnoustie and Arbroath, and northbound and southbound between Hillside and Inverkeilor. Users of the railways will be located at least 40km from Project Bravo and experience transitory views of the WTGs (up to two thirds of towers, hubs and blades) on less than approximately 73 days per year. Trains on this stretch are all high speed long distance services. Up to minor and **not significant** impacts are predicted on users of the railway route.

Visual impacts on recognised vantage points and tourist attractions

- 16.317. Elevated locations along the coast act as local vantage points out to sea. All of these locations, identified in paragraph 16.126 of this chapter, are over 41km away from Project Bravo and will experience views of the WTGs (up to upper half of towers, hubs and blades) on the distant horizon on less than approximately 73 days a year. As per the analysis in the viewpoint assessment section, up to minor visual impacts could be anticipated at some local vantage points, with uninterrupted views out to sea between 40-50km. Users at these locations tend to pause and take in the view and often focus on the horizon of the areas such that they are more likely than other receptors to notice the turbines. Project Bravo will therefore be noticeable at locations including St Cyrus, Newtonhill and Arbroath during conditions of good visibility, and locations in these settlements with uninterrupted views will experience up to minor and **not significant** impacts, whilst locations at Stonehaven, Carnoustie, Montrose and Fife Ness will experience a negligible and **not significant** impact due to very limited visibility.

- 16.318. There are various car parks located at a number of locations within the study area at Inverberrie Bay, Johnshaven, St Cyrus, Lunan, Auchmithie, Arbroath and Carnoustie, which act as informal vantage points out to sea. All of these locations are located over 40km away from Project Bravo and will experience views of the WTGs (up to upper half of towers, hubs and blades) on the distant horizon on less than approximately 73 days a year. Users at these locations tend to pause and take in the view and often focus on the horizon of the areas such that they are more likely than other receptors to notice the turbines. Project Bravo will therefore be marginally more prominent at these locations and will experience up to minor and **not significant** impacts.
- 16.319. There are a number of other recreational receptors including hill tops and golf courses within the study area; all located over 40km from Project Bravo. Although their sensitivity to change is high, the magnitude of change will be negligible or low as discussed in the viewpoint assessment section. Therefore the overall significance of impact on the visual amenity of these receptors will be up to minor and **not significant**.

Visual impacts on other land based receptors

- 16.320. It is acknowledged that there are other receptor groups represented in the study area, such as shoppers and people at their place of work. It is considered that there will be a negligible and **not significant** impact on the visual amenity of these receptors due to their low sensitivity and limited visibility of Project Bravo.

Visual impacts on marine receptors

- 16.321. The impacts of Project Bravo on marine receptors (recreational yachts and boats, fishermen, commercial vessels, and Bell Rock lighthouse) will be the same as per Project Alpha discussed in paragraphs 16.135 to 16.138, primarily due to the nature of the views, similar distances and routes that they would follow within the study area.

Visual impacts on aircraft passengers

- 16.322. From aircrafts passing over the study area, passengers may see the WTGs of Project Bravo in clear conditions. The turbines will form a passing feature in the view, and the magnitude of change is considered to be negligible; **no significant** impacts are predicted.

Night time visual assessment

- 16.323. The impacts of Project Bravo at night are assessed the same as Project Alpha although the lighting on the WTGs and offshore structures of Project Bravo would be visible on clear nights without any haze, on approximately less than 88 days a year, and at greater distance and therefore reduced visibility than for Project Alpha.

Mitigation

- 16.324. The Electricity Works (Environmental Impact Assessment) Regulations 2000 (SI 2000/ 1927) require that where significant impacts are identified, mitigation measures must be considered. Guidance on SLVIA (DTI, 2005) for offshore wind farms discusses design considerations that can be taken into account when developing the layout for an offshore wind farm. However this discussion was evidently intended for offshore sites much closer to the shore. The guidance acknowledges that “*It is questionable how much design changes will mitigate the impacts of, for example, a 200 turbine wind farm located over 25km offshore*”. Bearing in mind that Project Bravo will contain fewer WTGs than this and be located at a distance of over 38km from the coast, it was not considered that the design of layout could be altered in any way to further reduce the impacts.

- 16.325. The need to consider the aesthetic aspect of the wind farm layout has been recognised in discussions with SNH and other consultees. These discussions also recognised the limitations of the approach set out in *Siting and Designing Windfarms in the Landscape* (SNH, 2009), when applied to an offshore proposal.
- 16.326. The marine horizon is flat and typically uninterrupted, and therefore presents no opportunity to relate turbines to an underlying landform. All offshore wind farms are seen as rows of turbines, and regular patterns are therefore preferred, in contrast to the more organic layouts sought for onshore wind farms.

Residual Impact

- 16.327. Due to the above limitations for mitigation the residual impacts are assessed the same as the potential impacts.

Transmission Asset Project

Potential Impacts

Infrastructure within the Project Alpha and Project Bravo site boundaries

- 16.328. The infrastructure within the Project Alpha and Project Bravo site boundaries is substantially less in number and height than the WTGs of Project Alpha and Project Bravo (see Chapter 5: Project Description of this ES for details), and therefore the visual impacts would be negligible and **not significant**.

ECR Corridor

- 16.329. The only landscape or visual impacts from the ECR corridor during the operational phase will be associated with vessels undertaking monitoring / maintenance, as all the infrastructure will be buried. Operational impacts of the ECR Corridor are therefore assessed as negligible and **not significant**.

Mitigation

Infrastructure within the Project Alpha and Project Bravo site boundaries

- 16.330. As for Projects Alpha and Bravo, in paragraphs 16.146 to 16.149 and 16.278 to 16.230 of this chapter, no mitigation is identified or proposed for the operational phase of the Transmission Asset Project.

ECR Corridor

- 16.331. No mitigation is proposed for impacts of the ECR corridor during the operation phase.

Residual Impact

Infrastructure within the Project Alpha and Project Bravo site boundaries

- 16.332. As negligible impacts have been identified for the infrastructure within the Project Alpha and Project Bravo site boundaries during operation in paragraph 16.232 of this chapter, the residual impacts will remain as assessed for potential impacts.

ECR Corridor

16.333. As no mitigation is proposed, residual impacts of the ECR corridor remain as assessed for potential impacts.

IMPACT ASSESSMENT – DECOMMISSIONING

Project Alpha

Potential Impact

16.334. Potential sources of impact upon the seascape, landscape and visual amenity during the decommissioning phase include

- the presence and movement of construction vessels at sea;
- temporary 24 hour decommissioning lighting; and
- removal of WTGs, meteorological masts and OSPs.

16.335. There would only be a temporary impact from the activities to remove the WTGs and offshore structures, but this would be a minimum period of approximately 12 months.

Physical Impacts on landscape elements during decommissioning

16.336. Primary structures (WTGs, substructures/ foundations, OSPs and meteorological masts) of Project Alpha will have no physical impacts during the decommissioning phase on landscape elements as they are located offshore.

Impacts on seascape / landscape character during decommissioning

16.337. During decommissioning, impacts on the seascape / landscape character as a result of the offshore WTGs will decrease from the operation phase impact to no impact as the WTGs are removed.

16.338. The impacts on seascape and landscape character during the decommissioning activities will remain the same as assessed for the construction phase in paragraphs 16.199 and 16.200 of this chapter.

16.339. However, it is noted that once the WTGs and other offshore structures have been removed, there will be a negligible and **not significant** impact on landscape or seascape character and in this regard the impacts of Project Alpha on landscape and seascape character are entirely reversible.

Impacts on landscape designations during decommissioning

16.340. The impacts on landscape designations during the decommissioning activities will remain the same as assessed for the construction phase in paragraph 16.201 of this chapter.

16.341. Once the WTGs and other offshore structure are removed, there will be a negligible and **not significant** impact on landscape designations and in this regard the impacts of Project Alpha are entirely reversible.

Impacts on visual amenity during decommissioning

- 16.342. Impacts on the visual amenity as a result of Project Alpha will decrease incrementally as the WTGs are removed. Impacts resulting from the WTGs themselves are treated as operational / permanent impacts. These impacts are assessed in Section 'Impact Assessment – Operation' of this chapter.
- 16.343. The impacts on visual amenity during the decommissioning activities will remain the same as assessed for the construction phase in paragraphs 16.203 and 16.204 of this chapter.
- 16.344. Once the WTGs and other offshore structures are removed, there will be a negligible and **not significant** impact on visual amenity and in this regard the impacts of Project Alpha are entirely reversible.

Mitigation

- 16.345. There are no practicable mitigation measures which would reduce the potential for decommissioning impacts upon the landscape / seascape and on views as the decommissioning activities are short-term and temporary in nature.

Residual Impact

- 16.346. As there have been no significant potential impacts identified for Project Alpha within the SLVIA during decommissioning, and because there are no proposed mitigation measures to reduce the identified impacts, the residual impacts are assessed the same as the potential impacts.

Project Bravo

Potential Impact

- 16.347. It is important to note that Project Bravo is located 38km from the nearest section to the coastline and therefore the potential impacts arising from the decommissioning phase of Project Bravo will be similar or less than those arising from the decommissioning phase of Project Alpha.

Mitigation

- 16.348. The mitigation for Project Bravo during decommissioning will be the same as identified for Project Alpha in paragraph 16.346 of this chapter.

Residual Impact

- 16.349. As there have been no significant potential impacts identified for Project Bravo within the SLVIA during decommissioning, and because there are no proposed mitigation measures to reduce the identified impacts, the residual impacts are assessed the same as the potential impacts.

Transmission Asset Project

Potential Impacts

Infrastructure within the Project Alpha and Project Bravo site boundaries

- 16.350. The potential impacts during the decommissioning phase of the transmission asset infrastructure within the site boundaries of Project Alpha and/ or Project Bravo will remain the same as assessed for the construction phase in paragraph 16.212 of this chapter. .

