Contents

Abbreviations

BNG	British National Grid
CEMP	Construction Environmental Management Plan
CTMP	Construction Traffic Management Plan
ECoW	Ecology Clerk of Works
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
GHG	Green House Gasses
ha	Hectare
HIAL	Highlands and Islands Airports Ltd
HGV	Heavy Goods Vehicle
Km	Kilometre
Km^2	Square Kilometre
LCU	Landscape Character Unit
LGV	Large Goods Vehicle
m	Metre
MOD	Ministry of Defence
MW	Megawatt
NTS	Non-Technical Summary
OEMP	Operations Environmental Management Plan
OIC	Orkney Islands Council
RCCA	Regional Coastal Character Area
RSPB	Royal Society for the Protection of Birds
SEPA	Scottish Environmental Protection Agency
SNH	Scottish Natural Heritage
VOR	Very High Frequency (VHF) Omnidirectional Range
ZTV	Zone of Theoretical Visibility

1 Background

1.1 This document is a Non-Technical Summary of Orkney's Community Wind Project - Quanterness Environmental Impact Assessment (EIA) Report which supports the application by Orkney Islands Council (the Applicant) for the development of a wind farm (the Proposed Development) on The Mainland of Orkney.

Background and Needs Case Considerations

1.2 The Proposed Development is one of three under development by the Applicant under Orkney's Community Wind Farm Project. The aims of this project are threefold; to generate income to be used for the benefit of the people of Orkney, to aid towards a meaningful response to the Climate Emergency and the urgent need to further decarbonise, and to build the case for a new transmission connection for Orkney and unlocking wider benefits to the energy sector in Orkney.

1.3 In addressing these aims the scale of development is a critical issue.

1.4 In September 2019 the electricity market regulator Ofgem published its final decision on the needs case for a transmission connection linking Orkney to the Scottish Mainland. It determined that there is a need for a cable. To justify the required spending on a new cable, there is a requirement for Scottish Hydro Electric Transmission (SHE-T) to demonstrate that there will be sufficient generation capacity to connect to the new cable, once operational. Ofgem agreed that in order to trigger a new 220MW connection, 135MW of new generation is required to have obtained planning permission, signed up to a grid connection agreement, and passed a financial audit before the end of 2021. Currently less that 40MW of new wind has gained planning permission. Noting that there are a number of other private projects at different stages of development, it is clear that, without the Proposed Development and the other two wind farms within Orkney Community Wind Farm Project, the threshold will not be met, and a new interconnector will not be built.

1.5 In terms of delivering community benefit to the people of Orkney there are currently substantial challenges around funding service provision in the area which Orkney's Community Wind Farm Project may be able to address provided income from the Project is of the scale required.

1.6 In order to maximise the local benefit from the proposed 220MW cable, it is also considered desirable to ensure that as much of the generation as possible is taken into local or public ownership, thereby ensuring that profits stay within Orkney.

1.7 Developing all available sites with a realistic chance of contributing towards the Needs Case for a new cable to their realistic maximum capacity is viewed as the best way of ensuring that the aims outlined above are achieved.

Site Selection

1.8 In 2017 as part of feasibility work for a private wire network project looking to link together OIC owned buildings in Kirkwall with a direct supply renewable electricity, thereby reducing costs and carbon production, work was undertaken to identify potential locations for the required generation. OIC therefore sought to identify potentially suitable sites for wind energy generation within viable distance from Kirkwall. The search began with OIC owned sites but did not identify any which were considered suitable based on an initial review of technical and environmental constraints.

1.9 A search was undertaken of land within 10 km of Kirkwall and sites were tested against an initial range of technical and environmental parameters. This review included consideration of:

- Scottish Planning Policy (SPP) (Scottish Government, 2014);
- Orkney Islands Council's adopted planning policies and relevant supplementary guidance;

- international, national and local designated sites;
- transport facilities;
- operating airports;
- residential receptors; and

  other operational and consented but not built, wind farm developments or proposed wind farm developments where a planning application has been submitted but not determined.

1.10 The land at Quanterness (refer to Figure 1) was identified as a potentially suitable development site, and further work was undertaken to establish feasibility of development and the potential scale and capacity of potential wind energy generation at the site. Further details can be found in Chapter 2 of the EIA Report.

2 Purpose of the Proposed Development EIA Report

2.1 ITPEnergised (ITPE) was appointed by the Applicant to undertake an Environmental Impact Assessment (EIA) of the Proposed Development in accordance with The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 ('the EIA Regulations'). The EIA process is the systematic process of identifying, predicting and evaluating the environmental impacts of a proposed development.

2.2 The EIA process is reported in this EIA Report, which identifies the methodologies used to assess the environmental effects predicted to result from the construction and operation of the Proposed Development. Where appropriate, it also sets out mitigation measures designed to prevent, reduce and, if at all possible, offset potential significant adverse environmental impacts. An assessment of residual effects, those expected to remain following implementation of mitigation measures, is also presented.

