



# Green Volt Offshore Windfarm

Offshore Environmental Impact Assessment  
Report

Summary of Offshore and Onshore Environmental  
Impact Assessments

## Revision history

Revision	Date	Description	Prepared	Checked	Approved
1	13/01/2023	First draft	VC (Flotation Energy)	JM/PP (Royal HaskoningDHV)	VC (Flotation Energy)
2	18/01/2023	Final for submission	VC (Flotation Energy)	JM/PP (Royal HaskoningDHV)	VC (Flotation Energy)

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## Acronyms

Acronym	Acronym description
CEMP	Construction Environmental Management Plan
CO <sub>2</sub>	Carbon Dioxide
ECow	Ecological Clerk of Works
EIA	Environmental Impact Assessment
EMF	Electromagnetic Field
EPA	European Protected Species
FTE	Full Time Equivalent
GHG	Greenhouse Gas
GW	Gigawatt
HDD	Horizontal Directional Drilling
HMR	Helicopter Main Route
HRA	Habitat regulations Appraisal
IEMA	Institute of Environmental Management and Assessment
INTOG	Innovation and Targeted Oil and Gas decarbonisation
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MPA	Marine Protected Area
nm	Nautical Mile
NRA	Navigation Risk Assessment
OSP	Offshore substation Platform

PMF	Priority Marine Feature
RIAA	Report to Inform Appropriate Assessment
SAC	Special Area of Conservation
SPA	Special Protection Area
UK	United Kingdom
UXO	Unexploded Ordnance
WTG	Wind Turbine Generator

## Glossary

Term	Description
Applicant	Green Volt Offshore Windfarm Ltd.
Buzzard	Buzzard Platform Complex
Buzzard Export Cable Corridor	The area in which the export cables will be laid, from the perimeter of the Windfarm Site to Buzzard Platform Complex.
Green Volt Offshore Windfarm	Offshore windfarm including associated onshore and offshore infrastructure development (Combined On and Offshore Green Volt Projects)
Horizontal Directional Drilling	Mechanism for installation of export cable at landfall
Inter-array cables	Cables which link the wind turbines to each other and the offshore substation platform.
Landfall Export Cable Corridor	The area in which the export cables will be laid, from the perimeter of the Windfarm Site to landfall
Mean High Water Springs	At its highest and 'Neaps' or 'Neap tides' when the tidal range is at its lowest. The height of Mean High Water Springs (MHWS) is the average throughout the year, of two successive high waters, during a 24-hour period in each month when the range of the tide is at its greatest (Spring tides).
Moorings	Mechanism by which wind turbine generators are fixed to the seabed.
NorthConnect Parallel Export Cable Corridor Option	Landfall Export Cable Corridor between NorthConnect Parallel Landfall and point of separation from St Fergus South Export Cable Corridor Option
NorthConnect Parallel Landfall	Southern landfall option where the offshore export cables come ashore
Offshore Development Area	Encompasses i) Windfarm Site, including offshore substation platform ii) Offshore Export Cable Corridor to Landfall, iii) Export Cable Corridor to Buzzard Platform Complex.

Offshore export cables	The cables which would bring electricity from the offshore substation platform to the Landfall or to the Buzzard Platform Complex.
Offshore Export Cable Corridor	The proposed offshore area in which the export cables will be laid, from offshore substation to landfall or to the Buzzard Platform Complex.
Offshore infrastructure	All of the offshore infrastructure, including wind turbine generators, offshore substation platform and all inter-array and export cables.
Offshore substation platform	A fixed structure located within the Windfarm Site, containing electrical equipment to aggregate the power from the wind turbine generators and convert it into a more suitable form for export to shore.
Onshore Export Cable Corridor	The proposed onshore area in which the export cables will be laid, from landfall to the onshore substation.
Project	Green Volt Offshore Windfarm project as a whole, including associated onshore and offshore infrastructure development
Safety zones	An area around a structure or vessel which must be avoided.
St Fergus South Export Cable Corridor Option	Landfall Export Cable Corridor between St Fergus South Landfall and point of separation from NorthConnect Parallel Export Cable Corridor Option
St Fergus South Landfall	Northern landfall option where the offshore export cables come ashore.
Windfarm Site	The area within which the wind turbine generators, offshore substation platform and inter-array cables will be present.

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# 1. Introduction

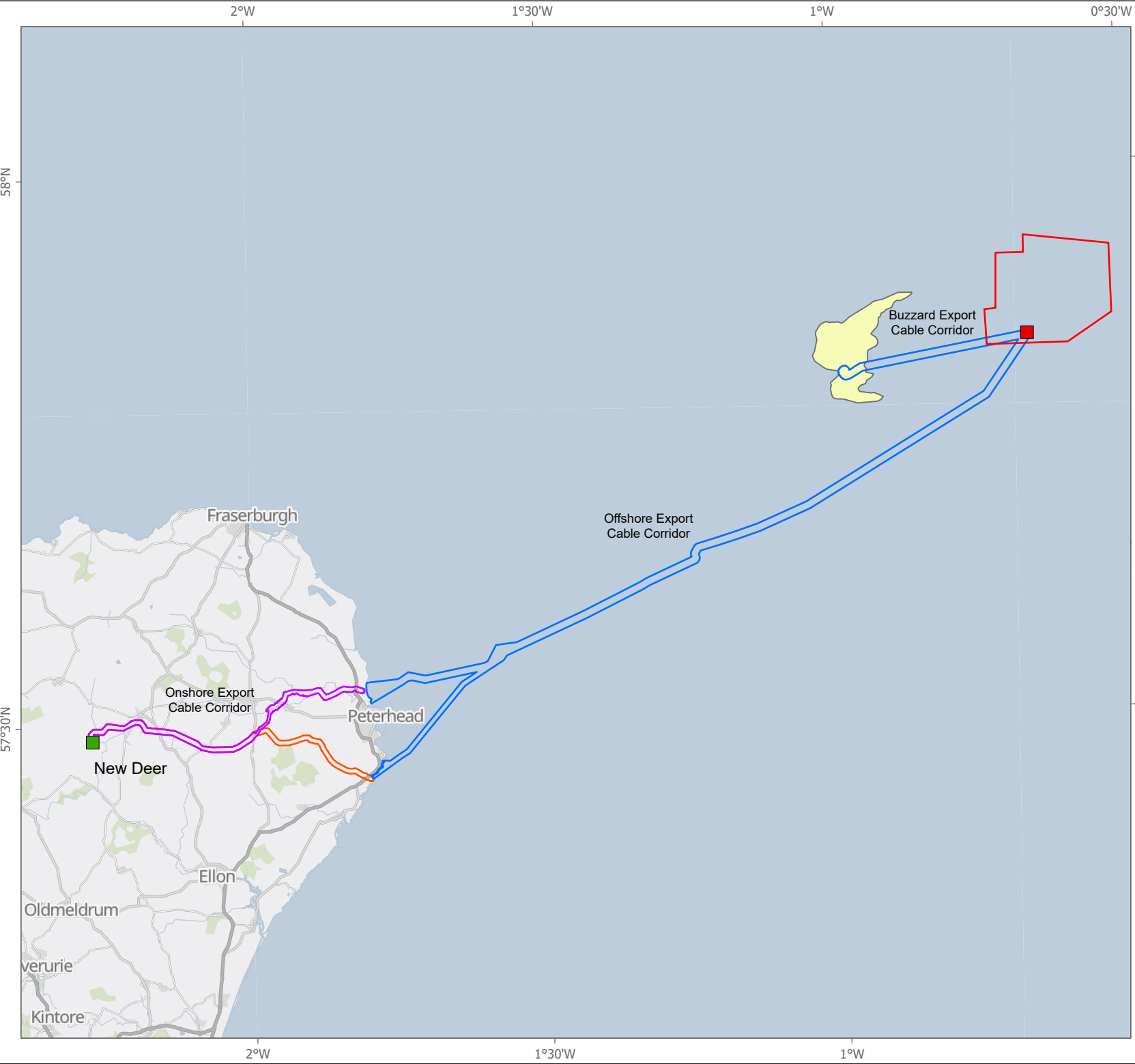
1. This document is the **Summary of the Offshore and Onshore Environmental Impact Assessments** for the Green Volt Offshore Windfarm (the Project). The offshore and onshore elements of the Project have been assessed in separate Environmental Impact Assessment (EIA) processes to enable independent EIA Reports to be submitted to the relevant regulator for each jurisdiction. This summary provides an overview of both EIAs so the environmental effects of the whole project, combining both offshore and onshore elements, can be understood.
2. The offshore application, including the **Offshore EIA Report**, will be submitted to Marine Scotland in January 2023, whereas the onshore application and **Onshore EIA Report** will be submitted to Aberdeenshire Council in early summer 2023. Consequently, the level of information available for each of the EIAs is different and this summary presents what is currently available.
3. Where a technical topic is required to be assessed for both offshore and onshore, such as socioeconomics, a separate chapter is provided in each the **Onshore and Offshore EIA Reports** for relevant infrastructure. This document has been prepared to enable consideration of the on and offshore elements of the Project as a whole. This document provides a summary of the **Offshore EIA Report** and the predicted summary of the onshore EIA. It will be submitted to the Scottish Ministers along with the offshore application documents and will be available on the Green Volt website<sup>1</sup>. The boundaries of potential offshore and onshore infrastructure are shown in **Figure 1**.
4. It is recognised that the onshore EIA assessment will be undertaken later than the submission of the **Offshore EIA Report**. Therefore, this document will be updated as required upon completion of the **Onshore EIA Report**.

