CONTENTS

INTRODUCTION

15.1 This Chapter considers any remaining environmental topics that are within the scope of the Environmental Impact Assessment (EIA), but do not warrant a standalone chapter and are therefore not considered elsewhere in the EIA Report. These topics include:

- shadow flicker;
- climate and carbon balance;
- risk of accidents and other disasters;
- population and human health;
- air quality;
- aviation;
- telecommunications and other infrastructure;
- television reception; and
- waste and environmental management.

SHADOW FLICKER

15.2 Shadow flicker may occur under certain combinations of geographical position and time of day, when the sun passes behind the rotors of a wind turbine and casts a shadow over neighbouring properties. As the blades rotate, the shadow flicks on and off, an effect known as shadow flicker. The effect can only occur inside buildings, where the flicker appears through a window opening.

15.3 The likelihood and duration of the effect depends upon:

- direction and aspect of the property relative to the turbine(s): in the UK, only properties within 130 degrees either side of north, relative to the turbines, can be affected, as turbines do not cast long shadows on their southern side;
- distance from turbine(s): the further the building is from the turbine, the less pronounced the effect would be, given the shadow fades with distance. Flicker effects are known to be strongest and most likely to have the potential to cause significant effects within ten rotor diameters of a turbine (refer to **Technical Appendix 4.1: Legislation, Policy and Guidance** for further detail). The Highland Council's (THC) expectation is for wind energy developments to be located a minimum distance of 11 times the rotor diameter of the turbine(s) from any regularly occupied buildings not associated with the development. Within a distance less than 11 times the blade diameter, a shadow flicker assessment will be required (THC, 2016);
- turbine height and rotor diameter;
- time of year and day; and
- weather conditions (i.e. cloudy days reduce the likelihood of effects occurring).

15.4 If shadow flicker cannot be avoided through layout changes, then technical mitigation solutions are available, such as shutting down the turbines which cause the effect when certain conditions prevail.

15.5 Shadow flicker effects are only considered during the operational phase of a wind farm development.

15.6 The nearest residential receptor, 9 Balmeanach, is located approximately 2.1km from proposed Turbine 8. This distance is considerably more than 11 times the turbine rotor diameter which would be 1,518m. Even in the case of potential 50m micrositing being taken into account, the property would be located much further than 11 times the rotor diameter. It is therefore considered that no shadow flicker effects from the Proposed Development would be experienced by residential receptors and as such are not considered further.

CLIMATE AND CARBON BALANCE

Introduction

15.7 This section details the calculations to work out carbon dioxide (CO_2) emissions from the Proposed Development and is supported by **Technical Appendix 15.1: Carbon Calculator**. In addition to generating electricity, the Scottish Government sees wind farms as an important mechanism for reducing the UK's CO_2 emissions. This section estimates the CO_2 emissions associated with the manufacture and construction of the Proposed Development as well as estimating the contribution the Proposed Development would make to reducing CO_2 emissions, to give an estimate of the whole life carbon balance of the Proposed Development. The assessment is based on a detailed baseline description of the Proposed Development and its location. All calculations are based on site specific data, where available. Where site specific data is not available approved national/regional information has been used.

15.8 Each unit of wind generated electricity would displace a unit of conventionally generated electricity, therefore, contributing to the UK net zero targets by reducing CO_2 emissions associated with power generation. **Table 15-1** provides a breakdown of the estimated emissions displaced per annum and over the assumed lifespan of 40 years for the Proposed Development.

Carbon and Peatland

15.9 Wind farms in upland areas tend to be sited on peatlands which hold stocks of carbon and so have the potential to release carbon into the atmosphere in the form of CO_2 if disturbed. The Proposed Development is located predominantly in an area of Class 1 Priority Peatland Habitat.

15.10 In order to minimise the requirement for the extraction of peat, the site design process (described in **Chapter 2: Site Description and Design Evolution**) has avoided areas of deeper peat. Peat probing was carried out onsite and peat depth mapped, as shown on **Figures 10.1.6** and **10.1.7** of **Technical Appendix 10.1: Peat Landslide Hazard and Risk Assessment**. This enabled wind turbines and associated infrastructure to be located in areas of shallower peat where possible.