3 Availability of the Proposed Development EIA Report

3.1 Copies of the Proposed Development EIA Report are available from:

Development and Infrastructure, Orkney Islands Council, Town House, Stromness, Orkney, KW16 3AA

or Sweyn.johnston@orkney.gov.uk

3.2 Electronic copies of the EIA Report can be accessed at https://www.orkney.gov.uk/Service-Directory/D/application_search_submission.htm

3.3 Hard copies of the Non-Technical Summary (NTS) are available free of charge from the Applicant, a hard copy of the EIA Report Volumes 1, 2, 3 and 4 are available for £1,250.00 (including printing and distribution). In addition, all documents are available (as a PDF for screen viewing only) on a DVD for £10.00.

3.4 Copies of the EIA Report will also be available for viewing during opening hours at the following locations:

Orkney Island Council	Orkney Library & Archive
Council Offices	44 Junction Road
School Place	Kirkwall, KW15 1AGl
Kirkwall, KW15 1NY	

4 Representations to the Application

4.1 Any representations to the application should be made directly to OIC at: planning@orkney.gov.uk

5 Site Location and Description

5.1 The Proposed Development site is located on the Mainland of Orkney, approximately 2.7 km north-west from the boundary of Kirkwall Town Centre (refer to Figure 1). The site is located on the peninsula of Quanterness, north of the A965 which abuts the southern boundary of the site.

5.2 The elevation of the site ranges from 0 m AOD in the north to 20 mAOD in the south. The site covers 172.27 ha and the central grid reference of 341560, 1013640.

5.3 The site comprises agricultural fields, mainly used for cattle grazing, with some crops. There are a no natural watercourses within the site boundary, but a number of drainage ditches follow the field boundaries. Although a number of waterbodies are shown within the site on Ordnance Survey mapping, these have been confirmed to be ephemeral, rain-water fed hollows. The Wide Firth is located to the north of the site.

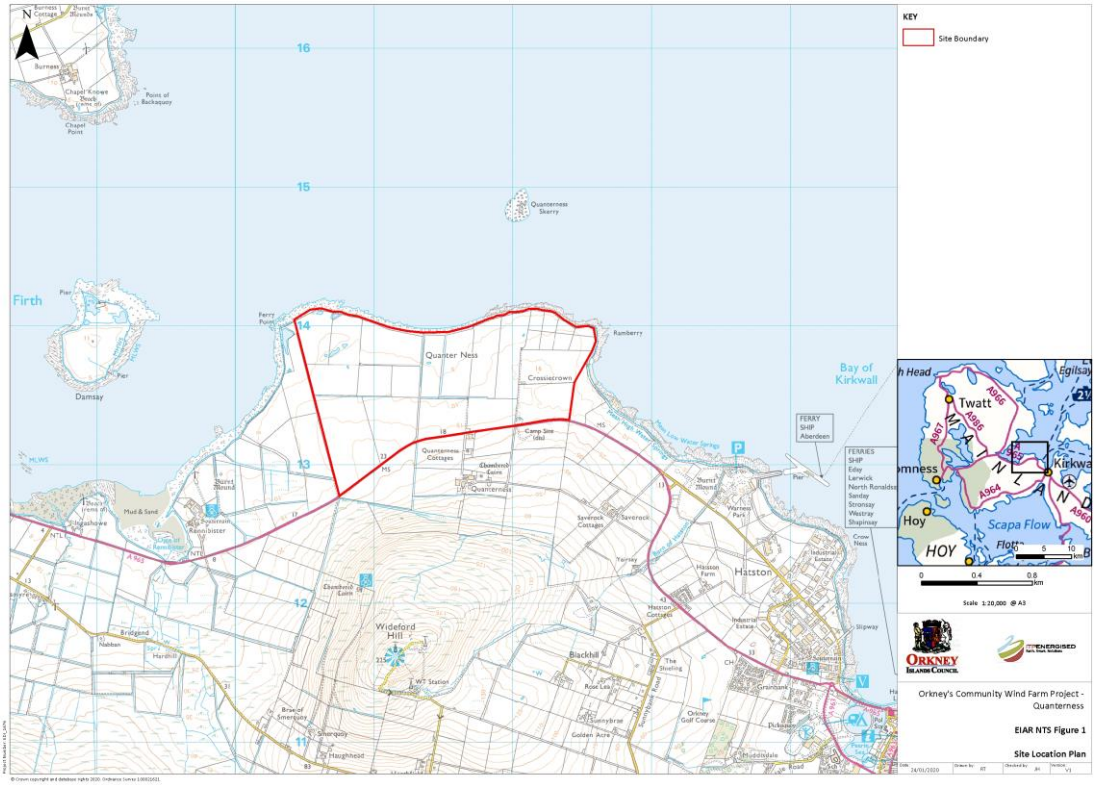

Figure 1. Site Location

6 Design Process

6.1 The design of the Proposed Development has undergone several iterations of turbine and access track layout. It has taken into consideration factors including comments received from consultees, environmental constraints, visual effects and landscape character. The following principles were adopted during the design iterations to ensure that the final design was the most suitable for the site:

- maximising wind yield and maintaining adequate spacing between turbines;
- ensure appropriate distance between the turbines and residential properties;
- avoid placing turbines below 5 m AOD;
- ensuring a minimum distance of 165 m between the turbines and A965;
- ensuring an appropriate separation distances between non-designated assets of regional importance and the Proposed Development infrastructure;
- consideration of key views, in particular from Cuween and Wideford Hill cairns;
- ensuring that the Proposed Development is compatible with other planned and consented wind farms on Orkney; and
- avoiding inconsistent turbine spacing, such as relatively large gaps, outliers or excessive overlapping turbines to minimise visual confusion and ensure a balance / compact array from key views.