## 1.1 Further Information

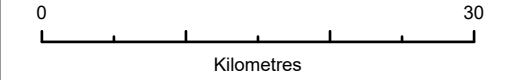
5. Further information on the proposed Green Volt Offshore Windfarm can be accessed on the Project website <https://greenvoltoffshorewind.com/>
6. The full **Offshore EIA Report** and its **Non-Technical Summary** are available now, and the full **Onshore EIA Report** will be available once it is completed.

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<sup>1</sup> <https://greenvoltoffshorewind.com/>



- LEGEND**
- Green Volt Offshore Wind Farm
  - Offshore Export Cable Corridor
  - Offshore Substation Platform
  - Buzzard Oil Field
  - Onshore Export Cable Corridor Northern Route
  - Onshore Export Cable Corridor Southern Route
  - Onshore Substation



Data:  
North Sea Transition Authority

Esri, HERE, Garmin, USGS  
Esri, HERE  
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Contains data from OS Zoomstack

PROJECT: **GREEN VOLT**

TITLE: **Figure 1 Green Volt Development Area**

REV	DATE	COMMENTS	DRAWN	CHECKED
001	17/01/2023		SK	JM

ARCGIS REF: FLO\_GRE\_GIS\_PRJ001\_Green\_Volt\_Rev001  
DRAWING: FLO-GRE-GIS-MAP021-Green Volt Location-Rev001

SCALE:	PAGE SIZE:	COORDINATE SYSTEM:
1:525,000	A4	WGS 1984 UTM Zone 30N



## 1.2 Purpose of the Project

7. The Project has been designed to provide renewable electricity to existing oil and gas facilities in the North Sea to decarbonise their operations. The provision of renewable electricity to existing oil and gas facilities is increasingly being proposed with the support of the UK Government and industry through the North Sea Transition Deal that was agreed in March 2021. This North Sea Transition Deal accompanies the Government commitment made in November 2020 for 40 GW of offshore wind by 2030 including 1 GW of floating wind (HM Government, 2020). A key commitment within this deal was a joint Government and oil and gas sector investment of up to £14-16 billion 2030 in new energy technologies to reduce carbon emissions by 50% against a 2018 baseline by 2030. This includes up to £3 billion to replace fossil-fuel based power supplies on oil and gas platforms with renewable energy, most notably offshore wind.
8. The Project will provide oil and gas platforms in the Outer Moray Firth with renewable electricity, harnessed from the proposed windfarm. Whilst Outer Moray Firth platforms will have the potential to use Green Volt's electricity, a key target for the Project is the decarbonisation of the Buzzard oil and gas Platform Complex (Buzzard). Buzzard is a large, relatively new facility with high power demand. Focusing the initial design around the decarbonisation of Buzzard provides an exciting opportunity to maximise potential emission savings, whilst offering a nearby connection point for other oil and gas installations looking to decarbonise their onboard power generation.
9. With an operational target date of 2027, the Project enables 500,000 tonnes of CO<sub>2</sub> per year to be mitigated, including at least 300,000 tonnes of CO<sub>2</sub> from oil and gas assets in the area. Any surplus power produced could be transmitted onshore to the National Grid.

## 2 Project Description

10. The Project is a proposed floating offshore windfarm located 80 km east of the Aberdeenshire coast in the North Sea, with an indicative generating capacity of 490 to 560 megawatts (MW). The location of the Project is shown in **Figure 1**.
11. The Project will comprise of the floating offshore wind structures (wind turbines, floating substructures, anchor chains, anchors), as well as the offshore transmission infrastructure (offshore substation platform (OSP), inter-array cables, offshore export cables). The Project will be located within a marine brownfield site at the Ettrick and Blackbird oil and gas fields, historically used by the oil and gas industry where decommissioning is currently being finalised. A full description of the offshore Project components is provided in **Chapter 5: Project Description of the Offshore EIA Report**.
12. To facilitate the connection of the Project to the National Grid, a new buried Offshore Export Cable Corridor will be required to connect the Project from the landfall location near Peterhead to a new substation at New Deer, Aberdeenshire, approximately 25 km west.
13. The landfall location for the Landfall Export Cable Corridor has not yet been determined; however, two principal areas are currently under consideration: St Fergus South Landfall option located north of Peterhead, and NorthConnect Parallel Landfall option located south of Peterhead. For either location, Horizontal Directional Drilling (HDD) will be used to take the offshore export cables from the jointing pit onshore to a location approximately 750 m onshore to the transition pit. Further details of the proposed onshore works are provided in the Onshore Scoping Report (Green Cat Renewables Ltd. 2022), submitted to Aberdeenshire Council 23/12/2022.
14. The Project is defined as the onshore and offshore elements combined, i.e. the Windfarm Site, the Buzzard Offshore Export Route, the Landfall Export Cable Route, the HDD at landfall, the Onshore Export Cable Route and associated temporary and permanent infrastructure and the Onshore Substation.

### 2.1 Offshore Elements

15. The offshore works relate to infrastructure and activities below mean high water springs (MHWS).
16. The Windfarm Site covers an area of 116 km<sup>2</sup> and will comprise up to 35 wind turbine generators (WTGs) on floating substructures, inter-array cables and any required cable protection. The Project will have one OSP with fixed foundations, which will be located in the Windfarm Site.
17. The Project will have two Offshore Export Cables – the first to electrify Buzzard (approximately 20 km away – the Buzzard Export Cable Corridor), and the second to bring excess electricity to shore where the Project will be connected to the National Grid (Landfall Export Cable Corridor).
18. Two locations (with a total of four landing point options) are under consideration for the landfall for the Landfall Export Cable Corridor; St Fergus South located north of Peterhead, and NorthConnect Parallel located south of Peterhead.
19. The key offshore components comprise:
  - WTGs;
  - substructures and foundations;
  - mooring and anchoring;

- one OSP;
- inter-array cables;
- up to two export cables to Buzzard; and
- up to two export cables to landfall

## 2.2 Onshore Elements

20. The Onshore works relate to activities above Mean Low Water Springs (MLWS).
21. The onshore elements of the Project consists of the installation of electrical cables and a new substation as well as a small number of temporary work elements required as part of the process, including the following:
  - HDD compound;
  - Joint bays (underground);
  - Electrical cables installed in a single trench;
  - Temporary working area alongside trench;
  - Temporary storage and welfare compounds that move along the cable route;
  - Temporary compounds associated with HDD where required along the cable route; and
  - A new substation with temporary storage and welfare compound.
22. The proposed substation location will comprise of Gas Insulated Switchgear substation on a site approximately 250 m by 180 m. The temporary construction compound for the proposed substation will be approximately 150 m by 70 m.
23. The cable will comprise 3 single core 33,000-volt cross-linked polyethylene cables, copper earth strip (50 mm<sup>2</sup> or greater. The cables will be buried for the entire length of the route in a trench excavated to 1.5 m depth and approximately 3 m in width, except where they are ducted under watercourses or roads.
24. At the end of each cable section, a joint bay is required which allows each length of cable to be jointed to the next. The joint bay will be excavated 1.5 m deep max, 2 m x 2 m in area.
25. An area extending 10 m alongside the trench will be required as a temporary working area. On the opposite side a 4 m area for temporary storage of spoil materials prior to reinstatement will also be required.
26. During the installation phase of the Project there will be two temporary compounds housing a skip container (approx. 2 m x 3 m), a welfare unit (approx. 6 m x 3 m) and the cable drums (approx. 2 m in diameter and 1.5 m in width). There will be approximately 20 drums stored at any one time. It is not anticipated that hardstanding is required to provide a suitable and level working platform. Following completion of the onshore cable route the facilities will be removed and the areas returned to their original use.
27. Additional smaller temporary compounds will be required at the locations where HDD activities are proposed to take place along the cable route.

### 3 Summary of the Environmental Impact Assessments

28. Consent for the offshore and onshore elements of the Project are being obtained through separate planning and consenting routes. Independent EIA Reports to be submitted to the relevant regulator for each jurisdiction.
29. Green Volt Offshore Windfarm Ltd (the Applicant) is seeking consent for the offshore works from Scottish Ministers through the following:
  - A Section 36 consent under the Electricity Act 1989 to allow for the construction and operation of the offshore wind farm and transmission works;
  - A marine licence under the Marine and Coastal Access Act 2009 for the commencement of marine activities and offshore infrastructure associated with the Buzzard Export Cable Corridor extending beyond 12 nautical miles (nm) from the coast;
  - A marine licence under the Marine and Coastal Access Act 2009 for the commencement of marine activities and offshore infrastructure associated with the Landfall Export Cable Corridor extending beyond 12 nautical miles (nm) from the coast; and
  - A marine licence under the Marine (Scotland) Act 2010 for the section of Landfall Export Cable Corridor which is within 12 nm of the coast.
30. The Applicant is seeking consent for the Onshore works from Aberdeenshire Council through Regulation 17 of The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017).
31. This section details the summary of the **Offshore EIA Report** (January 2023) and the anticipated conclusions of the **Onshore EIA Report** (due for submission summer 2023).