Effects of Carbon Emissions from Construction

15.11 Emissions arising from the fabrication of the turbines and the associated components are based on a full life analysis of a typical turbine and include CO_2 emissions resulting from transportation, erection, operation, dismantling and removal of turbines and foundations and transmission grid connection equipment from the existing electricity grid system.

15.12 With respect to turbines, emissions from material production are the dominant source of CO_2. Emissions arising from construction (including transportation of components, quarrying, building foundations, access tracks and hard standings) and commissioning are also included in the calculations. The assessment has used Nayak et al (2008) default values for 'turbine life' emissions, calculated with respect to installed capacity.

15.13 A number of technical papers (detailed in Nayak et al, 2008) have reported a wide range of emissions values from wind farms, these being between 6 and 34 tonnes CO_2 GWh-1. From this a calculation of additional CO_2 payback time due to production, transportation, erection and operation of the Proposed Development that this represents can be compared.

15.14 The additional CO_2 payback time for the best-case scenario of 6t CO_2 GWh-1 would be 13 months (1.1 year) assuming replacement of fossil fuel mix of electricity generation (the combination of electricity suppliers, including coal, gas and oil generation, used for grid balancing and the type of power generation most likely to be replaced by wind generated power). For the worst-case scenario (34t CO_2 GWh-1), this would increase to 47 months (3.9 years) additional CO_2 payback respectively.

15.15 These increases are considerable and so it is essential that they are taken into account for the calculation of CO_2 payback time for a wind farm. However, it should be noted that this may still compare very favourably with the life cycle analysis of other means of non fossil fuel based power generation, such as nuclear, particularly when the full energy costs of construction, operation, maintenance and decommissioning, uranium mining and transportation and long term waste management are taken into account.

Characteristics of Peatland

15.16 The loss of carbon from the carbon fixing potential from plants and vegetation on peat land is small, but is calculated for the area from which peat is removed and the area affected by drainage. The carbon stored in the peat itself represents a much larger potential source of carbon loss.

15.17 When flooded, peat soils emit less CO_2 but more methane than when they are drained. In flooded soils, carbon emissions are usually exceeded by plant fixation, so the net exchange of carbon with the atmosphere is negative and soil stocks increase. When soils are aerated, carbon emissions usually exceed plant fixation, so the net exchange of carbon with the atmosphere is positive.

15.18 To calculate the carbon emissions attributable to the removal or drainage of the peat, emissions occurring if the soil had remained in situ and undrained are subtracted from the emissions occurring after removal or drainage.

15.19 The indirect loss of CO_2 uptake (fixation) by plants originally on the surface of the site, but eliminated by construction activity including the destruction of active bog plants on wet sites and felling, is calculated on site specific data collected as part of the EIA process and based on blanket bog.

15.20 Emissions due to the indirect, long term liberation of CO_2 from carbon stored in peat due to drying and oxidation processes caused by construction of the site, can also be calculated from site specific data for the Proposed Development. This figure is a worst-case scenario, as the peat would be re-used onsite to minimise carbon losses.

15.21 Data from turbine manufacturers and the construction related activity is included as part of the assessment to address payback periods, however the two previous sources (from peat and the losses from loss of plant uptake) are a much more significant contributor to CO_2 emissions and the overall CO_2 debt where peat is disturbed onsite.

Methodology

15.22 The Carbon Calculator Tool has been developed by the Scottish Government to support the process of determining the carbon pay-back period for wind farm developments in Scotland. The carbon payback period is derived by comparing the carbon costs of wind farm developments (particularly during construction) with the carbon savings likely to be achieved through their operation.

15.23 The methodology used in the Carbon Calculator is based on the document 'Calculating Carbon Savings from Wind Farms on Scottish Peatlands - A New Approach', (Nayak et al, 2008 and 2010) and (Smith et al, 2011).

15.24 The latest version of the Carbon Calculator Tool v1.7.0 uses methods given in 'Calculating carbon savings from windfarms on Scottish peat lands - A New Approach' (Nayak et al, 2008 and 2010) and (Smith et al, 2011) and revised equations for GHG emissions (Nayak, D.R., Miller, D., Nolan, A., Smith, P. and Smith, J.U., 2010 & 2011, and Wind Farm and Carbon Savings – Technical Note v.2 2.10.0. Input Parameters).