ECR Corridor

16.351. Negligible and **not significant** impacts have been predicted upon the seascape, landscape and visual amenity during the decommissioning phase of the ECR corridor as the infrastructure will stay buried on the seabed and no activities will be carried out.

Mitigation

Infrastructure within the Project Alpha and Project Bravo site boundaries

16.352. There are no practicable mitigation measures which would reduce the potential for decommissioning impacts upon the landscape / seascape and on views as the decommissioning activities are short-term and temporary in nature.

ECR Corridor

16.353. No mitigation measures have been identified for decommissioning activities associated with the removal of the ECR corridor as there will be no seascape or visual impacts arising from these activities.

Residual Impact

Infrastructure within the Project Alpha and Project Bravo site boundaries

16.354. As there is no proposed mitigation, the impacts are as assessed for potential impacts, above.

ECR Corridor

16.355. As there have been no impacts identified for the ECR corridor within the SLVIA during decommissioning, no mitigation is proposed and therefore the residual impacts will remain the same as the potential impacts.

CUMULATIVE IMPACT ASSESSMENT

16.356. Cumulative impacts are the additional impacts of adding a development into a situation where one or more other developments are also proposed. It occurs where the study areas for two or more wind farms overlap so that they are experienced at proximity where they may have an incremental impact. The cumulative assessment covers the potential cumulative impacts on seascape, landscape and visual amenity.

16.357. The methodology for the Cumulative Assessment is described in Appendix K1 which has been developed by the landscape consultants appointed by the three FTOWDG developers, Repsol, Mainstream and Seagreen and has been adopted by each of the developer's consultants when writing the relevant cumulative sections of each developer's ES. The cumulative methodology has been developed and agreed with the local authorities, SNH and Marine Scotland at a meeting on 15th June 2011.

16.358. The cumulative assessment is undertaken in two parts:

- the cumulative assessment of Alpha, Bravo and Transmission Asset Project (to MHWS) - giving the total impacts of the Seagreen Project; and
- the cumulative assessment of the Seagreen Project together with other sites within a 65km search area provided in Table 16.26 and presented in Figure 16.35.

- 16.359. The Seagreen Phases 2 and 3 encompass five potential offshore wind farm sites and connection to the National Grid via three export cables running from the south-western boundary of the Round 3 Zone and coming together at a single landing point near Torness. Connection agreements, which are in place, indicate that the power generated is to be connected to the electricity transmission network at a location near Branxton, East Lothian. Phases 2 and 3 are planned to have a combined output target of 2.6 GW.
- 16.360. It is anticipated that applications for the necessary consents for development of wind farm sites within Phase 2 and Phase 3 will be submitted in 2014 and 2016 respectively. The Applicants believe that the design and development within Phases 2 and 3 of the Zone must be adaptive and take into account the lessons learned from both Round 1 and Round 2 offshore wind farm projects that have gone through the consenting and construction processes, alongside lessons from the Seagreen Project (as discussed in this ES) and other projects currently under development in the Scottish Territorial Waters (STW).
- 16.361. The status of Phases 2 and 3 is that an environmental scoping exercise has been undertaken (Seagreen, 2011) based upon current best-available evidence for those areas. It is anticipated that substantial further detailed work will be undertaken in the period leading up to submission of applications for the necessary consents in 2014 and 2016. Such work will include:
- desk based assessment and some site specific survey to determine the baseline conditions; and
 - site visits to undertake baseline photography and assessment of additional cumulative viewpoints not in the Phase 1 study area.
- 16.362. From the above, it can be seen that either large amounts of data relevant to Phases 2 and 3 have yet to be analysed or indeed have yet to be collected. Any assessment of the baseline for these Phases would therefore be assigned a low level of confidence when included in this ES.
- 16.363. There have been considerable changes to the original design and location of the Phase 1 projects during the detailed development work as environmental concerns (both ecological and human) have emerged that have shaped the projects going forward within the EIA. Given the size of the Zone and the development process Seagreen intends to follow, an optimal layout and approach will be developed in order to deliver as close to the target power output (2.6GW) as possible without causing a significant impact upon the receiving environment. The Applicant will consider the use of all areas within the Zone not necessarily restricted to the Phase 2 and Phase 3 indicative boundaries. Seagreen are committed to progressing the development of Phases 2 and 3 to ensure environmental impacts and in particular cumulative environmental impacts can be minimised and significant impacts avoided.
- 16.364. As a responsible developer, Seagreen wishes to use best available evidence and best practice in order to follow a responsible approach to the development of Phases 2 and 3. Therefore, to a great extent, the design refinement for Phases 2 and 3 will be dependent upon the on-going process with regard to Phase 1, the STW sites and other offshore wind developments in Scotland. Given the data gaps and further work required cited above, any assessment of the baseline conditions of Phases 2 and 3 required for the cumulative assessment of the Seagreen Project would have to be assigned a low confidence level with regard to overall accuracy in particular with respect to capacity, developable area and layout. Given this, the Applicants do not consider that for this assessment it is reasonable to present detailed analysis of the potential impacts of Phases 2 and 3 for inclusion within this assessment.

The Seagreen Project (Project Alpha, Project Bravo and Transmission Asset Project)

Cumulative Impacts on Landscape Elements

16.365. It has already been determined in Section 'Impact Assessment – Operation' that the Seagreen Project will have a negligible direct impact on any landscape elements, although the landfall will directly impact landscape elements during construction. However, there will be negligible and **not significant** cumulative impacts from the Seagreen Project on any landscape elements as Project Alpha and Project Bravo will not contribute any impacts at all.

Cumulative Impacts on Seascape Character

16.366. In order to assist with the assessment of cumulative impacts on seascape character a combined cumulative ZTV has been prepared (Figure 16.34). The cumulative ZTV (Figure 16.34) of the Seagreen Project illustrates the theoretical extent of where the WTGs of Project Alpha and Project Bravo will be visible from, assuming 100% visibility. It does not account for any screening that vegetation or the built environment may provide. Therefore, the actual extents of visibility are likely to be much less extensive.

16.367. It can be inferred from the cumulative ZTV, that the WTGs of Project Alpha and Project Bravo will theoretically be visible from the coastline and therefore have the potential to affect seascape character. The extent of the cumulative ZTV is prominent along the Aberdeenshire, Angus and a small portion of the Fife coastlines, gradually decreasing inland from the coast due to the topography in the area with limited theoretical visibility between 40-50km on hilltops and elevated areas.

16.368. With reference to Figure 16.34, it is evident that the WTGs of Project Alpha and Project Bravo will be visible simultaneously (in combination) from most of the same locations within the landward part of the study area as Project Alpha and Project Bravo individually. This is also due to the fact that Project Bravo lies immediately behind Project Alpha and therefore both are visible simultaneously (in combination) from most areas within the study area.

16.369. Within the three National Seascape Units (Area 2: Firth of Forth, Area 3: East Fife/ Firth of Tay and Area 4: North East Coast), the WTGs of the Seagreen Project (Project Alpha and Project Bravo) will be visible (up to upper two thirds of tower, hubs and blades) simultaneously (in combination) on less than approximately 88 days a year. The nearest WTG will be over 27km away from any location within these seascape units, the closest being Area 4: North East Coast. There will be limited visibility of Project Bravo viewed immediately behind Project Alpha giving rise to a cumulative impact similar to the impact of Project Alpha. Therefore, the combined Seagreen Project will have no greater than a moderate and **potentially significant** cumulative impact on Area 4: North East Coast and no greater than a minor and **not significant** cumulative impact on Areas 2 and 3.

16.370. Similarly, within the Regional Seascape Areas, the WTGs of the Seagreen Project (Project Alpha and Project Bravo) will be visible (up to upper two thirds of tower, hubs and blades) simultaneously (in combination) on approximately less than 88 days a year. The nearest WTG will be over 27km away from any location within these seascape units, the closest being SA3: Cove Bay to Milton Ness. There will be limited visibility of Project Bravo viewed immediately behind Project Alpha which is more prominent giving rise to a cumulative impact similar to the impact as Project Alpha. Therefore, the combined Seagreen Project will have no greater than a moderate and **potentially significant** cumulative impact on Areas SA3 and SA4 and no greater than a minor and **not significant** cumulative impact on the remaining Regional Seascape Areas.

16.371. It is important to note that at almost every location along the coastline within the 50km study area, the WTGs of Project Alpha will be more prominent than the WTGs of Project Bravo and therefore the combined impacts from the Seagreen Project will be similar to those assessed for Project Alpha. This is a simple reflection of the fact that Project Alpha will be much closer to the shore than Project Bravo.

Cumulative Impacts on Landscape Character

16.372. Cumulative impacts on the landscape are often addressed by considering whether an area will become a 'wind farm landscape' where wind farms are a key characteristic. Due to its offshore location, there is no potential for the construction of the Seagreen Project to transform any LCT into a 'wind farm landscape', since no further turbines will be within the LCT.

16.373. Given the minor impacts identified in the stand-alone assessment, and the limited potential for offshore development to give rise to cumulative impacts on landward character, no detailed assessment of cumulative impacts on onshore landscape character, as represented by LCTs, has been undertaken. Visual impacts may occur at locations across these areas, but these will not extend to impacts upon the underlying landscape character.