#### 3.1.1 Offshore EIA

32. This section provides a summary of the **Offshore Environmental Impact Report (EIA) Report** and the potential offshore environmental impacts of the offshore elements of the Green Volt Offshore Windfarm as identified in **Chapters 7 – 19** of the **Offshore EIA Report**.
33. The significance of potential effects has been defined by considering receptor sensitivity together with the magnitude of a given impact. Embedded mitigation measures have been built into the design of the Project have been included for consideration in the impact assessment. The assessment considers potential effects during construction, operation and maintenance and decommissioning phases.
34. Each effect is graded on a scale from 'negligible' to 'major', either adverse or beneficial. For the purposes of the **Offshore EIA Report**, major and moderate adverse effects are deemed to be significant, and, as such, may require additional mitigation (above any embedded mitigation). Effects rated as minor or negligible adverse are not considered significant in EIA terms. Where there are variations to this approach, these are detailed within the relevant chapters of the **Offshore EIA Report**.

#### 3.1.2 Marine Geology, Oceanography and Physical Processes

35. This section describes the potential impacts on marine geology, oceanography and physical processes of the Project and provides an assessment of the potential effects arising from the construction, operation and maintenance and decommissioning phases. The geographical scope of the assessment principally includes the seabed within and adjacent to the Landfall Export Cable Corridor inshore of 12 nm and the two potential landfall options. In addition, three specific



matters pertaining to the Windfarm Site itself have been considered, including increase in suspended sediment concentration due to installation/removal of cables within the Windfarm Site; scour; and changes in the water column structure within the Windfarm Site and along the Offshore Export Cable Corridors.

36. A desk-based assessment of geological data, Project-specific bathymetric and seabed grab samplings surveys, and other publicly available environmental information acquired for other developments in the region was undertaken to characterise the geology and geomorphology of the seabed and metocean conditions. At the proposed landfall options, projections of future coastal change and sea-level rise were used alongside geological and topographic data to characterise the coastal environment, including geology, geomorphology, littoral sediment transport and coastal defences. The full baseline description of the Windfarm Site is given in **Appendix 1.2 of the Offshore EIA Report**.
37. As HDD will be used at the proposed landfalls, there will be no impact from construction, operation and maintenance or decommissioning on the geology and geomorphology of the seabed between the coastline and the HDD exit point. The HDD length will be between 1,000 and 1,300 m from the shoreline. Therefore, any impacts on the wave, tidal or sediment regimes will be negligible and no interruptions to littoral sediment transport along the shore are expected, meaning nearby designated geodiversity or conservation sites will not be affected.
38. Seabed morphology and sediments between the HDD exit point and 12 nm will be directly affected during cable installation. However, the effects will be short-lived, localised and recoverable over time, and the significance of effect is deemed negligible.
39. Part of the Offshore Export Cable Corridor passes through the Southern Trench Marine Protected Area (MPA) which contains areas of mud of high geodiversity value. Careful site selection ensured that these muds were avoided by the Offshore Export Cable Corridor so that the mud would not be affected by cable installation (see **Chapter 4: Site Selection and Assessment of Alternatives** in the **Offshore EIA Report**). An increase in suspended sediment concentration during cable installation may affect the Southern Trench MPA. However, the MPA is not sensitive to localised deposition of muddy sediments meaning the significance of effect is negligible.
40. The presence of cable protection measures across short sections of the Offshore Export Cable Corridor will have a permanent footprint on the seabed during the operation and maintenance phase until decommissioning. The impact of cable protection measures on wave, tidal and sediment regimes will be localised and of small magnitude, and in the highly dynamic nearshore environment, any change will be negligible in comparison to prevailing conditions. Given the low sensitivity and high recoverability of the seabed impacted, the overall significance of effect is negligible.
41. Within the Windfarm Site, the disturbance of seabed sediments through the catenary action of mooring lines is expected to be highly localised, small scale and only occur during large storm events. While this could occur throughout the operation and maintenance phase, the significance of effect is deemed to be negligible. As the WTGs will be located in water depths between 100 and 115 m, there is unlikely to be sufficient wave or tidal current velocities to cause significant scour around foundations of mooring anchors and the significance of effect is deemed to be negligible through the operation and maintenance phase.
42. Changes in water column stratification due to the presence of structures and alterations to near-surface wind speeds are not expected as the extent of infrastructure below the water line is small for each WTG. In addition, seasonal changes in stratification are driven by temperature, rather than metocean processes (including wind-generated waves). Therefore, there will be no effect on regional-scale patterns of seasonal stratification.

43. No cumulative or transboundary impacts in relation to marine geology, oceanography and physical processes between the Project and other activities, have been identified.

### 3.1.3 Marine Sediment and Water Quality

44. Current speeds and extreme tidal current surges for the Windfarm Site are not strong enough to mobilise recently deposited sediments (associated with oil and gas subsea infrastructure).
45. The Windfarm Site was historically used by the oil and gas industry. Any chemicals used and discharged by the oil and gas industry must be permitted by the regulator after completion of a chemical risk assessment and an environmental assessment to demonstrate that there will be no significant environmental effects. The Decommissioning Programme for Ettrick and Blackbird and site surveys record no drill cuttings piles or oil-based muds on site, with no significant environmental effects anticipated now or in the future.
46. Sediment grain size is important to inform assessment of the risk of contamination because finer grained materials (silts and clays) function as a sink for contaminants and therefore have a greater potential to retain contaminants than larger grained materials. The seabed in the Windfarm Site is sand and muddy sand and the Buzzard Export Cable Corridor is predominantly sand. The Landfall Export Cable Corridor predominantly consists of gravelly sand and slightly gravelly sand with gravel close to the shore.
47. A site-specific survey undertaken at the Windfarm Site, in addition to desk-based resources, showed that the levels of contaminants surveyed are typical of background levels of hydrocarbon inputs in areas of historic oil and gas exploration, such as the North Sea.
48. Potential impacts during construction are associated with an increase in suspended sediment concentrations due to installation of WTG substructures, inter-array cables, OSP foundations and the Landfall Export Cable Corridor; suspended solids concentrations due to works at the landfall; and the re-suspension of sediment-bound contaminants causing a deterioration in water quality in these locations. No effects were assessed as significant for the construction phase.
49. During operation and maintenance, there may be similar impacts associated with suspended sediment concentrations due to sweeping by catenary moorings suspending these surficial sediments and maintenance activities. The effects of these impacts were assessed to be not significant. An additional operational impact includes changes in water column stratification due to the presence of Windfarm structures and changes to surface wind speeds, however, due to the limited extent of infrastructure below the waterline and no measurable changes to wind-sea states (generated by near-surface wind speeds) there is no effects associated with this effect.
50. For decommissioning, the effect of increase in suspended sediments and deterioration of water quality was assessed to be not significant. No cumulative or transboundary impacts were identified.

### 3.1.4 Benthic Ecology

51. Benthic ecology relates to the habitats and their communities of animals and plants inhabiting the seafloor. Some benthic habitats and species are protected under national and international legislation.
52. Seabed surveys of benthic habitats and species were carried on the Ettrick and Blackbird sites between 2006 and 2012, providing historical data to show trends of how the benthic community has potentially changed over the years. Surveys commissioned for the **Offshore EIA Report** have been carried out on the Offshore Development Area in two separate surveys: in 2021 the



area beyond 12 nm from shore was surveyed (the area surrounding the Windfarm Site and part of the Offshore Export Cable Corridor); and in 2022 the Offshore Development Area within 12 nm of shore was surveyed (Offshore Export Cable Corridor). These surveys identified that the Offshore Development Area is composed of habitat types that are relatively common and widespread in this area of the North Sea. Some habitats and species of conservation importance (referred to as Priority Marine Features (PMFs)) were found in the Study Area. The 'Seapens and Burrowing Megafauna' habitat was identified in the Windfarm Site and is a component of the PMF 'burrowed mud', although this habitat is common and widespread in this area of the North Sea. Burrowed mud is a component of the Southern Trench MPA, but none of this habitat type was identified in the section of the MPA crossed by the Offshore Export Cable Corridor. Some small aggregations of ross worm *Sabellaria spinulosa* were identified, however these aggregations were not considered substantial enough to be considered reef forming (biogenic reefs are protected under Annex I of the Habitats Directive).

53. The assessment considered the value and sensitivity of the benthic communities and habitats present and considered how they may be affected by the range of activities occurring throughout the lifespan (construction, operation and maintenance and decommissioning). Effects mainly relate to activities which interact with the seabed (such as cable burial), causing direct loss of benthic habitat, and disturbance of the sediment which becomes suspended and redeposited, leading to burial and smothering of benthic species with low mobility. The assessment determined that given the short term and localised nature of impacts of from these activities, there would not be significant effects on benthic habitats and species.
54. Other impacts considered are the potential for contaminants in the sediment to be resuspended, the potential introduction of marine invasive non-native species, permanent loss of habitat and introduction of hard substrate (operation) and removal of hard substrate (decommissioning), the impacts on benthic communities from increased currents surrounding infrastructure on the seabed (scour) and electromagnetic fields (EMF) generated from cables. The assessment determined that none of these would have significant effects on benthic ecology. Potential cumulative impacts are also assessed as not significant.