6.2 The Proposed Development layout put forward in the EIA Report is considered to represent the most appropriate design while maximising the generating capability of the site. The process of design iteration is explained fully in Chapter 2 of the EIA Report.

7 Description of the Development

The Proposed Development

7.1 The Proposed Development comprises of six wind turbines of up to a maximum 149.9 m height from ground to blade tip when vertical. The target capacity of the Proposed Development will be approximately 28.8 MW. The actual installed capacity may be greater or less dependent on turbine model selection but will not be greater than 50 MW.

7.2 The proposed locations of the six turbines, together with their access tracks, substation and temporary construction compounds are shown on **Figure 2.** A micro-siting allowance of up to 50 m in all directions can be applied to each turbine and its associated infrastructure. The exception to this is turbine T5 which will not be micro-sited between 141° and 341° to prevent any impacts on the telecommunication links. Micro-siting allows for flexibility in locating the Proposed Development following detailed pre-construction surveys, which may identify unsuitable ground conditions or environmental constraints that could be avoided. No micro-siting will be undertaken that results in an increase in the significance of adverse effects. The final positioning will be addressed through an appropriately worded planning condition.

7.3 A number of ancillary elements are also proposed, including a temporary construction compound, permanent hardstandings adjacent to the wind turbines for maintenance cranes, temporary laydown areas adjacent to the wind turbines, internal access tracks (both new and upgrading of existing farm access tracks), underground cables between turbines, an on-site substation compound and a permanent meteorological monitoring mast. A full description of the Proposed Development can be found in Chapter 3 of the EIA Report.

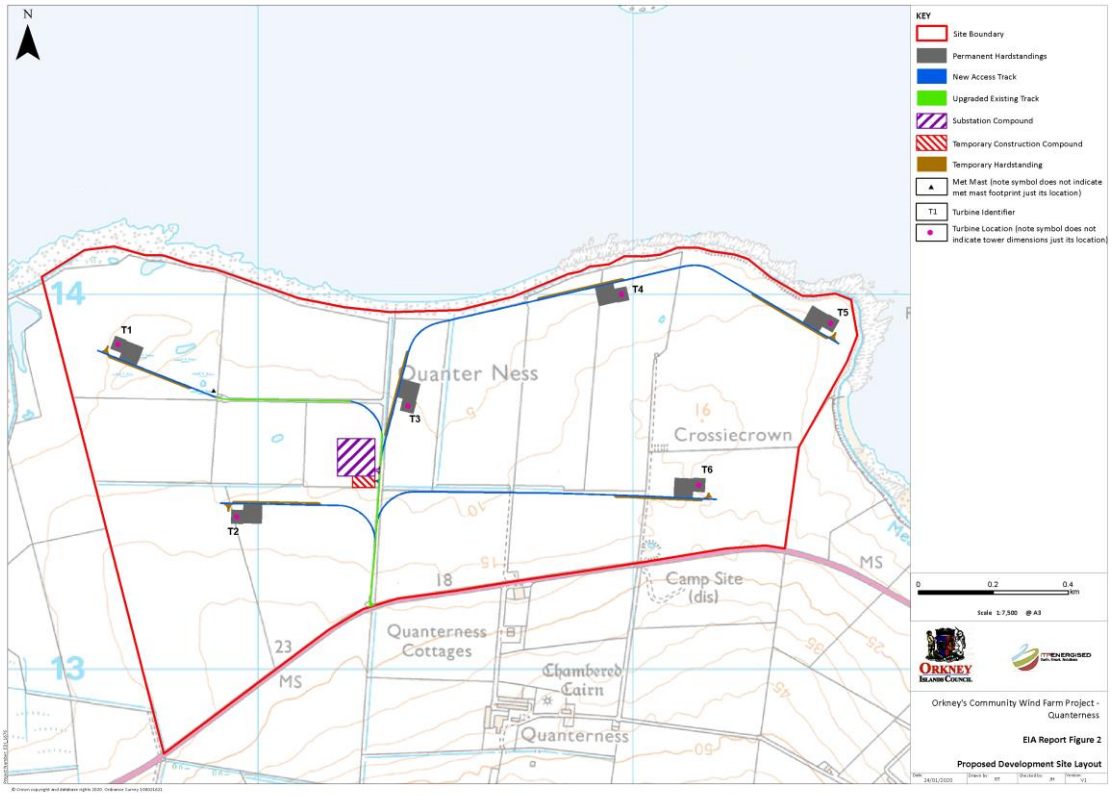

Figure 2 – Proposed Development Site Layout

Construction

7.4 The estimated onsite construction period for the Proposed Development is expected to take approximately 12 months and includes a programme to reinstate all temporary working areas. Normal construction hours will be between 07:30 to 18:00 weekdays and 08:00 to 13:00 Saturdays. There will be no working on Sundays or bank holidays. These times have been chosen to minimise disturbance to local residents and if required to be restricted this will be agreed with OIC by an appropriately worded condition.