16.374. In summary, as per Figure 16.34, none of the landscape character types and areas within the study area have full visibility of the Seagreen Project. Although theoretical visibility is possible, inter-visibility will be significantly affected by intervening landform, built-form and tree cover not identified in the ZTV. Where visibility of the combined Seagreen Project exists, it will be at long distance (over 27km) and is likely to occur only in very good viewing conditions on less than approximately 88 days a year. There will be limited visibility of Project Bravo viewed immediately behind Project Alpha which is more prominent giving rise to a cumulative impact similar to the impacts predicted for Project Alpha. As a result of this and given the geographical separation of the landscape areas / types, the cumulative magnitude of change is considered low in very good visibility but generally negligible or none. As such, the cumulative impacts of the Seagreen Project will be no greater than a minor cumulative impact on the landscape character types and areas identified, and therefore not significant.

16.375. The conclusion of no significant cumulative impacts was the result of a variety of factors including distance of receptors from the Seagreen Project, limited relationships with the sea, and ultimately lack of intervisibility with the Seagreen Project.

Cumulative Impacts on Landscape Designations

16.376. As with LCTs, given that no significant impacts have been identified in the stand-alone assessment, and the limited potential for offshore development to give rise to cumulative impacts on landward designations, no detailed assessment of cumulative impacts on onshore landscape designations, has been undertaken.

16.377. In summary, for the SLAs and HGDLs within the study area, there will be little inter-visibility between the proposed WTGs of the Seagreen Project and the landscape designations within the study area due to the screening effects of coastal embankments, intervening vegetation and local ridgelines in the wider landscape. There may, however, be some areas of limited visibility from the designations on the coastline (a minimum of 27km) and a few elevated areas of the SLAs beyond 35km from the Seagreen Project. Where these distant views of the WTGs can be seen, the WTGs will appear as small elements in views on the far distant horizon. There will be limited visibility of Project Bravo viewed immediately behind Project Alpha which is more prominent giving rise to a cumulative impact similar to the impact as Project Alpha. Given the distant nature and limited extent of potential views towards the proposed WTGs, the anticipated cumulative magnitude and overall significance of operational impact on the SLAs in the study area is considered to be negligible. The overall significance of cumulative impact upon the landscape designations will be negligible and **not significant**.

Cumulative Impacts on Visual Amenity

Simultaneous visibility

16.378. As discussed in the section above, within the 50km study area for the Seagreen Project, there will be various locations where a Project Alpha and Project Bravo will theoretically be visible simultaneously.

16.379. Table 16.25 considers the magnitude of change on 14 cumulative viewpoints (Figure 16.35).

Table 16.25 Table Cumulative viewpoint analysis matrix

VP no	Viewpoint	Wind farm visible	Distance to nearest WTG (km) of Seagreen Project	Number of WTGs theoretically visible (tip)	Compass bearing to site (direction)	Horizontal angle
1	Garron Point	Yes	37	150	148°	29°
2	Beach Rod, Kirkton, St Cyrus	Yes	31	150	118°	31°
3	White Caterthun Hill Fort	Yes	51	150	109°	20°
4	Montrose	Yes	32	143	111°	29°
5	Braehead of Lunan	Yes	35	150	103°	26°
6	Arbroath Signal Tower	Yes	38	149	84°	23°
7	Carnoustie	Yes	48	54	79°	21°
8	Fife Ness, Lochaber Rock	Yes	48	46	53°	20°
9	Dodd Hill	Yes	59	150	86°	16°
10	Tentsmuir	Yes	55	0	72°	13°
11	Strathkinness	Yes	60	116	66°	17°
12	St Andrews, East Scores	Yes	56	17	63°	15°
13	Anstruther Easter	Yes	56	1	54°	9°
14	Isle of May	Yes	53	121	47°	20°

16.380. Although the Seagreen Project WTGs are theoretically visible simultaneously from all viewpoints, except VP10, it will be visible less than 50% of the year as more than half of the viewpoints are located over 40km away from the Seagreen Project boundary at its closest point. As Project Bravo is viewed immediately behind Project Alpha from all the viewpoints, the combined horizontal and vertical angles of view of the Seagreen Project is similar to those assessed individually for Project Alpha and Project Bravo. Therefore, the cumulative magnitude of change of the Seagreen Project will be similar to those assessed individually for Project Alpha and will be no greater than a moderate and **potentially significant** cumulative impact on VP2 and VP5, minor and **not significant** cumulative impact on VP1, VP3, VP4, VP6 and VP14, and negligible and **not significant** cumulative impacts on the remaining seven viewpoints (VP7, VP8, VP9, VP10, VP11, VP12 and VP13).

Cumulative visual impacts on residential receptors

- 16.381. All the residential visual receptors considered in the stand-alone assessments of Project Alpha and Project Bravo are located over 27km from the Seagreen Project. As per the analysis in the viewpoint assessment section, up to moderate cumulative impacts could be anticipated at locations in coastal settlements that have uninterrupted views out to sea within 35km of the Seagreen Project WTGs, including Johnshaven, Inverbervie and St Cyrus (VP2). Moderate cumulative impacts will only occur where the turbines of the Seagreen Project are clearly visible from a property with an existing open sea view. Where visibility occurs, up to the upper half of turbine towers, hubs and blades of the Seagreen Project WTGs will be visible on less than 50% of days in a year i.e. approximately between 135 – 153 days a year, for the closest turbine. Further turbines will be less visible, and less frequently. The man-made appearance and upright form of the turbines will contrast with the existing views. Residential receptors are of high sensitivity and the cumulative magnitude of change will be medium to low at residential properties in the above settlements that have uninterrupted views from within 35km, giving rise to an overall moderate and **potentially significant** cumulative impact.
- 16.382. Settlements located beyond 35km from the Seagreen Project will experience up to minor and **not significant** cumulative impacts. Minor impacts will only occur where the turbines of the Seagreen Project will not form a substantial feature of the view. Some of these settlements include Montrose (VP4), Inverkeilor, Stonehaven, Newtonhill, Hillside and Arbroath (VP6). Where visibility from these settlements occurs, up to half of turbine towers, hubs and blades of the Seagreen Project WTGs will be visible on less than 24% of days in a year i.e. approximately less than 88 days a year, for the closest turbine. Further turbines will be less visible, and less frequently.
- 16.383. A negligible and **not significant** cumulative impact is predicted on settlements including Carnoustie (VP7), Brechin, Fettercairn, Glenbervie, Laurencekirk, Portlethen and Kingbarns, either due to being outwith the ZTV or with very limited visibility of the turbines (up to blade tips only on the distant horizon).

Cumulative visual impacts on recognised vantage points and tourist attractions

- 16.384. All identified vantage points in paragraphs 16.263 and 16.317 are located over 30km away from the Seagreen Project and will experience views of Project Alpha and Project Bravo simultaneously (up to upper half of towers, hubs and blades) on the distant horizon on less than approximately 135 days, for the closest turbine. Further turbines will be less visible, and less frequently. As per the analysis in the viewpoint assessment section, up to moderate and **potentially significant** cumulative impacts could be anticipated at some local vantage points, including St Cyrus and Inverbervie Bay. Users at these locations tend to pause and take in the view and often focus on the horizon of the areas such that they are more likely to notice any change than other receptors. Other locations beyond 35km will experience up to minor and **not significant** cumulative impacts, including Arbroath and Newtonhill, whilst locations at Carnoustie and Fife Ness will experience a negligible and **not significant** cumulative impact.
- 16.385. Informal vantage points at locations up to 35km away from Project Alpha, including Inverbervie Bay, St Cyrus, Johnshaven and Lunan will experience views of the Seagreen Project (up to upper half of towers, hubs and blades) on the distant horizon on approximately less than 135 days, for the closest turbine. Further turbines will be less visible, and less frequently. Users at these locations tend to pause and take in the view and often focus on the horizon of the areas such that they are more likely than other receptors to notice any the WTGs. As Project Bravo is viewed immediately behind Project Alpha

from these locations, the combined horizontal and vertical angles of view of the Seagreen Project is similar to those assessed individually for Project Alpha and Project Bravo. Project Alpha will be more prominent than Project Bravo and therefore up to moderate and **potentially significant** cumulative impacts are predicted. Locations beyond 35km will experience up to minor and **not significant** cumulative impacts.

- 16.386. There are a number of other recreational receptors including hill tops and golf courses within the study area; all located over 35km from the Seagreen Project. Although their sensitivity to change is medium or high, the cumulative magnitude of change will be low as discussed in the viewpoint assessment section. Therefore, the overall significance of cumulative impact on the visual amenity of these receptors will be up to minor and **not significant** cumulative impacts.

Cumulative visual impacts on marine receptors

- 16.387. Recreational yachts and boats tend to sail near Arbroath Harbour (Arbroath Sailing and Boating Club) and along the coastline and rarely venture far out to sea. Boat users may view the turbines for prolonged periods. The harbour is approximately 38km from the Seagreen Project, and will experience views of the Seagreen Project WTGs (up to upper third of tower, hubs and tips) on approximately less than 88 days a year, for the closest turbine. Further turbines will be less visible, and less frequently. Although their sensitivity to change is medium, the cumulative magnitude of change will be medium due to the above factors. Therefore, the overall significance of cumulative impact on the visual amenity of these receptors will be moderate and **potentially significant**. The impact will be potentially significant when boats are in close proximity to the Seagreen Project (less than 20km) but reduce to not significant as the boats draw away from the Seagreen Project.
- 16.388. There are a few fishing, commercial, and industrial vessels which frequent the waters in the study area and the WTGs of the Seagreen Project will potentially be a fundamental change to views when in the vicinity. Smaller fishing vessels from the harbours may be more affected as they do not travel as fast or as far offshore as the larger ships and may have visibility of the Seagreen Project for the duration of their fishing trips. However, due to the fact that they will be focussed on their line of work and due to their generally transient nature, cumulative impacts would be reduced. Therefore, the cumulative magnitude of impact is medium. As the workers on the boats and ships would have a generally low sensitivity to change, the significance of cumulative impact will be minor / moderate, and therefore not significant.
- 16.389. Bell Rock Lighthouse is located approximately 28km south-west of the Seagreen Project. Visitors to the lighthouse will experience transient views of the Seagreen Project in one direction. Although transient, visitors on boat trips may view the turbines for prolonged periods. The WTGs will not compete in scale with the lighthouse, nor will they surround it and will be simultaneously visible within a small percentage of the seascape on approximately less than 153 days or less in a year. The magnitude of change will be medium. When combined with the medium sensitivity of the receptor, the overall significance of cumulative impact will be no greater than moderate and **potentially significant**. The views from the Arbroath Signal Tower to the lighthouse will not be affected by the Seagreen Project, as the turbines are located significantly further to the east of the lighthouse.