### 3.1.5 Fish and Shellfish Ecology

55. Fish and shellfish are broad categories, comprising a diverse range of species with numerous life-strategies. Various types of fish and shellfish are found within the Offshore Development Area, including commercially important species such as Nephrops (Norway lobster), king scallop, brown crab and lobster haddock, herring and whiting; other species are of conservation importance, including Atlantic salmon, lampreys, European eel, herring and sandeel. Some species also play important ecological roles as key links in food webs, such as sandeels which are an important prey resource for seabirds and marine mammals.
56. Species with low mobility and close association with the seabed are potentially vulnerable to localised effects associated with the Project such as physical disturbance and habitat loss; increased suspended sediments and sediment re-deposition; and re-mobilisation of contaminated sediments and sediment redistribution. Of particular sensitivity in this regard are shellfish that live on, or in, the seabed. Given the temporally and spatially limited extent of these impacts during construction, operation and decommissioning, and also taking into account the distribution of shellfish populations across the wider region, these potential effects are assessed to be not significant.

57. Effects on the spawning grounds of sandeel and herring, which spawn in close association with the seabed (and are therefore more sensitive to disturbance and smothering) were assessed as not significant. This is due to the limited spatial extent of impacts associated with the Project, the fact that construction activities will only occur for a limited time in any one location, and the wide extent of spawning grounds beyond the range of impact.
58. Fish and shellfish are also potentially sensitive to EMF and noise. Worst case noise levels have been modelled for Project activities during construction, operation and maintenance, and decommissioning. As the Project is a floating wind farm, piling is only under consideration to be used for the offshore substation installation, and underwater noise generated during construction is therefore greatly reduced compared to a conventional fixed-foundation wind farm. Based on modelling of underwater noise, effects will not be significant for any species.
59. EMF around Offshore Export Cables during operation has the potential to cause behavioural impacts on electrosensitive species. Some sharks and rays use electrical signals for prey detection, whilst some migratory fish, such as Atlantic salmon, may use field to aid navigation during migrations and may have some electrosensitivity. These groups are therefore considered to be of higher sensitivity to EMF. Modelling has been undertaken for the EMF around the Offshore Export Cables during operation, and taking into account the mitigating effect of burying cables, no significant effects of EMF are predicted.
60. The introduction of foundation structures and anchors, and the potential for this new hard substrate habitat to cause changes in biological communities within the Offshore Development Area has also been assessed. The effects are considered to be not significant due to the limited extent of hard substrate introduced.
61. Based on the findings described above, the potential for the Project to effect designated sites (via impacts to fish from those sites travelling through the Project) has also been assessed as not significant.
62. Given the limited duration and range of impacts found for the Project, no significant cumulative effects with the Salamander Floating Windfarm and Acorn Carbon Capture and Storage Site, both of which have construction periods that may overlap with the Project's construction. Similarly, no significant cumulative effects of the Project are assessed for operation and maintenance, or decommissioning.

### 3.1.6 Marine Mammal Ecology

63. Marine mammals include whales, dolphins, porpoises and seals. The most regularly occurring marine mammals in the vicinity of the Offshore Development Area include harbour porpoise, bottlenose dolphin, white-beaked dolphin, Atlantic white-sided dolphin, Risso's dolphin, minke whale, humpback whale, grey seal and harbour seal. All species of whale, dolphin and porpoise are protected under the Habitats Directive either individually or through the designation of Special Areas of Conservation (SACs).
64. Potential impacts on the Moray Firth SAC, which is designated for bottlenose dolphin, have been assessed as part of the Habitats Regulations Appraisal (HRA), the results of which are presented in the **Offshore Report to Inform Appropriate Assessment (RIAA)**. Minke whale is a primary interest feature associated with the Southern Trench MPA, which is assessed in the **Offshore EIA Report**.
65. One of the main potential impacts of the Project on marine mammals is underwater noise produced during construction from, for example, geophysical surveys, unexploded ordnance (UXO) clearance and piling of foundations of the OSP. Underwater noise sources during

operation are from operational wind turbines (noise transmitted down moorings), maintenance activities, such as repairs and replacement of cables, and vessels. Underwater noise can lead to both physical injury and disturbance.

66. Underwater noise modelling was carried out to determine the distance from the Offshore Development Area at which different marine mammal species could potentially be injured or disturbed by the different noise sources. These results were used to inform the assessment of effects of underwater noise on the nine key species of marine mammal present in the Study Area. The results from the underwater noise modelling and assessments concluded that, with appropriate and adequate mitigation for geophysical surveys, UXO clearance and for piling the risk of physical injury for all species is not significant.
67. Disturbance, including any barrier effects, during construction, operation and maintenance is assessed as not significant for all noise sources and all marine mammal species assessed. Any potential disturbance would be temporary and localised. Therefore, there would be no significant disturbance of marine mammal populations, including bottlenose dolphin from the Moray Firth SAC (see the **Offshore RIAA**) and minke whale associated with the Southern Trench MPA.
68. There is the perceived risk for entanglement in the mooring systems for floating WTGs. The mooring lines and cables have a large diameter and are sufficiently heavy which prevents them from looping and entangling marine mammals. Marine debris, such as fishing gear, may become snagged on mooring lines and cables, which could potentially lead to entanglement of marine mammals. To reduce this risk, monitoring will be conducted following a similar approach used at Kincardine Offshore Windfarm, which has not recorded any entanglement events to date.
69. The potential for increased collision risk with vessels during construction, operation and maintenance is assessed as not significant. All vessel operators will use good practice to reduce any risk of collisions with marine mammals, this includes following the Scottish Marine Wildlife Watching Code.
70. Other potential effects on marine mammals occurring during construction, operation and maintenance, including EMF, changes of prey resources and barrier effects from physical presence of the Project are assessed as not significant.
71. During decommissioning, the potential impacts are anticipated to be similar or less than the worst-case for the construction phase as no piling or UXO clearance will be required. All effects during decommissioning are also assessed as not significant.
72. The cumulative impact from underwater noise is assessed for piling and other construction activities at other offshore wind farms, plus geophysical surveys, oil and gas installation projects, seismic surveys, subsea pipeline installation and UXO clearance. The overall cumulative effect significance for disturbance to marine mammals from underwater noise including the Project, is not significant for all marine mammals, except for grey seal for which there is a potentially significant disturbance effect. However, the scenario used for the cumulative assessment is likely to be over-precautionary and a worst case estimate of the marine mammals that could be at risk of disturbance. The contribution of the Project to cumulative underwater noise is small and the impact significance for disturbance from cumulative noise is the same with and without the Project. The potential cumulative effects for barrier effects due to underwater noise or physical presence, increased collision risk with vessels, entanglement and any changes in prey resources are assessed as not significant.

73. All of the effects on marine mammals, taking into account proposed mitigation measures, for the Project alone and in-combination with other projects and activities, are assessed as not significant. There are no significant transboundary effects. Effects upon the minke whale population of Southern Trench MPA are not significant.
74. European Protected Species (EPS) licence applications will be made for all activities that have the potential for injury or disturbance on EPS (cetaceans).

### 3.1.7 Offshore and Intertidal Ornithology

75. To inform this assessment, site-specific aerial digital video surveys have been conducted for the Project over 24 months, the details of which are presented in **Appendix 12.1: Offshore and Intertidal Ornithology Baseline Technical Report**. A total of 21 species were recorded across the site-specific baseline surveys, with guillemot, fulmar, kittiwake and gannet the most frequently encountered species. These four species accounted for 93.2% of all birds recorded.
76. To determine intertidal ornithology associated with the landfall for the Offshore Export Cables, surveys of breeding seabirds utilising the cliffs and vantage point surveys of birds utilising waters up to 500 m from shore at the NorthConnect Parallel Landfall site have been conducted for the Project.
77. The St Fergus South Landfall Export Cable Corridor Option is located away from all known breeding locations and as HDD is proposed for the method of installation no impact is considered for the intertidal zone and subsequent impacts on winter breeding birds.
78. Potential impacts on a number of Special Protection Areas (SPAs) were considered as part of the HRA, the results of which are presented in the **Offshore RIAA**.
79. The construction, operation and decommissioning phases of the Project may cause a range of impacts on offshore ornithological receptors. The magnitude of these impacts has been assessed individually using expert judgement, drawing from a wide science base that includes project-specific surveys and previously acquired knowledge of the bird ecology of the North Sea.
80. Disturbance and subsequent potential displacement of offshore ornithology receptors at the Windfarm Site and Offshore Export Cable Corridors during the construction phase is primarily centred around where construction vessels and anchoring and cable connection activities are planned to occur (Windfarm Site) and the physical presence of the installation vessels (Offshore Export Cable Corridors). The activities may displace individuals that would normally occur within and around the area of sea where the Project is proposed to be developed. This potentially reduces the area available to those seabirds to forage, loaf and/ or moult.
81. Disturbance and subsequent potential displacement, including any barrier effects, of offshore ornithology receptors at the Windfarm Site and Offshore Export Cable Corridors during the operation and maintenance phase primarily considers the physical presence of the WTGs and associated Project vessels.
82. The indirect impacts via changes in prey or habitat availability during all phases of the Project largely concerns benthic disturbance and the increase in suspended sediments from Project activities (e.g. cable burial, movement of moorings on the seabed, removal of moorings etc). These mechanisms could potentially result in reduced prey availability in areas adjacent to active construction sites to seabird foraging areas. Any form of indirect impact (including reductions in prey and habitat availability) may cause reduced survival or reproductive fitness of the species deemed at risk.