7.5 The construction programme will consist of the following principal operations. The Proposed Development will be phased so that certain activities will take place concurrently:

- construction of the construction compound and establishment of a storage area for wind farm components and temporary site facilities;
- construction of access tracks, including construction of drainage, and excavation of cable trenches;
- construction of wind turbine foundations, crane pad hardstanding areas, met mast and substation;
- cable laying;
- erection of wind turbines;
- connection of on-site electrical power and signal cables;

- commissioning of the site equipment; and
- site reinstatement and restoration of temporary works areas.

7.6 The Applicant will ensure that all construction traffic will be routed as agreed with OIC to minimise disruption and disturbance to local residents (refer to Chapter 12 of EIA Report for further details).

7.7 Prior to commencement of construction activities, the mitigation measures to be implemented will be provided within a Construction Environmental Management Plan (CEMP) to OIC (refer to Appendix 3.2 of EIA Report for further details).

Operation and Maintenance

7.8 During operation, only site maintenance vehicles and local utility company vehicles will normally be required on the site. Up to two visits per week to the control building by maintenance personnel in four-wheel drive or conventional passenger vehicles will occur following the commissioning phase.

7.9 In the unlikely event that a major turbine component requires replacement, vehicles delivering the components will use the new access tracks and crane pads, utilising the same route as delivery of components during construction.

7.10 The Applicant will implement an Operation Environmental Management Plan (OEMP). Similar to CEMP the OEMP will set out how the Applicant will manage and monitor environmental effects throughout operation. The OEMP will be developed in consultation with SNH, SEPA and OIC.

Decommissioning

7.11 The Applicant is seeking in-perpetuity consent for the Proposed Development. In the event of decommissioning, or replacement of turbines, it is anticipated that the levels of effect would be similar but of a lesser level than those during construction. Decommissioning would be undertaken in line with best practice processes and methods at that time and will be managed through an agreed Decommissioning Environmental Management Plan.

8 Consultation

8.1 Consultation remains a critical component of the EIA process. In order to inform the EIA, there has been on-going consultation with statutory consultees, engagement through the formal EIA Scoping process and subsequent discussions, correspondence and meetings as required. Full details of these are provided within each technical chapter of the EIA Report.

Public/Community Consultation

8.2 The Applicant has consulted widely with the general public/local community on the Proposed Development, including holding community consultation events and presentations at community council meetings. Full details of all the public consultation that has been undertaken can be found within the Pre-Application Consultation Report.

9 Environmental Impact Assessment (EIA)

9.1 The EIA considers the effects of the Proposed Development during construction, operation and decommissioning on the following topics:

- landscape and visual (effects to the character of the landscape and views from agreed locations);
- ornithology (the effects to birds and protected bird habitats);
- ecology (the effects to protected habitats, flora and fauna, excluding birds);

- noise and vibration (effects to local properties from noise and vibration caused by the Proposed Development);
- cultural heritage (direct effects and indirect effects and direct setting of historic assets);
- hydrology, hydrogeology and geology (the effects to surface water, ground water, rocks and soils);
- traffic and transport (effects from traffic travelling to, and from, the Proposed Development);
- socio-economics, tourism and recreation (effects to the local and national economy, local tourism businesses, recreation facilities, and the change in use of the land at the site of the Proposed Development);
- aviation and radar (effects to civil and military aviation facilities and air space);
- shadow flicker (effects caused by the passing of the turbine blades in front of the sun); and
- other issues (effects to telecommunications facilities and marine radar and calculation of carbon balance).

9.2 Chapter 4 of the EIA Report describes the EIA process in more detail.

9.3 For each topic, the existing conditions (the baseline) were identified, the effects of the Proposed Development on these conditions assessed (the likely effects) and the standard best practice mitigation for those receptors identified. Potential effects are assessed to determine which are significant and on what scale. Mitigation measures have then been proposed to minimise or avoid adverse effects where required. Following this an assessment was undertaken of the effects of the Proposed Development on the existing conditions taking into consideration the proposed mitigations (the residual effects) to identify significant and non-significant effects. An assessment of the cumulative effects of Proposed Development in combination with other existing and proposed developments in the local area, primarily wind farms, was also undertaken.

9.4 A summary of the baseline conditions, the proposed mitigation and the resulting residual effects for each topic is provided below. Full details of the EIA for each of the topics are provided in Chapters 6 to 16 of the EIA Report.

Landscape and Visual

9.5 The full assessment of landscape and visual receptors is found in Chapter 6 of the EIA Report. The assessment of landscape and visual effects has been carried out to identify the significant effects that are likely to arise as a result of the Proposed Development. It has considered the effects on landscape and visual receptors, as well as the cumulative effect of the Proposed Development in addition to other wind farm developments.

9.6 The effects of the Proposed Development are assessed as being relatively localised. The Zone of Theoretical Visibility models (ZTVs) illustrate an especially contained pattern in which visibility is largely concentrated within the viewshed of the Wide Firth, which extends a minimum of 2 km and a maximum of 8 km from the Proposed Development. As a direct result of this largely contained pattern of visibility, the landscape and visual receptors assessed are all located within a 15 km radius of the Proposed Development. This has been identified as the zone within which there is likelihood that significant effects may arise.