Sequential visibility

- 16.390. Sequential cumulative impacts may arise as a visual receptor moves along a defined linear route such as walking and cycle routes, roads, and railways.

- 16.391. The cumulative ZTV (Figure 16.34) indicates that there would several lengths of the routes, as described below, where the Seagreen Project will be sequentially visible. The durations of these sequential impacts will range from short glimpses to longer periods.
- 16.392. It is important to note in assessing sequential cumulative views that these will be reduced by roadside vegetation and other local obstructions, that any visual impacts would decrease with increasing distance from the wind farms, and that changes in the view will depend on the direction of the road and thus direction of travel.

Cumulative visual impacts on recreational walking and cycle routes

- 16.393. Users of the Fife Coastal Path walk around the coast of Fife Ness (VP8) will be located at least 48km from the Seagreen Project WTGs at its closest point, and will only experience sequential views of the WTGs between Fife Ness and Kingbarns, on less than 10% of days in a year i.e. approximately only 36 days a year. Where visibility between Fife Ness and Kingbarns occurs, both northbound and southbound, only the blade tips of less than half of the turbines of the Seagreen Project will be visible at an oblique angle and will be negligible to the user of the footpath. As Project Bravo is viewed immediately behind Project Alpha along the route, the combined horizontal and vertical angles of view of the Seagreen Project is similar to those assessed individually for Project Alpha and Project Bravo. Although the sensitivity of the footpath users is high, and based on the above factors, a negligible and **not significant** cumulative impact is predicted on users of the Fife Coastal Path.
- 16.394. Northbound and southbound users of the cycle route, along the coast, will have uninterrupted views of the Seagreen Project sequentially between Montrose and north of Inverbervie. The man-made appearance, upright form and movement of the turbines will contrast with the existing views. The turbines that will be visible will comprise up to upper half the tower, hubs and blades. There will be intermittent visibility between Carnoustie and Arbroath, and between north of Inverbervie and Stonehaven, with very limited visibility between Fife Ness and Kingbarns. Limited visibility occurs due to built-form, vegetation and local landform. The route lies outside the ZTV between Arbroath and Inverkeilor. Users of this route will be located at least 27.5km from the Seagreen Project and will experience views of the WTGs at an oblique angle, on less than 42% of days (i.e. approximately less than 153 days a year). Considering the high sensitivity of the cycle route and the varying magnitude of change, up to moderate and **potentially significant** cumulative impacts are predicted on a small section of the route between Montrose and north of Inverbervie, where users have uninterrupted views of The Seagreen Project whilst the rest of the route within the study area will experience up to minor and **not significant** cumulative impacts.

Cumulative visual impacts on roads and railways

- 16.395. There will be distant, intermittent views of the Seagreen Project from the A92, southbound, between Stonehaven and Inverkeilor, and northbound between Arbroath and Carnoustie. Where the road passes through towns and villages (Montrose, St Cyrus, Johnshaven, Inverbervie) views will be very limited due to built-form, landform and vegetation. At its closest point, users of this route will be located at least 28km from the Seagreen Project and will experience transitory views of the WTGs (up to upper half of towers, hubs and blades) at an oblique angle on approximately less than 153 days a year, for the closest turbine. Further turbines will be less visible, and less frequently. The road passes through and near VP1, VP2, VP5 and VP6. As Project Bravo is viewed immediately behind Project Alpha along the route, the combined horizontal and vertical angles of view of the Seagreen Project is similar to those assessed individually for Project Alpha and Project Bravo. Considering the low sensitivity of the A road, and the factors above, the overall significance of cumulative impact on the visual amenity of users travelling along the A92 will be up to a minor and **not significant** cumulative impact.

- 16.396. As there has been a minor impact predicted for users on the A90 on Project Alpha and no impact predicted for users on the A90 on Project Bravo, there will be a negligible and **not significant** cumulative impact on the visual amenity of users travelling along the A90 on the Seagreen Project. Similarly for the rest of the A and B Roads in the study area, there will be a negligible and **not significant** cumulative impact on the visual amenity of these routes due to the above factors.
- 16.397. On very clear days, there will be glimpses of the Seagreen Project on the East Coast Mainline Railway northbound between Carnoustie and Arbroath, northbound and southbound between Hillside and Inverkeilor, and southbound between Aberdeen and Stonehaven. Users of the railways will be located at least 32.5km from the Seagreen Project and experience transitory views of the WTGs (up to upper half of towers, hubs and blades) on approximately less than 135 days, for the closest turbine. Further turbines will be less visible, and less frequently. Trains on this stretch are all high speed long distance services. Up to minor and **not significant** cumulative impacts are predicated on users of the railway route.

Cumulative visual impacts on aircraft passengers

- 16.398. From aircrafts passing over the study area, passengers may see the WTGs of both Project Alpha and Project Bravo in clear conditions. These turbines will form a passing feature in the view, and the magnitude of change is considered to be negligible; no significant cumulative impacts are predicted.

Cumulative Night Time Impacts

- 16.399. The WTGs and offshore structures of the Seagreen Project (Project Alpha and Project Bravo) will introduce light to an area of seascape that is currently, predominantly unlit. However, the proposed lighting will be seen in context with other existing lighting identified within the study area, both at sea and land along the coast. These include illumination from occasional shipping movements visible out at sea and some aircraft movements in the sky. Lighting is also associated with a number of ports and harbours including Stonehaven, Johnshaven, Montrose and Arbroath. Frequent settlements on the coastline provide illumination, increasing in extent around larger town such as Stonehaven, Montrose, Arbroath and Carnoustie. There are also a number of lighthouses which have prominent lights at Bell Rock, Girdle Ness, Scurdie Ness and Fife Ness. The lighting on the 150 WTGs and offshore structures of the Seagreen Project would be visible on clear nights without any haze, on approximately less than 153 days a year, for the closest turbine. Further turbines will be less visible, and less frequently. However, as Project Bravo is viewed immediately behind Project Alpha from many locations along the coast in the study area, the combined horizontal angle of view and the combined glow from the lighting will not be greater than those assessed individually for Project Alpha and Project Bravo as the lighting will be seen in context with the existing levels of illumination within the study area. With regards to the cumulative viewpoints, even when discernible, the cumulative magnitude of change will at most be medium. When combined with the low sensitivity of these receptors at night time (see paragraph 16.143), the cumulative impact on sea views of the marine lighting would be minor and **not significant**, even if viewed from a remote location with no adjacent development. All, except four viewpoints are at coastal locations within a settlement which already have moderate levels of street lighting or residual lighting 'pollution' from the settlement. The four viewpoints where views would be obtained from more 'natural' viewpoints are Fife Ness, White Caterthun Hill Fort, Dodd Hill and Isle of May. In these cases visitors are likely have returned home before full nightfall.

Cumulative Impacts of the Seagreen Project together with Other Schemes

- 16.400. In order to consider the cumulative impact of the Seagreen Project with other sites, information about the other projects has been extracted from relevant application documents. Details and assumptions made about the other sites within the 65km cumulative search area, considered in the cumulative assessment are presented in Table 16.26 below and presented on Figure 16.35.
- 16.401. Details of three onshore wind farms in Aberdeenshire currently at the scoping stage were unavailable and have therefore been discounted from the cumulative assessment however, they are presented on Figure 16.35 and Table 16.26 below.

Table 16.26 Cumulative wind farm details

Site Name	Number of WTGs	Maximum blade tip height (m)	Distance to the Seagreen Project (km)	Application Stage	Council
Offshore wind farms					
Neart na Gaoithe	80 - 128	175 - 197	27	Submitted	N/ A
Inch Cape	188	152 - 215	9	Scoping	N/ A
Onshore wind farms					
Kenly	6	100	54	Planning	Fife
South Cassingray	2	100	63	Planning	Fife
Michelin Tyre Factory (Dundee)	3	105	58	Operational	Dundee City
Port of Dundee	2	127	60	Scoping	Dundee City
Frawney	7	110	62	Scoping	Angus
Muir of Pert	1	100	40	Scoping	Angus
Hatton Mill	1	100	42	Scoping	Angus
Kinblethmont	5	125	40	Scoping	Angus
Dodd Hill	5	126	58	Scoping	Angus
North Mains of Cononsyth	1	66.7	46	Consented	Angus
East Memus, Forfar	1	86.45	60	Consented	Angus
Corse Hill (Nether Kelly)	7	126	44	Planning	Angus
Pickerton, Guthrie	1	77	48	Planning	Angus
Tealing Farm	1	94	63	Planning	Angus
Woodside, Aberlemno	1	74	52	Planning	Angus
Whitefield of Dun Farm, Montrose	1	67	38	Planning	Angus
Glaxo Smith Kline, Cobden Street, Montrose	2	132	32	Planning	Angus
Reidhall Farm, Edzell	1	74	46	Planning	Angus
Fordoun Saw Mill	1	77	38	Consented	Aberdeenshire
Droop Hill	3	80	40	Consented	Aberdeenshire
Jacksbank	3	100	40	Consented	Aberdeenshire