83. Diving birds have the potential to become entangled in the mooring lines during the operation of the wind farm. There is also a risk to birds through collision with WTGs. Both impacts have the risk of resulting in injury or fatality to affected birds.
84. Collision risk modelling has been carried out for the Project, with detailed methods and results presented in **Appendix 12.3: Offshore Ornithology Collision Risk** of the **Offshore EIA Report**, to provide information for seabird species as potentially at risk from collision with WTGs.
85. There is the potential that aviation and navigation lighting on WTGs could affect the behaviour of birds moving through the Project at night.
86. All of the effects on offshore ornithology receptors, taking into account proposed mitigation measures, for the Project alone and cumulatively with other projects and activities, are assessed as not significant for construction, operation and maintenance or decommissioning. There are no significant transboundary effects. Effects upon the populations of birds within potentially affected SPAs are assessed as not significant.

### 3.1.8 Commercial Fisheries

87. A number of different types of fisheries are active in the Offshore Development Area. In the Windfarm Site and surrounding areas, a Nephrops fishery is active in a small area of the southeastern boundary of the Windfarm Site, and a herring and demersal whitefish fishery is active in areas around the Windfarm Site. In the Offshore Export Cable Corridor and surrounding areas, a lobster and crab creel fishery is concentrated in inshore areas within 6 nm, while the scallop dredge fishery is active between 6 and 12 nm. Squid fishing is also undertaken in these areas at low levels and inshore mackerel fishery undertaken by jigs/handlines in the nearshore area. Fishing activity takes place only at low levels in the Windfarm Site.
88. There is potential for commercial fishermen to be affected by the Project in a number of ways, including:
  - Reduction in access to, or exclusion from established fishing grounds;
  - Displacement leading to fishing gear conflict and increased fishing pressure on adjacent grounds;
  - Physical presence of offshore wind farm infrastructure leading to fishing gear snagging;
  - Displacement or disruption of commercially important fish and shellfish resources;
  - Project activities (associated with construction, operation and maintenance or decommissioning activities) leading to additional steaming to alternative fishing grounds; and
  - Increased vessel traffic within fishing grounds leading to interference with fishing activity.
89. During construction, there may be temporary reduced access to fishing grounds or temporary exclusion from discrete areas. This could be in response to installation activities and the physical presence of constructed infrastructure. The reduction in access may also lead to the displacement of the fisheries into other areas.
90. Potential effects on all fisheries due to construction and installation activities were assessed as being not significant. Fishing activity in the Windfarm Site is low and construction activities will be short term and localised to areas where Safety Zones are implemented around construction vessels or infrastructure in both the Windfarm Site and along the Offshore Export Cable Corridor. For creel fisheries only, gear clearance may be required in certain areas, however, measures will be implemented to manage any potential impacts of construction activities on all commercial fisheries.



91. Once operational, the worst case scenario assumes that fishing vessels operating mobile gear (demersal fisheries such as Nephrops, squid and whitefish; pelagic herring fishery) will be excluded from fishing activity in the Windfarm Site but that fishing may continue at the fisher's discretion along the Offshore Export Cable Corridor. In the context of the range of available Nephrops grounds compared to the size of the Windfarm Site and the lower importance of other demersal fisheries, significance of effect is considered to be not significant for these fisheries. For the creel fishery and scallop dredge fisheries, any fishing restrictions will be limited to exclusions associated with maintenance works on the inshore sections of the Offshore Export Cable Corridor and therefore have negligible impact. The scallop dredge fishery will also be excluded from any areas where external cable protection is used, however, this constitutes only a minimal proportion of the total areas that are available to scallop dredgers.
92. All fisheries active in the vicinity of the Offshore Development Area have the potential to be impacted by gear snagging. However, a number of mitigation measures will be implemented to reduce potential impacts. Post-installation assessments will be undertaken to identify any areas where remedial protection is required, and results will be shared with the fishing industry.
93. Potential impacts of decommissioning are considered to have largely the same effect as reversal of the construction process and are therefore not significant. In the event that some cable infrastructure is left in-situ to avoid disturbing the seabed unnecessarily, impacts for the operational phase will apply for the Offshore Export Cables only.
94. No significant cumulative effects were identified for commercial fisheries receptors as a result of reduction in access to, or exclusion from established fishing grounds during the construction phase of the Salamander Floating Wind Farm, Moray West Wind Farm, NorthConnect HVDC Link and Eastern Green Link 2 transmission projects. This is a result of restrictions being temporary and localised in nature and considering the operational ranges of the relevant fisheries. During operation, negligible impact only was identified for the demersal whitefish and pelagic herring trawling fisheries.

### 3.1.9 Shipping and Navigation

95. The assessment of potential impacts from the Project on shipping and navigation users is based on a 10 nm buffer around the Windfarm Site and is informed by the Navigational Risk Assessment (NRA) (**Appendix 14.1 in the Offshore EIA Report**). It is noted that the NRA also includes detailed assessment of vessel traffic within a 2 nm buffer of the Offshore Export Cable Corridor.
96. The most prominent navigational features in the Study Area are associated with oil and gas. The Ettrick and Blackbird oil and gas field is situated within the Windfarm Site, noting that production ceased in June 2016. Fields in the Study Area currently in production include Buzzard, which is approximately 14 km to the southwest of the Windfarm Site, and Golden Eagle approximately 11 km to the northwest. The nearest operational offshore wind farm is Hywind Scotland Pilot Park, located 52 km to the southwest of the Windfarm Site. There are 11 wrecks or obstructions located within the Study Area, noting none of these are located within the Windfarm Site itself.
97. The site-specific survey took place over two periods; summer (August, 2021) and winter (January, 2022). The main vessel types recorded within the Study Area were oil and gas, fishing, and cargo vessels. The main commercial routes in the vicinity of the Offshore Development Area were associated with oil and gas platforms and cargo. Fishing vessels were less prevalent during the winter period. In addition, consultation input indicated that recreational transits were likely to occur in the area from vessels sailing between the UK and Scandinavian ports.
98. Impacts assessed for the construction phase include vessel displacement, vessel to vessel collision risk, vessel to structure collision risk, reduced access to local ports and reduction in

emergency response capability. It is considered likely that commercial vessels will deviate to avoid the Windfarm Site during construction noting that there will be no restrictions on entry other than through any active Safety Zones. None of the deviations would require large changes in routing patterns, and due to the number of vessels affected it is perceived to be unlikely that there will be an increase in vessel encounters or collision risk. Port access is unlikely to be reduced as the Offshore Export Cable Corridor is located in excess of 2 km from the port entrance. The increase in frequency of occurrence in relation to emergency response capability is extremely unlikely. Therefore, all impacts are assessed as broadly acceptable, with the exception of vessel to structure collision risk. While the frequency of occurrence is extremely unlikely, the severity of consequence is very serious, and therefore risks are assessed to be tolerable with the incorporation of mitigation measures.

99. The risk for the above impacts is the same for the operation and maintenance phase. For the operation and maintenance phase, additional impacts of reduction of under keel clearance, anchor snagging and loss of station are also assessed. Risks are considered to be broadly acceptable with the incorporation of mitigation measures.
100. Decommissioning impacts are assessed as for construction. There is potential for cumulative impacts associated with vessel displacement, vessel to vessel collision risk, vessel to structure collision risk and reduction of emergency response capability from the MarramWind and Acorn Carbon Capture Storage projects. Potential cumulative impacts were assessed as broadly acceptable for all impacts except vessel to structure collision, which is tolerable with mitigation.

### 3.1.10 Aviation and Radar

101. The site lies 80 km off the Aberdeenshire coast, approximately 112 km northeast of Aberdeen Airport. It lies underneath uncontrolled airspace, remote from any danger areas or restricted areas. It does lie underneath military flight refuelling area 4, operating between 7,000 ft and 24,000 ft. It is also directly underneath two of the offshore helicopter main routes (HMRs), which radiate out from Aberdeen to service the oil and gas platforms.
102. The key receptors are military and civil radar and airspace used by helicopters servicing the oil and gas platforms:
  - A single military air defence radar (RAF Buchan) located approximately 4 km south of Peterhead;
  - Two civil en-route radars (Allanshill and Perwinnes Hill) located approximately 9 km southwest of Fraserburgh and 6 km north of Aberdeen respectively;
  - Aberdeen Airport; and
  - HMRs from Aberdeen.
103. The WTGs are the only source of potential impact. Wind turbines interfere with aviation radar because of the movement of the blades. Radars are complex pieces of equipment, designed and set-up with the specific aim of seeing aircraft but not displaying land, static objects or weather systems. For this reason, when a turbine's blades are not rotating, it does not generate radar impacts that are of concern. In addition, turbines could be a collision hazard for aircraft.
104. With the implementation of a number of mitigation measures to reduce or eliminate potential impacts to radars, the effect of the Project will be not significant. No cumulative impacts are expected from the closest other wind farm development (Hywind Scotland Pilot Park) due to its small size (five turbines) and distance (55 km to the southwest of the Project).