9.7 In respect of the physical effects on landscape elements, the assessment found that the direct effect on the agricultural land as a result of the construction of the Proposed Development will not be significant.

9.8 In respect of effects on landscape character, the assessment found there will be significant effects within a 5 to 6 km radius of the Proposed Development, with 13 Landscape Character Units (LCUs) either wholly or partially significantly affected. These LCUs are either close to the site or located around the Wide Firth from where a strong visual association with the site arises. There will be no-significant effects beyond this radius. In terms of coastal character, the Proposed Development will give rise to significant effects on the Wide Firth Regional Coastal Character Area (RCCA), largely owing to the strong association between the site and the surrounding coastal landscapes, and a very localised significant effects from the more sensitive parts of the Kirkwall RCCA and Shapinsay RCCA. No other RCCAs will be significantly affected.

9.9 In respect of landscape designations, the assessment found that there will be no significant effects on national and regional landscape designations within the study area. While the overall effect on Balfour Castle GDL was found to be not significant, a localised significant effect associated with the more exposed southern terraces was identified.

9.10 In respect of effects on visual amenity, the assessment found that 12 of the 13 viewpoints assessed will be significantly affected during the construction and operational phases of the Proposed Development, including the summit of Wideford Hill (refer to Figure 3). These viewpoints are all located within an approximate 6 km radius of the Proposed Development. The viewpoints will mostly be affected owing to either their close proximity to the construction works and operation of the Proposed Development, or their greater sensitivity. All viewpoints beyond this 6 km range will not be significantly affected as a result of the Proposed Development.

Figure 3: A photomontage showing the Proposed Development in operation from Wideford Hill.

9.11 In terms of the principal visual receptors assessed, it was found that the more elevated or exposed parts of Kirkwall, to the east, and Finstown, to the west, will be significantly affected during the construction and operational phases, while the remaining parts of these settlements and all other settlements in the study area will not be significantly affected. The A965 between Finstown and Kirkwall will also be significantly affected, along with the southern part of the A966, owing to the proximity and openness of views to the Proposed Development from these sections of road. The remainder of the A966 and all other routes, will not be significantly affected during either the construction and operational phases.

9.12 A Residential Visual Amenity Appraisal has considered the impact of the Proposed Development on the visual amenity of residents within a 2 km radius. The assessment found that only two of the 40 properties assessed will reach the 'Residential Visual Amenity Threshold' making this a matter for the planning balance. Both these properties, namely 1 Quanterness Cottages and 2 Quanterness Cottages, are currently occupied by tenants and are owned by a party that has a commercial interest in the Proposed Development

9.13 In summary, the Proposed Development will give rise to significant effects on landscape character and visual amenity within the localised extent of approximately 5 to 6 km. While landscape and visual receptors beyond these ranges may be affected by the influence of the Proposed

Development, these effects will not be significant. There will be no significant cumulative effects. In respect of the wider area, all effects will be close range and this reflects the natural containment of the site owing to its low-lying location and enclosure from the surrounding moorland hills. The site has capacity for wind farm development owing to the simplicity and openness of the landform. The localised area which will be subject to significant effects is already influenced by built development and a modified landscape.

Ornithology

9.14 The full assessment of effects on ornithology (bird life) is provided in Chapter 7 of the EIA Report.

9.15 The ornithology assessment evaluated the bird interest at the site and determined the nature conservation importance of this interest. It considered the potential effects of the Proposed Development on birdlife, drawing on information from desk studies, consultations and field surveys.

9.16 It identified one international, two proposed international and five national nature conservation designations within 10 km of the site. These include the North Orkney Proposed Special Protection Area (SPA), The Scapa Flow Proposed SPA, The Orkney Mainland moors SPA, and the Keelylang Hill and Swartaback Burn Sites of Special Scientific Interest (SSSI). The SPAs are designated for their importance on an international level, and the SSSIs for their importance on a national level. The assessment considered the impact of the Proposed Development on populations of bird species which are features of these designated sites.

9.17 The Proposed Development site is considered to be of local importance to lapwing, oystercatcher (refer to Figure 4), greylag goose, and redshank, and of Council level importance to Curlew (.

Figure 4: An Oystercatcher

9.18 Construction activities of the Proposed Development are considered to provide a risk to birds species by disturbance of their habitat or nesting sites, causing displacement. However, the overall effects on these species during construction are considered to be temporary and not significant.

9.19 Operational risks to bird species are through the displacement due to ongoing disturbance caused by the turbines and through collision with moving blades or associated infrastructure. For the Proposed Development, those species that are most susceptible are likely to be those that have a low tolerance to disturbance (such as red-throated diver), and those which are susceptible to collision. The level of collision will depend on the extent to which birds are displaced and their ability to detect and manoeuvre around rotating turbine blades. However, the risk of collision during the operation of the Proposed Development is extremely low (0.1 collisions annually) and the effects are considered not to be significant.