Site Name	Number of WTGs	Maximum blade tip height (m)	Distance to the Seagreen Project (km)	Application Stage	Council
Hillhead of Auquhirie	3	92.5	36	Consented	Aberdeenshire
Mid Hill I	25	126.5	48	Consented	Aberdeenshire
Rubberatkins	1	66.6	60	Consented	Aberdeenshire
St John's Hill	9	80	31	Consented	Aberdeenshire
Meikle Carewe	12	70	44	Consented	Aberdeenshire
Kempston Hill	-	-	39	Scoping	Aberdeenshire
Learney Estate	-	-	64.5	Scoping	Aberdeenshire
Wynford	-	-	59	Scoping	Aberdeenshire
Tullo	7	100	34	Operational	Aberdeenshire
Mid Hill II	9	126.5	47	Planning	Aberdeenshire
South Lasts Farm	1	86.45	50	Planning	Aberdeen City

16.402. Trends can be identified relating to the pattern of developments across the 65km study area with reference to Figure 16.35 and Table 16.26. Existing and proposed developments are seen to be grouped by region, corresponding to hill ranges and areas of upland moorland, as well as developed coastal areas. The following areas and groupings have been identified:

- medium-scale wind development across the coastal and inland areas between Montrose and Aberdeen;
- dispersed medium and small-scale development across the coastal and lowland areas to the north of Montrose;
- small-scale wind farms and turbines through lowland areas of Angus between Strathmore and the coast;
- medium-scale wind farms in the Sidlaw Hills in Angus;
- small-scale and single turbine developments in and around the city of Dundee, often in association with industrial sites;
- limited small-scale proposals across the north western fringes of the Ochil Hills and north Fife; and
- two relatively isolated proposals in east Fife.

Cumulative impacts on landscape elements/ features

16.403. It has already been determined in Section 'Impact Assessment – Operation' that the Seagreen Project will have no direct impact on any landscape elements/ features. Therefore there will be no direct cumulative impacts on any landscape elements/ features either.

Cumulative impacts on seascape character

16.404. In order to assist with the assessment of cumulative impacts on seascape character a series of cumulative ZTVs has been prepared as follows:

- Seagreen Project with all offshore wind farms Cumulative ZTV (Figure 16.36);
- Seagreen Project with operational onshore wind farms Cumulative ZTV (Figure 16.37);
- Seagreen Project with consented onshore wind farms Cumulative ZTV (Figure 16.38);
- Seagreen Project with planning onshore wind farms Cumulative ZTV (Figure 16.39);
- Seagreen Project with scoping onshore wind farms Cumulative ZTV (Figure 16.40);
- Seagreen Project with all onshore wind farms Cumulative ZTV (Figure 16.41); and
- Seagreen Project with all other wind farms Cumulative ZTV (Figure 16.42).

16.405. Cumulative visualisations have also been prepared for the selected fourteen viewpoints as listed in Table 16.25. The cumulative visualisations are presented in Figures 16.43 to 16.56.

16.406. With reference to Figure 16.36, it is evident that the proposed Neart na Gaoithe and Inch Cape offshore wind farms will be visible from the same locations along the coastline as the Seagreen Project, particularly from Fife and Angus, although Neart na Gaoithe and Inch Cape lie much closer to the Fife and Angus coastline at approximately 15km.

16.407. Figure 16.37 indicates theoretical visibility of the Seagreen Project and the two operational wind farms is limited to small areas of Angus, North Fife and South Aberdeenshire. There is no theoretical cumulative visibility with Michelin Tyre Factory as it is over 50km from the Seagreen Project. There is theoretical cumulative visibility with Tullo within 30km of the Seagreen Project.

16.408. Figure 16.38 indicates theoretical cumulative visibility of the Seagreen Project with three of the nine consented onshore wind farms including St John's Hill, Meikle Crewe in South Aberdeenshire and North Mains of Consonyth in East Angus.

16.409. Figure 16.39 indicates theoretical cumulative visibility of the Seagreen Project with four planning onshore wind farms, two on the east coast of Angus near Montrose, Kenly on the north-east coast of Fife and Corse Hill near Arbroath.

16.410. Figure 16.40 indicates there is no theoretical cumulative visibility of the Seagreen Project with any of the onshore scoping wind farms.

16.411. Cumulative impacts on Regional Seascape Units are described and assessed in Table 16.27. Seascape character is considered to be more sensitive to offshore wind farms than to onshore wind farms at similar distances.

Table 16.27 Cumulative Impacts on Seascape Units

Regional Seascape Units	Sensitivity	Cumulative Magnitude of Change	Cumulative Impact
SA2: Greg Ness to Cove Bay Representative viewpoints: N/ A	Medium	Negligible Due to the very limited visibility of the Seagreen Project from this area, there is no potential for cumulative impacts on the perception of seascape character	Minor Negligible impact – Not significant
SA3: Cove Bay to Milton Ness Representative viewpoints: VP1 – Garron Point	Medium	Medium Inch Cape would be seen at 43km south, with Neart na Gaoithe some 72km further south, and Seagreen Project 37km south-southeast. Turbines will be visible across the marine horizon. Although Neart na Gaoithe and Inch Cape are distant and will not be clearly visible. The contribution of the Seagreen Project, which is slightly closer and more visible to SA3, may slightly affect the perception of the currently undeveloped seaward character The consented St John's Hill and Hillhead of Auchmithie wind farms will be visible at 12km to the south-west, but is unlikely to have significant impact on the seascape character, and cumulative impacts are likely to be limited	Moderate – Potentially significant
SA4: Montrose Bay Representative viewpoints: VP2 – St Cyrus & VP4 – Montrose	High	Medium Inch Cape would be seen at 24km southeast, with Neart na Gaoithe not clearly visible immediately behind Inch Cape. Seagreen Project would be seen at 31km southeast. Turbines will be visible across the marine horizon. Although Seagreen Project is distant, the contribution of this wind farm, considering the likely presence of Neart na Gaoithe and Inch Cape, may slightly affect the perception of the currently undeveloped seaward character The proposed Glaxo Smith Kline onshore wind farm will be visible to the south-west in close proximity but unlikely to have an impact on seascape character	Major / Moderate Moderate – Potentially significant

Regional Seascape Units	Sensitivity	Cumulative Magnitude of Change	Cumulative Impact
SA5: Long Craig Representative viewpoints: N/ A	Medium	Medium-low Inch Cape would be seen at 18km southeast, with Neart na Gaoithe at 40km south-southeast. Seagreen Project would be seen at 32km southeast. Turbines will be visible across the marine horizon. Considering the likely presence of the other wind farms, the addition of the Seagreen Project would increase the presence of turbines within the seascape The proposed Glaxo Smith Kline onshore wind farm will be visible to the south-west in close proximity but unlikely to have an impact on seascape character	Moderate – Potentially significant
SA6: Lunan Bay Representative viewpoints: VP5 – Braehead of Lunan	High	Medium-low Inch Cape would be seen at 18km southeast, with Neart na Gaoithe at 40km south-southeast. Seagreen Project would be seen at 35km southeast. Turbines will be visible across the marine horizon. Considering the likely presence of the other wind farms, the addition of the Seagreen Project would increase the presence of turbines within the seascape, albeit at approximately double the distance of the Inch Cape turbines The addition of the Seagreen Project is unlikely to have cumulative impacts with the limited visibility of the onshore wind farms	Moderate – Potentially significant
SA7: Land Craig to The Deil's Heid Representative viewpoints: N/ A	High	Low Inch Cape would be seen at 17km east, with Neart na Gaoithe at 30km south-southeast. Seagreen Project would not be clearly visible as it is hidden behind Inch Cape at 35km east. Turbines will be visible across the marine horizon. Although Seagreen Project is distant, the contribution of this wind farm, considering the likely presence of Neart na Gaoithe and Inch Cape, may slightly affect the perception of the currently undeveloped seaward character Small onshore wind farms will be visible but will have little impact on this seascape	Moderate/ minor Minor - Not significant

Regional Seascape Units	Sensitivity	Cumulative Magnitude of Change	Cumulative Impact
SA8: Arbroath to Monifieth Representative viewpoints: VP6 – Arbroath & VP7 - Carnoustie	Medium	Low Inch Cape would be seen at 17km east, with Neart na Gaoithe at 30km south-southeast. Seagreen Project would not be clearly visible as it is hidden behind Inch Cape and partly behind the headland, at 38km east. Turbines will be visible across the marine horizon. Although Seagreen Project is distant, the contribution of this wind farm, considering the likely presence of Neart na Gaoithe and Inch Cape, may slightly affect the perception of the currently undeveloped seaward character The proposed Corse Hill Wind Farm will be visible in close proximity to the northwest, but is unlikely to have significant impact on the seascape character, and cumulative impacts are likely to be limited	Minor/ moderate Minor - Not significant
SA12: St Andrews to Fife Ness Representative viewpoints: VP8 – Fife Ness	High	Negligible Inch Cape would be seen at 27km northeast and Neart na Gaoithe would be visible at 15km east. Seagreen project will barely be visible at 48km. Seagreen Project would be a relatively small element in the view behind Inch Cape, and is unlikely to result in cumulative changes to the perception of the seascape	Minor/ moderate Negligible - Not significant
SA13: East Neuk of Fife Representative viewpoints: VP8 – Fife Ness	High	Negligible Similar to SA12, Inch Cape would be seen at 27km northeast and Neart na Gaoithe would be visible at 15km east. Seagreen project will barely be visible at 48km. Seagreen Project would be a relatively small element in the view behind Inch Cape, and is unlikely to result in cumulative changes to the perception of the seascape	Minor/ moderate Negligible - Not significant

Cumulative impacts on landscape character

- 16.412. The Seagreen Project is located offshore, and the landscape impact assessment has not identified any significant impacts upon landscape character areas.
- 16.413. Landscape character types within the study area have been reviewed, and coastal characteristics have been identified (Table 16.6). This has led to an assessment of their sensitivity to offshore development (Table 16.6). While many areas have views to the coast, the changes to the inherent character arising from the offshore development are limited. Up to minor impacts were predicted on the Landscape character types within the study area.
- 16.414. Cumulative impacts on the landscape are often addressed by considering whether an area will become a 'wind farm landscape' where wind farms are a key characteristic. Due to its offshore

location, there is no potential for the construction of the Seagreen Project to transform any LCT into a 'wind farm landscape', since no further turbines will be within the LCT.