### 3.1.11 Marine Archaeology and Cultural Heritage

105. A characterisation of the existing environment for offshore archaeology and cultural heritage has been undertaken based on both existing and site-specific geophysical survey data. This has considered the potential for seabed prehistory sites, paleogeographic features and seabed features of archaeological interest, such as wrecks of either maritime or aviation origin.
106. There are no known seabed prehistory sites within the Study Area, however, once additional data has been acquired pre-construction, the archaeological assessment and interpretation of this will help to determine the presence or absence of any paleogeographic features, such as former river channels. These are of interest from an archaeological perspective because they may be associated with surviving terrestrial features and deposits corresponding to times when sea levels were lower, and the Offshore Development Area may have been inhabited. This will be further investigated through geotechnical surveys, such as the collection of sediment samples or 'cores', prior to the start of construction.
107. Seabed features are categorised according to their level of archaeological potential, from low to high. Features described as high archaeological potential include all those of anthropogenic origin or archaeological interest, of which one has been identified within the Windfarm Site, a wreck identified as the Ernst Friesecke, a German cargo vessel built in 1955. The approach to mitigation is to avoid these features via Archaeological Exclusion Zones and micro-siting of infrastructure to ensure that direct impacts will not occur. This will include further investigations prior to the start of construction, such as high-resolution geophysical survey and seabed imagery.
108. In order to account for unexpected archaeological finds such as wrecks or aircraft crash sites potentially concealed beneath the seabed and not seen by the geophysical surveys, a formal protocol for archaeological discoveries will be agreed with regulators and implemented during construction. The approach to the implementation of mitigation measures will be agreed in consultation with Historic Environment Scotland in accordance with industry standards and guidance. An **Outline Written Scheme of Investigation** is provided in **Appendix 15.2** of the **Offshore EIA Report**, setting out the methodology for all proposed mitigation.
109. With the application of recommended measures, significant effects to offshore archaeology and cultural heritage from the Project (including cumulative and transboundary impacts) will not occur. There is the potential for beneficial effects through the contribution of data to academic and scientific objectives, and public outreach and engagement, both within the UK and wider European networks.

### 3.1.12 Infrastructure and Other Users

110. The infrastructure and other users assessment considered the potential impacts of the Project on other activities within the North Sea / Outer Moray Firth. These include: other offshore wind farm developments; Carbon Capture and Storage; oil and gas infrastructure; future exploration of other licenced oil and gas blocks in the North Sea; and marine disposal activities at Peterhead. There are eight electrical cable crossings and 11 gas pipeline crossings required during the installation of export and inter-array cables. There are no military Practice and Exercise Areas of relevance to the assessment.
111. The Project is being developed to support decarbonisation of the oil and gas industry by electrification of oil and gas platforms. The physical presence of the Project will not inhibit further oil and gas exploration as, prior to decommissioning of the Ettrick and Blackbird fields, these have been deemed uneconomic and unviable. The Windfarm Site is located wholly within a provisional Innovation and Targeted Oil and Gas (INTOG) decarbonisation Lease Area, identified by Marine Scotland as suitable for potential offshore wind development for the oil and gas



industry. Whilst Outer Moray Firth platforms will have the potential to use the Project's electricity, a key target for the project is the electrification of Buzzard. Buzzard is a large, relatively new facility with high power demand, and the closest oil and gas infrastructure to the Windfarm Site.

112. The Project has sought to avoid existing marine infrastructure and minimise crossings where required, and the Project's infrastructure can be actively microsituated to avoid obstacles on the seabed as necessary. The final offsets from historic oil and gas asset locations applied will be determined by collaboration with the oil and gas operator via a structured risk assessment approach. Industry standard safety zones will be applied for by the Project to ensure safe and effective construction, operation and maintenance of the Windfarm and marine users will be updated via appropriate communications, and a series of management plans will be developed to protect other marine users in line with best practice. Crossing agreements will be made with owners and operators of existing infrastructure and oil and gas licence blocks which are crossed by the offshore export cable routes where required. All cables will be installed and maintained in line with standard industry guidance and good practice. Measures will also be taken to minimise the risks of a turbine breaking free of mooring, including third party verification of moorings, alarms and tracking systems.
113. The main source of a potential impact on other human activities is where construction activities or operations of the Project restricts access to, or interferes with, the ongoing operation of the existing activities. Access restrictions are likely to be greatest during construction activities for oil and gas and other offshore wind farms, however this will be short term and temporary. Overall, with the implementation of the embedded mitigation, effects to infrastructure and other marine users are anticipated to be no more than minor adverse in significance.
114. The potential cumulative effects of the Project on infrastructure and other users have been assessed to be non-significant or able to be fully mitigated through consultation with the relevant parties for construction, operation and decommissioning phases. All other parties that interact with the same receptor will also need to demonstrate no impact (i.e., through avoidance) or agree mitigation with the operators. Therefore, no project will have a direct impact on another user, and by extension it is considered that there will be no pathways for cumulative impacts or effects.

### 3.1.13 Climate Change

115. A Greenhouse Gas (GHG) assessment was undertaken to predict the contribution of the offshore aspects of the Project to national and regional GHG emissions in Scotland and the UK, and its 'net effect' compared to the Project not going ahead and the equivalent power being generated using fossil fuels.
116. To assist with the determination of the significance of the Project's contribution to GHG emissions, consideration was given to the GHG intensity of the Project (the amount of energy generated over the Project lifetime in relation to its total GHG emissions), the GHG savings resulting from the Project (the net reduction in GHGs) and the GHG 'payback' period (the time it would take for electricity generated by fossil fuels to be displaced, including the use of energy generated by the Project to fully electrify Buzzard).
117. The total emissions of GHGs generated by the Project during construction, operation and decommissioning (by proxy) were quantified. The GHG intensity of the Project was determined to be 15.3 gCO<sub>2</sub>/kWh, which is in the mid-range of values derived from other offshore wind farm life cycle studies. Over the Project's lifetime, the GHG savings would be -38,649,717 tonnes CO<sub>2</sub> equivalent in comparison to the same amount of energy being produced by natural gas. Assuming that energy generated by natural gas would be displaced by the renewable energy

from the Project, the GHG 'payback' period of the Project would be 1.44 years from the Project becoming fully operational.

118. The Project's GHG emissions would contribute 0.01% of the UK's 6th Carbon Budget (2033-2037), which was not considered to be significant in the context of the Project's net benefit after 1.44 years of operation. The overall significance of the effect on GHG emissions and climate change was considered to be beneficial, as the Project will result in a reduction in atmospheric GHG concentrations compared to the without-project baseline and will contribute to Scotland's goal of achieving net zero emissions by 2045, and the UK by 2050.
119. A whole Project GHG assessment will be presented separately in the **Onshore EIA Report**. See **Section 4.1.10** for further information on the onshore GHG assessment.

### 3.1.14 Socioeconomics, Tourism and Recreation

120. The socioeconomic assessment considers the potential for the Project to generate direct, indirect and induced employment (at local, regional, national scales) and to promote investment and supply chains in the local, regional, and national levels. As the **Offshore EIA Report** considers the offshore components of the Project, so does the socioeconomic assessment consider the potential impacts of the offshore component. The onshore components will be included within the **Onshore EIA Report**, and are summarised in **Section 4.1.11**.
121. The strategy for procurement adopted by the Applicant aims to maximise local content, where possible. Supply chain events in Scotland will be held to enable local businesses to engage with the Project, and a supply chain contact form is available on the Project website to enable local suppliers to contact the Project. Construction work is likely to be undertaken at a port or harbour in a region of Scotland that has the appropriate facilities, capacity and staff resources. Installation will draw on existing oil and gas industry expertise in the Aberdeenshire region. It is therefore expected that opportunities for the creation of employment and supply chain engagement will be realised as a positive impact of the Project.
122. Full-time equivalent (FTE) employment directly generated by the Project is expected to be 113 per annum at the local level, and 703 at the regional level over the three-year construction period, resulting in a significant beneficial effect at the local level. A total of 13 full time equivalent jobs per annum generated in the local area during the operation phase, whilst beneficial, is not assessed as significant.
123. There will be no significant effect of increase in demand for local private services/goods, or interference with planned infrastructure improvements in the local area. Construction activities will occur predominantly in a region of Scotland with existing port capacity, facilities and staff resource to service the project, meaning there will be no impact on local accommodation availability. Floating turbine structures will be towed to site and anchored using tug/anchor handling vessels with their pre-existing crews. During operation and maintenance, a service operation vessel will be used for any required works, and workers will live aboard the vessel for periods of up to two-weeks, once again meaning that no significant effect on accommodation or services will occur.
124. Significant cumulative beneficial effect may occur, if the construction periods of Salamander Floating Windfarm and Acorn Carbon Capture and Storage Site overlap with the Project and coordination between these projects allows for the maximal employment resource and supply chain engagement to be achieved across the region (rather than stretching a limited supply of workers and suppliers across all projects). The Applicant aims to engage with these projects in due course to promote this outcome.

125. There are a number of coastal recreational users within the Study Area, including surfing, yachting, scuba diving, sea angling, cliff climbing, golfing, stand-up paddleboarding, swimming, windsurfing, kayaking, and snorkelling. The nature of these activities means that the vast majority are constrained to within the coastal 12 nm zone.
126. There is no pathway for effects from the Windfarm Site located 80 km from shore to these inshore recreational activities.
127. The greatest scope for impacts therefore comes from cable-laying and landfall activities in the inshore area during construction. Effects caused by cable laying have been assessed as not significant, due to the limited area affected and their temporary duration. Regardless of the final landfall location chosen, landfall activities will not have a significant effect as HDD will be used to bring cables ashore, thereby minimising impacts to coastal users.
128. Given the highly localised and temporary impacts of the Offshore Export Cable Corridor and landfalls on coastal tourism and recreational users, the potential for additional cumulative effects with other projects is limited and not significant.