9.20 The Applicant proposes to implement the following measures to mitigate against construction and operational phase effects:

- removal of vegetation from working areas outside the breeding season;
- avoidance of unnecessary disturbance to habitats by minimising the extent of ground clearance and other construction practices;
- implementation of grazing management; and

- an Environmental Clerk of Works (ECoW) will undertake surveys of birds to record breeding success.

9.21 Following the application of the mitigation measures detailed above, the residual effects of the Proposed Development are assessed as being not significant, with some beneficial effects to species such as curlew, lapwing and oystercatcher anticipated. No significant cumulative effects are anticipated.

Ecology and Nature Conservation

9.22 The full assessment of effects on ecology and nature conservation is provided in Chapter 8 of the EIA Report.

9.23 The site is made up entirely of agricultural land, which extends to the west, east and south. The northern perimeter of the site comprises a rocky shoreline which is partly engineered in sections west of the site, with open sea extending north, while steep heather moorland rises to Wideford Hill approximately 500m south of the site perimeter.

9.24 Otter presence was found within the Proposed Development site boundary, however no holts or hovers were identified within the site boundary or the 250m survey buffer.

9.25 Residual effects were assessed as generally barely perceptible adverse effects. No significant cumulative impacts are anticipated in combination with other wind farms.

Noise

9.26 The full assessment of noise and vibration effects is provided in Chapter 9 of the EIA Report.

9.27 This assessment considered the potential noise effects associated with construction and operation phases of the Proposed Development. No potential vibration effects were identified and therefore consideration of vibration was scoped out of the EIA Report.

9.28 The assessment of noise has comprised consultation with OIC, characterisation of the baseline noise environment, prediction of noise levels associated with construction activities, construction traffic, operational wind turbines and operation of other non-turbine fixed plant, and evaluation of predicted levels against derived criteria.

Figure 5: Noise surveying equipment

9.29 Baseline noise data in the study area was taken at Harwood in St Ola and Mou Ness in Firth (relevant surveying equipment is displayed in Figure 5). Baseline noise at Harwood is typically dominated by windblown vegetation and occasional Heavy Goods Vehicle (HGV) traffic on the A965. The dominant baseline noise at Mou Ness was the wind and wave noise from the sea.

9.30 Following selection and procurement of the final turbine model, and implementation of an appropriate turbine noise management plan, the operational wind turbine noise levels will meet the required noise limits at all residential properties across the full range of wind speeds, both during the daytime and the night-time periods.

9.31 Cumulative effects relating to noise for both the construction and operational phases of the Proposed Development are considered not to be significant.

Cultural Heritage

9.32 The full assessment of effects on cultural heritage and archaeology is provided in Chapter 10 of the EIA Report.

9.33 The cultural heritage assessment identified the archaeological and cultural heritage value of the site and assessed the potential for direct and indirect effects on archaeological features and heritage assets resulting from the construction and operation of the Proposed Development.

9.34 There are no designated heritage assets within the site. Two Scheduled Neolithic chambered cairns; Wideford Hill and Quanterness lie within 1km. A further 15 Scheduled Monuments including the Cuween Hill chambered cairn lie within the 5km study area.

9.35 There are two non-designated prehistoric sites; Crossiecrown and Ramberry located on the higher ground on the eastern part of the site. The remains of a stone oval chambered structure were also disturbed within 2 m of the cliff edge at Ramberry Head during the 2005 ploughing and therefore there is potential for further previously unrecorded prehistoric remains to be present on the eastern part of the site.

9.36 Protective fencing buffer will be maintained around the Crossiecrown, Ramberry and Ramberry Head sites during construction and no works will be undertaken within these areas.

9.37 The potential for previously unrecorded buried remains to be affected will be addressed by a programme of archaeological works. This will include a geophysical survey of the proposed access routes, cable routes, turbine locations, crane pads and other infrastructure, followed by trial trenching which will be targeted on any possible anomalies that were identified as well as a representative percentage of the total footprint of the development infrastructure. Depending on the results of these investigations further works during construction including further excavations and/ or an archaeological watching brief may be required. These mitigation measures will ensure no significant effects to archaeological receptors during construction.

9.38 During operation, there would be moderate significant residual effects on the setting of the Cuween and Wideford Hill chambered cairns and a minor non-significant residual effect on the setting of the Quanterness chambered cairn which is hidden from the Proposed Development site by a tree cover. However, the key relationships between these Scheduled Monuments and their settings would not be significantly altered and therefore the overall integrity of their settings will not be adversely affected.

9.39 Cumulative effects on all cultural heritage sites affected by the Proposed Development and other wind farms during construction and operation are considered to be no greater than the Proposed Development alone.

Geology, Hydrology and Hydrogeology

9.40 The full assessment of effects on geology, hydrology (surface water bodies, drainage and flooding) and hydrogeology (groundwater) is provided in Chapter 11 of the EIA Report.

9.41 The geology, hydrology and hydrogeology assessment involved the review of the baseline conditions by undertaking a desk-based review of mapping, aerial imagery and available information. A site walkover was undertaken to feed into the EIA Report.

9.42 No sensitive receptors were identified on site, there are no natural watercourses on site, only drainage ditches following the field boundaries. There are no private water supplies on, or near the site.