- 16.415. Given the low magnitude of impact identified in the stand-alone assessment, and the limited potential for offshore development to give rise to cumulative impacts on landward character, no detailed assessment of cumulative impacts on onshore landscape character, as represented by LCTs, has been undertaken.
- 16.416. Visual impacts may occur at locations across these areas, and these are discussed below. Any impacts on views will not extend to impacts upon the underlying landscape character.

Cumulative impacts on landscape designations

- 16.417. As with LCTs, given that no significant impacts have been identified in the stand-alone assessment, and the limited potential for offshore development to give rise to cumulative impacts on landward designations, no detailed assessment of cumulative impacts on onshore landscape designations, has been undertaken.

Cumulative Impacts on Visual Amenity

Simultaneous visibility

- 16.418. As discussed in the section on cumulative impacts on seascape character above, within the 50km study area for the Seagreen Project, there will be various locations where a mixture of the Seagreen Project, Inch Cape and Neart na Gaoithe offshore wind farms, and a number of onshore wind farms will theoretically be visible simultaneously.
- 16.419. Appendix K4, which can be found in ES Volume III: Appendices, considers the magnitude of change on the cumulative viewpoints (Figure 16.35) for which wireframes have been produced (Figures 16.43 to 16.56). Table 16.28 below summarises the significance of impacts on the cumulative viewpoints.

Table 16.28 Cumulative viewpoint impact summary

VP no	Viewpoint	Number of wind farms visible (in 360 degree view)	Sensitivity to change	Cumulative Magnitude of change	Significance of cumulative impact (combination of significance matrix and professional judgement)
1	Garron Point (Golf club)	5	Medium	Low Seagreen Project is distant but is set apart from the discrete group formed by Inch Cape and Neart na Gaoithe. Seagreen Project will occupy part of the remaining open horizon of the sea	Minor/ Moderate Minor - Not significant
2	Beach Rod, Kirkton, St Cyrus	7	High	Medium In particularly clear weather conditions (up to approximately 153 days per year) the Seagreen Project WTGs will introduce a further large group of turbines across a previously open area of sea horizon, increasing the presence of turbines in this	Major/ moderate Moderate - Potentially significant

VP no	Viewpoint	Number of wind farms visible (in 360 degree view)	Sensitivity to change	Cumulative Magnitude of change	Significance of cumulative impact (combination of significance matrix and professional judgement)
				view, although Inch Cape is much closer to the viewpoint	
3	White Caterthun Hill Fort	24	High	Low Even with the likely presence of the other wind farms, there would be relatively limited presence of turbines in this panoramic view. The sea is a limited part of this view. The construction of the Seagreen Project would slightly increase the limited presence of offshore turbines in the view	Moderate/ Minor Minor - Not significant
4	Montrose	8	High	Low The Seagreen Project is visible as a separate wind farm from this viewpoint, and will occupy part of the remaining open horizon of the sea, although Inch Cape and the proposed Glaxo Smith Kline are much closer to the viewpoint	Moderate/ Minor Minor - Not significant
5	Braehead of Lunan	6	High	Medium Seagreen Project will introduce a further large group of turbines across a previously open area of sea horizon, increasing the presence of turbines in this view, although Inch Cape is much closer to the viewpoint	Major/ moderate Moderate - Potentially significant
6	Arbroath Signal Tower	13	High	Low Limited visibility of the Seagreen Project, which is partially screened by the headland. The construction of the Seagreen Project, considering the prominence of Inch Cape, will slightly increase the presence of offshore turbines in the view	Moderate/ Minor Minor - Not significant
7	Carnoustie	11	High	Negligible The Seagreen Project is very distant from this viewpoint, located behind Inch Cape and is likely to be much less visible than other offshore wind farms	Minor/ Moderate Negligible - Not significant
8	Fife Ness, Lochaber	16	High	Negligible The Seagreen Project is very	Minor/ Moderate Negligible - Not

VP no	Viewpoint	Number of wind farms visible (in 360 degree view)	Sensitivity to change	Cumulative Magnitude of change	Significance of cumulative impact (combination of significance matrix and professional judgement)
	Rock			distant from this viewpoint, located behind Inch Cape and is unlikely to be visible than other offshore wind farms which are prominent in the view	significant
9	Dodd Hill	25	High	Low - Negligible The Seagreen Project is very distant from this viewpoint, located behind Inch Cape and is likely to be much less visible than other offshore wind farms	Minor/ Moderate Negligible - Not significant
10	Tentsmuir	N/ A	N/ A	N/ A	N/ A
11	Strathkinness	13	High	Negligible The Seagreen Project is very distant from this viewpoint, located behind Inch Cape and is unlikely to be visible than other offshore wind farms which are prominent in the view	Minor/ Moderate Negligible - Not significant
12	St Andrews, East Scores	12	High	Negligible The Seagreen Project is very distant from this viewpoint, located behind Inch Cape and is unlikely to be visible than other offshore wind farms which are prominent in the view	Minor/ Moderate Negligible - Not significant
13	Anstruther Easter	3	High	Negligible The Seagreen Project is very distant from this viewpoint, located behind Inch Cape and is unlikely to be visible than other offshore wind farms which are prominent in the view	Minor/ Moderate Negligible - Not significant
14	Isle of May	15	High	Negligible The Seagreen Project is very distant from this viewpoint, located behind Inch Cape and is unlikely to be visible than other offshore wind farms which are prominent in the view	Minor/ Moderate Negligible - Not significant

- 16.420. In summary, moderate and **potentially significant** cumulative impacts are predicted on two of the fourteen viewpoints, St Cyrus (VP2) and Braehead of Lunan (VP5)). Moderate cumulative impacts are predicted where the Seagreen Project will be simultaneously visible on clear days in addition to Inch Cape and Neart na Gaoithe. Minor and **not significant** cumulative impacts are predicted on four viewpoints (VP1, VP3, VP4 and VP6) where the Seagreen Project is distant but can be seen on the far horizon in addition to Inch Cape and Neart na Gaoithe. Negligible and **not significant** cumulative impacts have been predicted on the remaining eight viewpoints due to lack of visibility of the Seagreen Project and where Inch Cape and Neart na Gaoithe are prominent and closer in the views.
- 16.421. The differences in views between very distant off-shore wind farms on a marine horizon and relatively close on-shore wind farms against a land / sky background act on very different parts of a view in different ways, and therefore are assessed as not creating significant cumulative impacts. Therefore, interactions between the Seagreen Project and onshore wind farms were not assessed as giving rise to significant cumulative impacts.

Cumulative visual impacts on residential receptors

- 16.422. Moderate and **potentially significant** cumulative impacts have already been identified at the settlement of St Cyrus (VP2) where the Seagreen Project will be simultaneously visible with Inch Cape and Neart na Gaoithe. Up to minor and **not significant** cumulative impacts may be experienced by residents at Montrose (VP4), Arbroath (VP6), Hillside, Newtonhill, Inverbervie, Johnshaven and Stonehaven (VP1) where the Seagreen Project is distant but can simultaneously be seen on the far horizon in with Inch Cape and Neart na Gaoithe. Impacts will only occur where the turbines are clearly visible from a property with an existing open sea view. Negligible and **not significant** cumulative impacts have been predicted at Carnoustie and any of the settlements in Fife due to lack of visibility of the Seagreen Project located behind Inch Cape.

Cumulative visual impacts on recognised vantage points and tourist attractions

- 16.423. Moderate and **potentially significant** cumulative impacts have been identified at St Cyrus (VP2), with uninterrupted views out to sea where the Seagreen Project will be simultaneously visible in addition to Inch Cape and Neart na Gaoithe. Users at these locations tend to pause and take in the view and often focus on the horizon of the areas such that they are more likely to notice any change than other receptors. Other locations will experience up to minor and **not significant** cumulative impacts, including Arbroath (VP6), Newtonhill and Inverbervie Bay, where the Seagreen Project is distant but can simultaneously be seen on the far horizon in addition to Inch Cape and Neart na Gaoithe whilst locations at Carnoustie (VP7) and Fife Ness (VP8) will experience a negligible and **not significant** cumulative impact due to lack of visibility of the Seagreen Project located behind Inch Cape.

Cumulative visual impacts on marine receptors

- 16.424. Visitors to the Bell Rock Lighthouse will primarily experience visibility of Inch Cape and Neart na Gaoithe offshore wind farms due to the close distance of the sites to the receptor (approximately 9km and 10km respectively). The Seagreen Project is located 28km away and will be visible behind Inch Cape for a short duration only on very clear days. The cumulative magnitude of change will therefore be low. When combined with the medium sensitivity of the receptor, this will result in a no greater than an overall minor and **not significant** cumulative impact on the visual amenity of the receptor.
- 16.425. Recreational boat users within the study area will view Neart na Gaoithe and Inch Cape at relatively close range, depending on their course, with distant visibility of the Seagreen

Project visible either adjacent to or behind Inch Cape. Boat users may view the turbines for prolonged periods. Although their sensitivity is medium, the cumulative magnitude of change will be medium. Therefore, up to moderate and **potentially significant** cumulative impacts are predicted for boat users to the north of Arbroath where the Seagreen Project will be visible in addition to Inch Cape and Neart na Gaoithe. However, minor and **not significant** cumulative impacts will be predicted for boat users to the south of Arbroath as the Seagreen Project will be hidden behind Inch Cape.