### 3.1.15 Offshore EIA Outcome

129. The outcome of the EIA, which is based on a realistic worst case scenario, shows that construction, operation and maintenance and decommissioning of the offshore elements on the Project (below MHWS) is anticipated to result in mostly non-significant effects.
130. The **Offshore EIA Report** only identified one significant adverse effect:
  - A moderate adverse effect on grey seal due to cumulative disturbance from underwater noise during piling and construction for the Project. This is deemed to be a precautionary and conservative assessment, based on the worst case scenarios for all potential offshore wind farms that could be piling or constructing at the same time as the Project. While there is a moderate effect significance for grey seal, the Project is contributing a relatively small amount to the overall cumulative underwater noise disturbance. For grey seal, the effect significance is moderate adverse with and without underwater noise during piling and construction at the Project. Therefore, no additional mitigation measures are proposed for the Project.
131. The **Offshore EIA Report** also identified significant beneficial effects for:
  - Socioeconomics, tourism and recreation, where major and moderate beneficial effects were identified for direct employment and supply chain impacts during the construction phase; and
  - Climate, with respect to a major beneficial impact to GHG emissions during construction, operation and decommissioning, in comparison to the without-project baseline and net zero aspirations.

## 4 Onshore EIA

132. The EIA process for the onshore elements of the Project is not yet complete at the time of writing (January 2023) so this section is based on the currently available information from the **Green Volt Offshore Windfarm Onshore Infrastructure EIA Scoping Report**. The **Onshore Scoping Report** was originally submitted to Aberdeenshire Council in February 2022 and a **Onshore Scoping Opinion** received in May 2022. However, an updated **Onshore Scoping Report** was submitted to Aberdeenshire Council in December 2022 following refinement of the landfall options, substation location and potential onshore cable route.
133. Presented below are the details of the environmental topics that will be considered in the **Onshore EIA Report** and a full assessment of the environmental topics outlined below will be undertaken. These will be amended if required, following the receipt of the **Onshore Scoping Opinion** from Aberdeenshire Council.

### 4.1.1 Landscape and Visual Impact

134. Seascape impacts have been scoped out due to the distance the WTGs will be located from shore (80 km).
135. The onshore elements may give rise to some significant effects particularly in terms of direct impacts on the landscape character and, while indirect impact will be considerably less, there is potential that sections of the development such as the substation could cause indirect impacts on the landscape character.
136. There may also be significant effects on visual receptors from the substation particularly, including residents, road users, hill walkers and visitors to the area. As such, a detailed assessment will be undertaken through a Landscape and Visual Impact Assessment, which will include accompanying maps and visualisations including Zone of Theoretical Visibility.

### 4.1.2 Ecology

137. Adverse effects upon ecological features to be addressed within the **Onshore EIA Report** may arise from:
- Habitat loss, fragmentation, severance or change as a result of the delivery and installation of development infrastructure; and
  - Disturbance, inadvertent killing or injuring of protected or otherwise notable species or inadvertent damage to their breeding sites or resting places.
138. There will be no direct impacts upon any designated site for nature conservation. The potential for indirect impacts upon ecological features, including designated sites, as a result of the accidental spillage and/or mitigation of pollutants during the construction phase will be considered, however, potentially significant effects are considered to be highly unlikely on the basis of spatial separation and on the basis of best practice construction methods and pollution prevention controls. The requirement for new watercourse crossings and HDD, will also be minimised as part of the iterative design process and where required be of a sensitive design, to ensure the free passage of water vole, fish and other wildlife beneath. This will include avoidance of peatland and woodland designated within the Ancient Woodland Inventory as part of the iterative design process.
139. Mitigation measures to minimise adverse impacts upon ecological features include a Construction Environmental Management Plan (CEMP) (including all good practice construction measures, pollution prevention controls and monitoring to be implemented over the course of the development in line with current guidance) and an ecological clerk of works (ECOW), who's role

will include undertaking pre-construction ecological surveys. A detailed assessment will be undertaken through field survey, desk-based research and consultation.

#### 4.1.3 Ornithology

140. Adverse effects upon onshore ornithological features to be addressed within the **Onshore EIA Report** may arise from:

- Habitat loss, fragmentation, severance or change as a result of the delivery and installation of development infrastructure; and
- Disturbance, inadvertent killing or injuring of protected or otherwise notable species or inadvertent damage to their breeding sites or resting places.

141. The adoption of embedded mitigation measures to avoid or minimise adverse impacts upon ecological and ornithological features will be part of the iterative design process for the onshore infrastructure. Measures to avoid or otherwise minimise potentially adverse effects upon ornithological features during scheme design will include:

- **Land-take** - infrastructure will be designed to minimise the requirement for land-take, felling of woodland, the number of watercourse crossings or HDD;
- **Construction Environmental Management Plan** - A CEMP will be in place during the construction, operational and decommissioning phases of the development. The CEMP will include all good practice construction measures, pollution prevention controls and monitoring to be implemented over the course of the development in line with current guidance.
- **EcoW** - It would be expected that the ECoW would undertake pre-construction breeding surveys during the appropriate survey months prior to construction.

142. Should the programme of onshore construction works include activities (including vegetation removal) within the breeding bird season (March – August inclusive) breeding bird and targeted species surveys will be undertaken to minimise adverse impacts to birds.

#### 4.1.4 Cultural Heritage

143. Potential direct effects may occur within the 500 m corridor option and 50 m either side of this for each route, whilst indirect visual impacts on the setting and character of known cultural heritage sites will also be considered. The cable will be buried and any indirect impact will be temporary during construction.

144. Historic assets will be avoided wherever possible as part of the design process. The Proposed Development is unlikely to give rise to significant effects in terms of indirect impacts on the setting of features of cultural heritage during the construction and operational phase. While the current baseline suggests that direct impact during the construction phase can be avoided.

145. The assessment will be informed by archaeological walkovers, consultation and desk-based assessment, and the Zone of Theoretical Visibility maps will be used to highlight areas that the substations are theoretically visible from. Mitigation may include an Archaeological Watching brief during ground breaking works if required.

#### 4.1.5 Geology, Hydrology, Hydrogeology and Soils

146. The Study Area is predominantly agricultural, however some potentially sensitive receptors are present, including Class 1 peat, coastal cliffs, waterbodies, Private Water Supplies and potentially groundwater dependant terrestrial ecosystems. The potential impacts this development may have on the water environment of the Study Area and the surrounding area are likely to include:



- Disruption to the surface and subsurface runoff and watercourses;
- Increased flood risk to areas downstream;
- Sedimentation, erosion, and silt-laden runoff;
- Chemical pollution of watercourses or groundwater;
- Increase in run-off; and
- Drop in the water table.

147. The assessment will be informed through desk-based research, field survey and consultation. Given the presence of sensitive receptors, there is the potential for significant hydrological effects to occur during the construction, operation and decommissioning phases of the Project. Mitigation measures, where required, will be identified and based on best practice techniques appropriate to site conditions and may include:

- Avoidance of sensitive areas;
- Appropriate location of proposed onshore infrastructures;
- The implementation of general pollution prevention measures to protect the water quality of the surrounding waterbodies and groundwater; and
- Suitable surface water management and appropriate design of drainage features.

#### **4.1.6 Contaminated Land**

148. The proposed cable route may pass through areas of potentially contaminated land, such as former landfill sites. A Phase One Geo-environmental assessment in accordance with BS10175, which includes a desk study and site reconnaissance, will be undertaken. This will establish a Conceptual Site Model using the standard Source-Pathway-Receptor assessment.

149. An understanding of the former uses along the route and the processes involved will be key to establishing the likely nature of any contamination and the risks that such contamination may present. The information will be used to make recommendations with respect to the construction process and to determine what ground investigation (if any) is required.

#### **4.1.7 Noise**

150. Construction activities, including use of heavy machinery, have potential to be located within 100m of sensitive receptors. All such receptors would be included in the impact assessment. A larger receptor inclusion buffer of 200m is proposed for directional drilling operations.

151. The construction noise assessment would follow BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites'. Rating levels at sensitive receptors would be calculated using the example sound power data of relevant equipment provided by the code or other suitable data representative of specific equipment. The assessment would consider the different construction phases and suggest best practice processes that could be applied to further minimise any noise impacts.

152. The proposed substation near New Deer is expected to contain the only operational noise sources of potential significance. The impact assessment would follow BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'. Should mitigation be required to meet the NR20 criteria, this would be included to inform the acoustic performance specification of the proposed substation buildings.

153. Receptors located beyond the proposed buffers would be scoped out of the construction noise assessment.

#### 4.1.8 Air Quality

154. Potential impacts are limited to emissions of dust and particulate matter during the construction phase and increased traffic flows during construction. Impacts relevant to both human receptors and ecological receptors will be considered.
155. Given the proximity of residential properties, a qualitative construction dust assessment will be included in the **Onshore EIA Report**. The modest increase in vehicle movements during construction is not expected to have any impact on air quality, therefore it is proposed that an air quality impact assessment for construction traffic is not undertaken. Operational phase emissions will be minimal and limited to maintenance activities, therefore an operational assessment will not be included in the **Onshore EIA Report**.