9.43 As with any development, during the construction stage there is the potential for threats to the quality of the water environment in the sea and local ditches. These mostly arise from poor site practice so careful attention will be paid to the appropriate guidance and policies to reduce the

potential for these to occur. Detailed mitigation measures will be included within the CEMP (refer to EIA Report Appendix 3.2) and the implementation of these will ensure that there are no significant construction or operation effects to geological and hydrological receptors.

9.44 Cumulative effects on geological and hydrological receptors are considered not to be significant.

Traffic and Transport

9.45 The full assessment of effects on traffic and transport is provided in Chapter 12 of the EIA Report.

9.46 Assessment covered the likely traffic and transport effects associated with the construction and operation of the Proposed Development.

9.47 The construction phase would lead to increased traffic volumes on the local road network related to staff movements, the delivery of materials and the delivery of turbine components. The highest traffic levels will be 56 HGV movements and 32 car and LGV movements per day, however for the majority of the construction period levels are anticipated to be lower (an example of a turbine blade being transported is presented in Figure 6). Traffic levels during operation of the Proposed Development would be one or two vehicles per week for maintenance purposes.

9.48 No significant capacity issues are expected on any of the roads within the study area due to the additional construction traffic movements associated with the Proposed Development as background traffic movements are very low, the links are or will be of reasonable standard and appropriate mitigation is proposed.

9.49 All abnormal loads would be unloaded at Hatston Pier and would access the site via Grainshore Road and the A965.

Figure 6: Example turbine blade in transit

9.50 Effects would be minimised through development of the Construction Traffic Management Plan (CTMP) which would be agreed with OIC and secured through an appropriately worded planning condition. The CTMP will outline such methods as the cleaning of vehicle chassis and wheels to prevent the deposition of construction site material on the road. The CTMP will be displayed in the site at all times. No significant residual or cumulative effects on traffic and transport are anticipated during construction or operation.

Socio-economic, Recreation and Tourism

9.51 The full assessment of socio-economic effects, and effects on recreation and tourism is provided in Chapter 13 of the EIA Report.

9.52 The renewables industry is an important economic asset to the UK and Scotland, and supports a substantial and growing number of employment opportunities. Although not significant in terms of the EIA regulations, the Proposed Development will further contribute to the positive economic effect of renewable energy, and associated skills base within the UK and Scotland.

9.53 It was estimated that during the construction and development phase the Proposed Development could support £2.6 million Gross Value Added (GVA) and 39 jobs in Orkney, and £10.4 million GVA and 161 jobs in Scotland (including in Orkney). Operation and maintenance spend from the Proposed Development could have an annual impact of £0.3 million GVA and four jobs in Orkney and £0.5 million GVA and nine jobs in Scotland (including in Orkney) . In addition, it would contribute to public finances around £0.5 million through the payment of non-domestic rates.

9.54 The Proposed Development would also contribute towards the achievement of the generating capacity mandated by Ofgem for the construction of an interconnector linking Orkney to the Scottish mainland, which could lead to annual benefits between £55 and £476 per person in Orkney. In addition to potentially generating considerable socio-economic benefits, the presence of the interconnector would enable the further development of the renewable sector in Orkney, a significant beneficial effect.

9.55 There are a limited number of recreational opportunities within 5 km of the Proposed Development site, with more opportunities within the wider area. There will be no significant direct or indirect effects on tourism or recreation as a result of the Proposed Development both in isolation or cumulatively, although land within the site may be inaccessible to the public during construction and decommissioning phases for health and safety reasons.

Aviation and Radar

9.56 The full assessment of effects on aviation and radar is provided in Chapter 14 of the EIA Report.

9.57 The Applicant has consulted with NATS, Highlands and Islands Airports Ltd (HIAL), Orkney Islands Council Airfields, Kirkwall Airport and the Ministry of Defence (MoD). No objections were received from NATS, Kirkwall Airport and Orkney Islands Council Airfields.

9.58 HIAL, as the operator of Kirkwall Airport, identified the proximity of the Proposed Development to an on-site navigational aid (a VOR), however it is concluded that it is unlikely that there would be any significant impact to the VOR. A study, required by HIAL, has been commissioned to determine the impacts prior to the final approval of the Proposed Development by HIAL. The formal study results are outstanding at the time of submission. Initial feedback from NATS is that impacts are very unlikely at the given range and elevation of the Proposed Development. The formal assessment is expected to confirm this position.

9.59 The site is in an area identified by the MoD as low priority for low flying and there are no apparent military low flying activities in this area that would conflict with the Proposed Development. Infrared lighting is likely to be required and will be fitted.

9.60 Following implementation of any required mitigation, it is concluded that there will be no significant residual or cumulative effects on aviation or radar as a result of the operation of the Proposed Development.

Shadow Flicker

9.61 The full assessment of shadow flicker effects is provided in Chapter 15 of the EIA Report.

9.62 Shadow flicker is the effect of the sun passing behind the moving rotors of turbines casting a flickering shadow through the windows and doors of neighbouring properties. This occurs in certain combinations of geographical position, time of day, time of year and specific weather conditions. No impact can occur from this during the construction of the Proposed Development.

9.63 The study area within which properties could potentially be affected by shadow flicker extends 1,360 m from each turbine and lies 130 degrees either side of north (relative to each turbine).