- 16.426. Fishermen and commercial vessels would have potential simultaneous visibility of Neart na Gaoithe and Inch Cape with distant visibility of the Seagreen Project, depending on their course. The presence of the turbines is unlikely to affect the overall experience as they will be at work. Significant cumulative impacts are therefore not predicted.

Sequential visibility

- 16.427. The cumulative ZTVs (Figures 16.36 to 16.42) indicate that there would several lengths of the routes, as described below, where the Seagreen Project will be sequentially visible with the other offshore and onshore wind farms. The durations of these sequential impacts will range from short glimpses to longer periods.
- 16.428. It is important to note in assessing sequential cumulative views that they will be reduced by roadside vegetation and other local obstructions, that any visual impacts would decrease with increasing distance from the wind farms, and that changes in the view will depend on the direction of the road and thus direction of travel.

Cumulative visual impacts on recreational walking and cycle routes

- 16.429. As no significant impact has been predicted on the Seagreen Project for users of the Fife Coastal Path, a negligible cumulative impact will therefore be experienced on users of the Fife Coastal Path due to lack of visibility of the Seagreen Project, and Inch Cape, Neart na Gaoithe and Kenly onshore wind farm being prominent and closer in the views.
- 16.430. Users of Sustrans NCN Route 1 would potentially view a number of the small- and medium-scale onshore proposals, and Inch Cape and Neart na Gaoithe in east Fife, Dundee and east Angus before seeing the Seagreen Project turbines. For most of the route between Fife Ness and Arbroath, there would be very limited visibility of the Seagreen Project as it is located behind Inch Cape. Beyond Arbroath, the Seagreen Project would also become visible on the distant horizon, and the onshore Corse Hill, Glaxo Smith Kline, Tullo, St John's Hill and Hillhead of Auquhire proposals would be seen along the route. Assuming the presence of the other wind farms, the addition of the Seagreen Project would give rise to an overall minor and **not significant** cumulative impact and would therefore not be significant on sequential views of the cycle route.

Cumulative visual impacts on roads and railways

- 16.431. The cumulative ZTVs (Figures 16.36 to 16.42) indicate that there will be several sections along the A92 where the Seagreen Project, and at least one other wind farm (offshore or onshore) will be visible. The duration of these sequential impacts will range from short glimpses to longer periods and the nature of these views will be transitory. The Seagreen Project will be visible on the distant horizon between Montrose and Stonehaven, at a minimum distance of 28km from the road. It will be visible sequentially in addition to Inch Cape and Neart na Gaoithe, and a number of onshore wind farms including St John's Hill, Tullo and Glaxo Smith Kline. All the onshore wind farms are located much closer to the roads and will be more prominent in the view than any of the offshore wind farms of which The Seagreen Project is the furthest away. Between Montrose and Carnoustie, the visibility of the Seagreen Project will decrease as it is located directly behind the proposed

Inch Cape and Neart na Gaoithe which are more prominent in the views. Where the road passes through Montrose, St Cyrus, Johnshaven and Inverbervie, views will be reduced by built-form, landform and vegetation. Any visual impacts would therefore decrease with increasing distance from the wind farms, and changes in the view will depend on the direction of the road and thus direction of travel. Assuming the presence of the other wind farms, the addition of the Seagreen Project would give rise to an overall minor and **not significant** cumulative impact on users of the A92.

- 16.432. The cumulative ZTVs (Figures 16.36 to 16.42) indicate that there will be several sections along the A90 where the Seagreen Project and at least one other wind farm will be visible. The duration of these sequential impacts will range from short glimpses to longer periods and the nature of these views will be transitory. The Seagreen Project will be visible on a short stretch of the route between Aberdeen and Stonehaven, at a minimum distance of 35km from the road. It will be visible sequentially in addition to Inch Cape and Neart na Gaoithe, of which Inch Cape is more prominent in the views. None of the onshore wind farms would be visible on this short stretch of the route due to built-form, landform and vegetation. Assuming the presence of the other wind farms, the addition of the Seagreen Project would give rise to an overall minor and **not significant** cumulative impact on users of the A90.
- 16.433. The East Coast Railway Line follows a similar route to the A92 and therefore the cumulative impact will be similar to those assessed for the A92 and A90 in paragraphs 16.432 and 16.433.

Cumulative visual impacts on aircraft passengers

- 16.434. From aircrafts passing over the study area, passengers may see a number of wind farms, including the Seagreen Project and potentially other offshore wind farms in clear conditions. These turbines will form a passing feature in the view, and the magnitude of change is considered to be negligible; **no significant** cumulative impacts are predicted.

Cumulative night time impacts

- 16.435. The WTGs and offshore structures of the Seagreen Project will introduce light to an area of seascape that is currently, predominantly unlit. However, both Inch Cape and Neart na Gaoithe, which are more prominent and closer (approximately 15km offshore) to the coastline, will be similarly illuminated to the Seagreen Project (located approximately 27km offshore). The offshore lighting on the three wind farms, will be seen in context with other existing lighting identified within the study area. These include illumination from occasional shipping movements visible out at sea and some aircraft movements in the sky. Lighting is also associated with a number of ports and harbours including Stonehaven, Johnshaven, Montrose and Arbroath. Frequent settlements on the coastline provide illumination, increasing in extent around larger town such as Stonehaven, Montrose, Arbroath and Carnoustie. There are also a number of lighthouses which have prominent lights at Bell Rock, Girdle Ness, Scurdie Ness and Fife Ness. Although the lighting on Neart na Gaoithe and Inch Cape will be more prominent on clear nights without any haze, the addition of the lighting on the Seagreen Project WTGs, will be visible on the distant horizon for a short duration during conditions of clear visibility but is unlikely to create any significant glow. The Seagreen Project turbines will be less visible, and less frequently than Neart na Gaoithe and Inch Cape, and for a number of receptors, the Seagreen Project will be hidden behind Inch Cape. The cumulative magnitude of change will therefore be low. When combined with the low sensitivity of these receptors at night time (see paragraph 16.143), the cumulative impact on sea views would be minor and **not significant** cumulative impact even if viewed from a remote location with no adjacent development.

OUTLINE MONITORING

16.436. Monitoring is not proposed for seascape, landscape and visual impacts.

SUMMARY

16.437. The assessment process has sought to define the full extent and nature of the likely seascape, landscape and visual impacts arising from the construction, operation and decommissioning of the Seagreen Project. Tables 16.29a to 16.29d provide a summary of the impacts assessed within the chapter.

Table 16.29 a Summary of Project Alpha Impacts

Description of Impact	Potential Impact	Proposed Mitigation Measures	Residual Impact
Construction Phase			
Impacts on Landscape elements	No physical impacts	N/ A	N/ A
Impacts on Seascape Character	Minor, reversible and temporary not significant impact during the day and night-time works	None	Same as potential impacts
Impacts on Landscape Character	Minor, reversible and temporary not significant impact during the day and night-time works.	None	Same as potential impacts
Impacts on Landscape designations	Negligible not significant impact	N/ A	N/ A
Impacts on visual amenity	Minor, reversible and temporary not significant impact during the day and night-time works	None	Same as potential impacts
Operation Phase			
Impacts on landscape elements	No physical impacts	N/ A	N/ A
Impacts on seascape character	<u>National Seascape Units:</u> Area 2 – Minor - not significant Area 3 – Minor - not significant Area 4 – Minor - not significant <u>Regional Character Areas:</u> SA2 – Minor - not significant SA3 – Moderate - potentially significant SA4 – Moderate - potentially significant SA5 – Minor - not significant SA6 – Minor - not significant SA7 – Minor - not significant SA8 – Minor - not significant SA12 – Minor - not significant SA13 – Minor - not significant	Limited mitigation measures as identified in paragraphs 16.146 to 16.149	Same as potential impacts
Impacts on landscape character	Minor - not significant	None	Same as potential impacts
Impacts on landscape designations	Special Landscape Areas – Negligible - not significant HGDLs – Negligible - not significant	N/ A	N/ A

Description of Impact	Potential Impact	Proposed Mitigation Measures	Residual Impact
Impacts on visual amenity	<p><u>Viewpoints:</u> VP1 – Minor - not significant VP2 – Moderate - potentially significant VP3 – Minor - not significant VP4 – Minor - not significant VP5 – Moderate - potentially significant VP6 – Minor - not significant VP7 – Negligible - not significant VP8 – Negligible - not significant</p> <p><u>Residential receptors:</u> Moderate - potentially significant on identified settlements within 35km Minor - not significant on identified settlements beyond 35km Negligible - not significant on settlements outwith the ZTV</p> <p><u>Recreational walking and cycling receptors:</u> Fife Coastal Path – Negligible - not significant Sustrans NCN1 – Moderate - potentially significant between Montrose and north of Inverbervie. Minor - not significant impacts on the rest of the route</p> <p><u>Roads and railways</u> Minor (not significant) on identified roads and railways</p> <p><u>Vantage points and tourist attractions:</u> Moderate - potentially significant on identified local vantage points and car parks within 35km. Minor - not significant impacts on vantage points and car parks beyond 35km. Minor - not significant impacts on recreational receptors</p> <p><u>Other land based receptors:</u> Negligible - not significant</p> <p><u>Marine receptors:</u> Recreational boats and yachts – Moderate - potentially significant Fishermen, commercial vessels – Minor / moderate - not significant. Bell Rock Lighthouse – Moderate - potentially significant</p> <p><u>Aircraft passengers:</u> Negligible - not significant</p> <p><u>Night time visual impacts:</u> Minor / moderate - not significant</p>	Limited mitigation measures as identified in paragraphs 16.146 to 16.149	Same as potential impacts
Decommissioning Phase			
Impacts on landscape elements	No physical impacts	N/ A	N/ A