#### 4.1.9 Infrastructure and Other Land Users

156. It is anticipated that there will be no significant effects on recreation; however, there will be temporary adverse effects on access to core paths during the construction phase due to temporary restrictions on the surrounding area. Given the linear nature of the Project, it is neither possible nor practical to avoid crossing all footpaths and walkways along the length of the route. Appropriate mitigation will be implemented at this time to limit disruption. The assessment on Core Paths and Public Right of Ways will be informed by consultation and desk-based assessment. Mitigation may include temporary fencing, signage and diversions as required.
157. A Traffic and Transport Assessment will identify the preferred routes for access along the route corridor and will consider the potential effects of traffic generated during construction and operation of the works, including identification of measures to minimise any disruption to the local and strategic road network. No significant adverse effects are anticipated from the movement of materials, plant and personnel. A range of mitigation measures are available that can further address potential impacts on the road network including commitment to good practice, and measures to prevent, reduce or offset adverse effects such as diversions, scheduling and travel plans, therefore Traffic and Transport will not be included in the **Onshore EIA Report**. Any new or temporary junctions formed on the public road network, e.g for haul roads, storage compounds etc must meet the Local Authority standards in terms of junction visibility. All such proposed accesses will be identified and forwarded to the Local Authority for approval.
158. An assessment will be undertaken focus on potential effects on land uses, agricultural activity and soils directly affected by the proposed onshore works. Potential impacts include direct loss of agricultural land or woodlands, indirect effects on soil quality, environmental effects or changes in use.
159. There will be a commitment to implementing accepted good practices during construction, operation and maintenance of the onshore works thereby ensuring that many potential effects on soils, agriculture and land use can be avoided or reduced. Generic mitigation and also site-specific measures will be identified including a soil protection strategy, land drainage management, avoidance of transmission if soil pests and diseases and maintenance of water supplies.
160. No significant adverse effects are anticipated from the Project on the type or quality of agricultural land. A range of mitigation measures are available that can further address potential impacts on scarce land resources. Following from Aberdeenshire Council's initial scoping opinion the impact to agricultural land will be fully considered in the **Onshore EIA Report**.

#### 4.1.10 Climate Change

161. The **Scoping Opinion (Appendix 1.1 of the Offshore EIA Report)** from Marine Scotland Licensing Operations Team on the **Offshore Scoping Report (Appendix 1.2 of the Offshore EIA Report)** requested a full Project GHG assessment to be undertaken, in line with Institute of Environmental Management and Assessment (IEMA) guidance “Environmental Impact Assessment Guide” “Assessing Greenhouse Gas Emissions And Evaluating Their Significance” (“IEMA GHG Guidance”), Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 and the requirement of the EIA Regulations to assess significant effects from the Project on climate. A GHG assessment has been undertaken for the offshore elements of the Project and is presented in the **Offshore EIA Report (3.1.13)**. As the full assessment for onshore works is not currently complete, the whole Project GHG assessment will be presented separately in the **Onshore EIA Report**.

#### 4.1.11 Socioeconomics

162. The **Onshore EIA Report** will include consideration of potential socioeconomic impacts associated with the construction, operation and decommissioning of the onshore works. This would include potential impacts on tourism and recreation receptors as required. Many impacts are likely to be assessed as positive impacts due to economy related benefits, however potential temporary adverse impacts through noise, visual and disruption to activities will also be considered, along with potential impacts to local accommodation. The Marine Scotland Marine Analytical Unit guidance<sup>2</sup> provided in the **Offshore Scoping Report (Appendix 1.2 of the Offshore EIA Report)** will be considered in the assessment.

#### 4.1.12 Onshore EIA Outcome

163. The outcome of the **Onshore EIA** will be presented in the **Onshore EIA Report** submitted to Aberdeenshire Council with the onshore application in early summer 2023.

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<sup>2</sup> Glasson J (2017a) “Socioeconomic impacts 2: Overview and economic impacts” in Therivel R and Wood G (eds.), *Methods of Environmental and Social Impact Assessment*, Abingdon: Routledge



## 5 Overall Environmental Effects

164. Taking the information currently available for the potential effects of both offshore and onshore elements of the Green Volt Offshore Windfarm, **Table 5.1** considers the interactions between the two elements and the overall environmental effects of the Project. **Table 5.1** indicates the highest level of significance for all stages of the Project; construction, operation and maintenance and decommissioning.
165. The receptors assessed for onshore and offshore are discrete and do not overlap. The only potential for interface between the onshore and offshore environments is at the landfall where the Landfall Offshore Export Cables come ashore, and because HDD will be used to transit the coastline there is a boundary between potential effects in the onshore and offshore environments.
166. Other potential onshore and offshore interfaces would include landscape and visual impact effects but due to the distance of the Windfarm Site from shore (80 km) offshore effects are scoped out of the EIAs.
167. Offshore socioeconomic effects would affect onshore receptors but potential onshore effects would occur to different receptor groups so there is no interaction, apart from positive impacts to the local and wider economy.

### 5.1 Conclusion

168. Taking an overview of both offshore and onshore EIAs, the environmental effects of the whole Project can be understood. It can be clearly seen that there are no likely significant effects from the combination of the offshore and onshore elements of the Project.

Table 5.1 Overview of Green Volt Offshore Windfarm Offshore and Onshore EIAs

Environmental Topic	Offshore Significance of Effect	Onshore Significance of Effect	Summary of Interaction	Overall Effect
Marine Geology Oceanography & Physical Processes	Negligible adverse	N/A	There would be no interaction between the offshore and onshore elements of the project	No likely significant adverse effect
Marine Sediment and Water Quality	Minor adverse	N/A	There would be no interaction between the offshore and onshore elements of the project	No likely significant adverse effect
Benthic Ecology	Minor adverse	N/A	There would be no interaction between the offshore and onshore elements of the project	No likely significant adverse effect
Fish and Shellfish Ecology	Minor adverse	N/A	There would be no interaction between the offshore and onshore elements of the project	No likely significant adverse effect
Marine Mammal Ecology	Minor adverse, for all potential impacts except cumulative disturbance from underwater noise during piling and construction of the Project for grey seal, which will be temporary moderate adverse	N/A	There would be no interaction between the offshore and onshore elements of the project	No likely significant adverse effect, from any potential impacts except cumulative disturbance from underwater noise during piling and construction of the Project for grey seal, which will be temporary moderate adverse
Offshore and Intertidal Ornithology	Minor adverse	N/A	There would be no interaction between the offshore and onshore elements of the project	No likely significant adverse effect
Commercial Fisheries	Minor adverse	N/A	There would be no interaction between the offshore and onshore elements of the project	No likely significant adverse effect
Shipping and Navigation	Tolerable with mitigation	N/A	There would be no interaction between the offshore and onshore elements of the project	No likely significant adverse effect
Offshore Archaeology and Cultural Heritage	Minor adverse	N/A	There would be no interaction between the offshore and onshore elements of the project	No likely significant adverse effect
Aviation and Radar	Not significant with mitigation	N/A	There would be no interaction between the offshore and onshore elements of the project	No likely significant adverse effect
Infrastructure and Other Marine Users	Minor adverse	N/A	There would be no interaction between the offshore and onshore elements of the project	No likely significant adverse effect

Environmental Topic	Offshore Significance of Effect	Onshore Significance of Effect	Summary of Interaction	Overall Effect
Climate Change	Beneficial	Considered in the onshore EIA	Over the offshore windfarm's lifetime, the GHG savings would be -38,649,717 tonnes CO <sub>2</sub> equivalent in comparison to the same amount of energy being produced by natural gas. A full Project GHG assessment will be considered in the Onshore EIA Report.	No likely significant adverse effect
Socioeconomics, Tourism and Recreation	Minor beneficial	Considered in the onshore EIA	Beneficial impacts on local and wider economy predominantly in a region of Scotland with existing capacity, facilities and staff resource to service the project, limiting the impact on local accommodation availability and demand for local private service/goods. Any onshore construction activities for the whole project are likely to be temporary and occur from noise, visual and disruption to activities. predominantly in a region of Scotland with existing capacity, facilities and staff resource to service the project, limiting the impact on local accommodation availability and demand for local private service/goods.	No likely significant adverse effect
Landscape and Visual Impact	N/A	Considered in the onshore EIA	There would be no interaction between the offshore and onshore elements of the project	No likely significant adverse effect
Ecology	N/A	Considered in the onshore EIA	There would be no interaction between the offshore and onshore elements of the project	No likely significant adverse effect
Ornithology	N/A	Considered in the onshore EIA	There would be no interaction between the offshore and onshore elements of the project	No likely significant adverse effect
Cultural Heritage	N/A	Considered in the onshore EIA	There would be no interaction between the offshore and onshore elements of the project	No likely significant adverse effect
Geology, Hydrology, Hydrogeology and Soils	N/A	Considered in the onshore EIA	There would be no interaction between the offshore and onshore elements of the project	No likely significant adverse effect
Contaminated Land	N/A	Considered in the onshore EIA	There would be no interaction between the offshore and onshore elements of the project	No likely significant adverse effect

Environmental Topic	Offshore Significance of Effect	Onshore Significance of Effect	Summary of Interaction	Overall Effect
Noise	N/A	Considered in the onshore EIA	There would be no interaction between the offshore and onshore elements of the project	No likely significant adverse effect
Air Quality	N/A	Considered in the onshore EIA	There would be no interaction between the offshore and onshore elements of the project	No likely significant adverse effect
Other Infrastructure and Land Users	N/A	Considered in the onshore EIA	There would be no interaction between the offshore and onshore elements of the project	No likely significant adverse effect

## 6 References

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