9.64 The assessment identified four receptors with potential to experience flicker effects during operation of the turbines. Calculations showed that the maximum occurrence of shadow flicker within the realistic scenario would be just under 13 hours per year, or a maximum of eight minutes per day at 1 and 2 Quanterness Farm Cottage. This is above the accepted limits for realistic shadow flicker, of less than 8 hours per year and therefore a potential significant effect. The model predicts less than 8 hours per year at the other two receptors (Quanterness Farm and Harwood).

9.65 Although the realistic scenario takes into consideration expected operational time for the turbines and average sunshine hours for the region, the results are likely to still be conservative due to local vegetation, dwelling orientation and internal screening from blinds, curtains or furniture that are not included in the model. Additionally, while shadow flicker may potentially occur at these locations it is possible that flicker will not be 'experienced' at all locations due to the time of day during which it may potentially occur.

9.66 The Applicant will implement a Shadow Flicker Protocol, to be agreed with OIC which will include a programme of selective automatic shutdown of certain turbine(s) under certain conditions, if required. Therefore, no significant residual shadow flicker effects will result from the Proposed Development.

9.67 In order to assess the potential for cumulative impact from other wind developments in the surrounding area, any turbines within 3 km of the proposed turbine locations were noted. Therefore, a 10 rotor diameter study area has been placed around all turbines in the vicinity of the Proposed Development, Rennibister and Crowness Business Park. No receptors were identified within the overlap between the shadow flicker study areas for Rennibister, Crowness Business Park and the Proposed Development, and as such there is no potential for cumulative shadow flicker effects.

Other Issues

9.68 The full assessment of other issues provided in Chapter 16 of the EIA Report.

Telecommunication

9.69 A review of telecommunication links identified one link managed by the Joint Radio Company (JRC) passing through the site. The Applicant has worked with JRC to mitigate this through design of the Proposed Development and with a limit to the micro-siting of T5 (it will not be micro-sited between 141° and 341°) no significant effects are anticipated on telecommunication receptors.

9.70 The Proposed Development has the potential to impact upon the television signal between Keelylang Hill transmitter and Shapinsay, Eday and Sandy. However, other transmitters are available, and the Applicant proposes that a condition is imposed on the permission such that the Applicant is required to fully investigate and provide alternative reception should the Proposed Development be identified as the cause of an unacceptable level of interference.

Marine Radar

9.71 Wind turbines have the potential to disrupt Marine Radars leading to effects such as ghost targets, multiple reflections, target spreading, shadowing and side lobe detection. Consultation with OIC's Marine Services and Harbour Authority identified a radar site at Kirkwall (Wideford Hill),

approximately 2.4km to the south-east of the Proposed Development site. In order to mitigate for the potential impacts to marine radar by the Proposed Development the Applicant proposes that a bond for 12 months be a condition to the planning permission, unless further studies identify no impacts to the satisfaction of the Department of Marine Services. The value of the bond would be agreed between Marine Services and the Applicant and released after 12 months at the discretion of the Department of Marine Services assuming no unacceptable impacts from the wind farm.

Air Quality

9.72 Due to the low volumes of traffic to be generated by the construction and operation of the Proposed Development, the Proposed Development does not meet the criteria for an air quality assessment for emissions and no significant effects are anticipated.

9.73 Dust emissions during construction will be controlled through best practice as detailed within the CEMP and no significant effects are anticipated.

Carbon

9.74 Increasing atmospheric concentrations of greenhouse gases (GHGs), including carbon dioxide (CO2) – also referred to as carbon emissions – is resulting in climate change. A major contributor to this increase in GHG emissions is the burning of fossil fuels. With concern growing over climate change, reducing its cause is of utmost importance. The replacement of traditional fossil fuel power generation with renewable energy sources provides high potential for the reduction of GHG emissions. This is reflected in UK and Scottish Governments climate change and renewable energy policy.

9.75 However, no form of electricity generation is completely carbon free; for onshore wind farms, there will be emissions as a result of manufacture of turbines, as well as emissions from both construction and decommissioning (if required) activities and transportation of materials to site.

9.76 However, this generation of carbon is minimal in comparison to the generation of carbon free electricity, and it is estimated that carbon generation will be offset by the Proposed Development's carbon savings within three months. Compared to fossil fuel electricity generation projects, which also produce embodied emissions during the construction phase and significant emissions during operation due to combustion of fossil fuels, the Proposed Development has a very low carbon footprint and the electricity generated will displace grid electricity generated from fossil fuel sources. The site would in effect be in a net gain situation following the estimated three month carbon payback period and will be contributing to national objectives of reducing greenhouse gas emissions. Therefore, the Proposed Development is evaluated to have a beneficial effect on meeting current climate change targets.

10 Conclusion

10.1 This Non-Technical Summary of the EIA Report provides an overview of the EIA undertaken for the Proposed Development in Quanterness, in the Orkney Islands.

10.2 Within Chapter 17 of the EIA Report a schedule of commitments can be found which details the environmental mitigation measures, summarised above, which the Applicant has committed to implement, while Chapter 18 of the EIA Report summarises the likely environmental effects, the mitigation to be implemented and the resulting residual effects.