Description of Impact	Potential Impact	Proposed Mitigation Measures	Residual Impact
Impacts on seascape character	Minor, reversible and temporary - not significant impact during the day and night-time works.	None	Same as potential impacts
Impacts on landscape character	Minor, reversible and temporary - not significant impact during the day and night-time works.	None	Same as potential impacts
Impacts on landscape designations	Negligible - not significant	N/ A	N/ A
Impacts on visual amenity	Minor, reversible and temporary - not significant impact during the day and night-time works.	None	Same as potential impacts

Table 16.29b Summary of Project Bravo Impacts

Description of Impact	Impact	Potential Mitigation Measures	Residual Impact
Construction Phase			
Impacts on landscape elements	No physical impacts	N/ A	N/ A
Impacts on seascape character	Minor, reversible and temporary - not significant impact during the day and night-time works.	None	Same as potential impacts
Impacts on landscape character	Minor, reversible and temporary - not significant impact during the day and night-time works.	None	Same as potential impacts
Impacts on landscape designations	Negligible - not significant	N/ A	N/ A
Impacts on visual amenity	Minor, reversible and temporary - not significant impact during the day and night-time works.	None	Same as potential impacts
Operation Phase			
Impacts on landscape elements	No physical impacts	N/ A	N/ A
Impacts on seascape character	<u>National Seascape Units:</u> Area 3 – Minor - not significant Area 4 – Minor - not significant <u>Regional Character Areas:</u> SA3 – Minor - not significant SA4 – Minor - not significant SA5 – Minor - not significant SA6 – Minor - not significant SA7 – Minor - not significant SA8 – Minor - not significant	Limited mitigation measures as identified in paragraphs 16.278 to 16.230	Same as potential impacts
Impacts on landscape character	Minor - not significant	None	Same as potential impacts
Impacts on landscape designations	Special Landscape Areas – Negligible - not significant HGDs – Negligible - not significant	N/ A	N/ A

Description of Impact	Impact	Potential Mitigation Measures	Residual Impact
Impacts on visual amenity	<p><u>Viewpoints:</u> VP1 – Minor - not significant VP2 – Minor - not significant VP4 – Negligible - not significant VP5 – Minor - not significant VP6 – Minor - not significant VP7 – Negligible - not significant VP8 – Negligible - not significant</p> <p><u>Residential receptors:</u> Minor - not significant on identified settlements Negligible - not significant on foreshore or lower level settlements</p> <p><u>Recreational walking and cycling receptors:</u> Sustrans NCN1 – Minor - not significant</p> <p><u>Roads and railways:</u> Minor - not significant on identified roads and railways</p> <p><u>Vantage points and tourist attractions:</u> Minor - not significant impacts on local vantage points and car parks Minor - not significant impacts on recreational receptors</p> <p><u>Other land based receptors:</u> Negligible - not significant</p> <p><u>Marine receptors:</u> Recreational boats and yachts – Moderate - potentially significant Fishermen, commercial vessels – Minor / moderate - not significant Bell Rock Lighthouse – Moderate - potentially significant</p> <p><u>Aircraft passengers:</u> Negligible - not significant</p> <p><u>Night time visual impacts:</u> Minor / moderate - not significant</p>	Limited mitigation measures as identified in paragraphs 16.278 to 16.230	Same as potential impacts
Decommissioning Phase			
Impacts on landscape elements	No physical impacts	N/ A	N/ A
Impacts on seascape character	Minor, reversible and temporary - not significant impact during the day and night-time works	None	Same as potential impacts
Impacts on landscape character	Minor, reversible and temporary - not significant impact during the day and night-time works	None	Same as potential impacts
Impacts on landscape designations	Negligible - not significant	N/ A	N/ A
Impacts on visual amenity	Minor, reversible and temporary - not significant impact during the day and night-time works	None	Same as potential impacts

Table 16.29c Summary of Transmission Asset Project Impacts

Description of Impact	Impact	Potential Mitigation Measures	Residual Impact
Construction Phase			
Impact on seascape, landscape and visual amenity	Moderate, reversible and temporary - potentially significant within 500m of the landfall works and cable-laying near landfall Minor, reversible and temporary - not significant on the cable-laying of the ECR corridor closest to shore reducing to negligible - not significant as the works move away from the shore	As per paragraph 16.217	Same as potential impacts
Operation Phase			
Impact on seascape, landscape and visual amenity	Negligible - not significant	N/ A	N/ A
Decommissioning Phase			
Impact on seascape, landscape and visual amenity	Negligible - not significant	N/ A	N/ A

Table 16.29d Summary of Cumulative Impacts

Description of Cumulative Impact	Impact
The Seagreen Project (Project Alpha, Project Bravo and the Transmission Asset Project)	
Cumulative impacts on landscape elements	Negligible - not significant
Cumulative impacts on seascape character	<u>National Seascape Units:</u> Area 2 – Minor - not significant Area 3 – Minor - not significant Area 4 – Moderate - potentially significant <u>Regional Character Areas:</u> SA2 – Minor - not significant SA3 – Moderate - potentially significant SA4 – Moderate - potentially significant SA5 – Minor - not significant SA6 – Minor - not significant SA7 – Minor - not significant SA8 – Minor - not significant
Cumulative impacts on landscape character	Minor - not significant
Cumulative impacts on landscape designations	Negligible - not significant
Cumulative impacts on visual amenity	<u>Cumulative Viewpoints:</u> VP1 – Minor - not significant VP2 – Moderate - potentially significant VP3 – Minor - not significant VP4 – Minor - not significant VP5 – Moderate - potentially significant VP6 – Minor - not significant VP7 – No or negligible - not significant VP8 – No or negligible - not significant

Description of Cumulative Impact	Impact
	<p>VP9 – No or negligible - not significant VP10 – No or negligible - not significant VP11 – No or negligible - not significant VP12 – No or negligible - not significant VP13 – No or negligible - not significant VP14 - Minor - not significant</p> <p><u>Residential receptors:</u> Moderate - potentially significant on identified settlements within 35km. Minor - not significant on identified settlements beyond 35km. Negligible - not significant on settlements outwith the ZTV.</p> <p><u>Recreational walking and cycling receptors:</u> Fife Coastal Path – Negligible - not significant. Sustrans NCN1 – Moderate - potentially significant between Montrose and north of Inverbervie. Minor - not significant impacts on the rest of the route.</p> <p><u>Roads and railways:</u> Minor - not significant on identified roads and railways.</p> <p><u>Vantage points and tourist attractions:</u> Moderate - potentially significant on identified local vantage points and car parks within 35km Minor - not significant impacts on vantage points and car parks beyond 35km Minor not significant impacts on recreational receptors</p> <p><u>Other land based receptors:</u> Negligible - not significant</p> <p><u>Marine receptors:</u> Recreational boats and yachts – Moderate - potentially significant Fishermen, commercial vessels – Minor / moderate - not significant Bell Rock Lighthouse – Moderate - potentially significant</p> <p><u>Aircraft passengers:</u> Negligible - not significant</p> <p><u>Night time visual impacts:</u> Minor / moderate - not significant</p>
The Seagreen Project with other schemes	
Cumulative impacts on landscape elements	Negligible - not significant
Cumulative impacts on seascape character	<p><u>National Seascape Units:</u> Area 2 – Minor - not significant Area 3 – Minor - not significant Area 4 – Minor - not significant</p> <p><u>Regional Character Areas:</u> SA2 – No or negligible - not significant SA3 – Moderate - not significant SA4 – Moderate - not significant SA5 – Moderate - potentially significant SA6 – Moderate - potentially significant SA7 – Minor - not significant SA8 – Minor - not significant SA12 - Negligible - not significant SA13 - Negligible - not significant</p>

Description of Cumulative Impact	Impact
Cumulative impacts on landscape character	N/ A/ . Refer to paragraphs 16.413 – 16.417
Cumulative impacts on landscape designations	N/ A/ . Refer to paragraph 16.418
Cumulative impacts on visual amenity	<p><u>Cumulative Viewpoints:</u> VP1 – Minor - not significant VP2 – Moderate - potentially significant VP3 – Minor - not significant VP4 – Minor - not significant VP5 – Moderate - potentially significant VP6 – Minor - not significant VP7 – Negligible - not significant VP8 – Negligible - not significant VP9 – Negligible - not significant VP10 – Negligible - not significant VP11 – Negligible - not significant VP12 – Negligible - not significant VP13 – Negligible - not significant VP14 – Negligible - not significant</p> <p><u>Residential receptors:</u> Moderate - potentially significant at St Cyrus Minor - not significant on identified settlements in paragraph 16.423 Negligible - not significant at Carnoustie and settlements in Fife</p> <p><u>Recreational walking and cycling receptors:</u> Fife Coastal Path – Negligible - not significant Sustrans NCN1 – Minor - not significant</p> <p><u>Roads and railways:</u> Minor - not significant on identified roads and railways</p> <p><u>Vantage points and tourist attractions:</u> Moderate - potentially significant at St Cyrus Minor - not significant impacts on identified vantage points and car parks in Paragraph 16.424 Negligible - not significant at Carnoustie and Fife Ness</p> <p><u>Other land based receptors:</u> Negligible - not significant</p> <p><u>Marine receptors:</u> Recreational boats and yachts – Moderate - potentially significant Fishermen, commercial vessels – Minor / moderate - not significant Bell Rock Lighthouse – Minor - not significant</p> <p><u>Aircraft passengers:</u> Negligible - not significant</p> <p><u>Night time visual impacts:</u> Minor - not significant</p>

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