Input Parameters

15.25 To undertake this assessment the following parameters were considered, which encompass a full life cycle analysis of the Proposed Development. These parameters include:

- emissions arising from the fabrication of the turbines and all the associated components;
- emissions arising from construction, (including transportation of components; quarrying; building foundations, access tracks and hard standings; and commissioning);
- the indirect loss of CO_2 uptake (fixation) by plants originally on surface of the site but eliminated by construction activity (including the destruction of active bog plants on wet sites) and felling;
- emissions due to the indirect, long term liberation of CO_2 from carbon stored in peat due to drying and oxidation processes caused by construction; and
- loss of carbon due to drainage and from forestry clearance.

15.26 To calculate the pay-back period, the Scottish Government's Carbon Calculator Tool considers the following carbon saving and carbon loss parameters:

- carbon emissions savings, based on emissions from different power sources.
- loss of carbon due to production, transportation, erection, operation and decommissioning of the wind farm.
- loss of carbon from backup power generation.
- loss of carbon-fixing potential of peatland.
- loss and/or saving of carbon stored in peatland (by peat removal or changes in drainage).

- carbon saving due to improvement of habitat.

15.27 The calculation spreadsheet within the Carbon Calculator Tool (online version reference number 5CE9-7MO7-C1JK v6) allows a range of data to be input in order to utilise expected, minimum and maximum values, where relevant and applicable.

15.28 This assessment draws on information detailed in the EIA Report**, Chapter 8: Ecology** and **Chapter 10: Hydrology, Hydrogeology and Soils**. For the purpose of this assessment, it is assumed that all the embedded good practice measures outlined in **Chapter 8: Ecology** and **Chapter 10: Hydrology, Hydrogeology and Soils** would be employed.

15.29 The input parameters used for the greenhouse gas savings and carbon payback are based on the estimated capacity of the Proposed Development assumed at this stage, consisting of 10 turbines of approximately 4.5MW each. The wind turbine model to be installed on site is not yet known so figures are based on currently available turbines within the design parameters and assume one turbine type for all turbine locations. Note that, within the calculation spreadsheet, the expected, maximum and minimum values have been adjusted to suit the input parameter.

15.30 The recommended capacity factor within the calculation spreadsheet is 42.4%. This is considerably higher than the UK average and is based on the collection of onsite wind data.

15.31 The input parameters for the Scottish Government calculation spreadsheet are detailed in **Technical Appendix 15.1: Carbon Calculator**. The choice of methodology for calculating the emission factors uses the 'Site Specific methodology' defined within the calculation spreadsheet.

Results

15.32 This section presents a summary of the carbon assessment which has been undertaken in respect of the Proposed Development. The purpose of the 'carbon calculator' is to assess, in a comprehensive and consistent way, the carbon impact of wind farm developments. This is undertaken by comparing the carbon costs of wind farm developments with the carbon savings attributable to the wind farm. An assessment has been undertaken to calculate the carbon emissions which would be generated in the construction, operation and decommissioning of the Proposed Development.

15.33 The carbon calculations spreadsheet is provided in **Technical Appendix 15.1**. A summary of the anticipated carbon emissions and carbon payback of the Proposed Development are provided in **Table 15-1**.

Table 15-1
Anticipated Carbon Emissions

Results	Exp.	Min.	Max.
Net emissions of carbon dioxide (t CO2 eq.)	148,018	89,262	259,514
Carbon Payback Time			
Coal-fired electricity generation (years)	0.9	0.5	1.6
Grid-mix of electricity generation (years)	4.6	2.6	8.1
Fossil fuel - mix of electricity generation (years)	**2.0**	**1.2**	**3.6**
Ratio of CO2 eq. emissions to power generation (g / kWh) (TARGET ratio by 2030 (electricity generation) < 50 g /kWh)	**22.14**	**12.58**	**39.19**

Interpretation of Results

15.34 The calculations of total CO_2 emission savings and payback time for the Proposed Development indicates the overall payback period of a wind farm with 10 turbines with an average (expected) installed capacity of 4.5MW each would be approximately 2 years, when compared to the fossil fuel mix of electricity generation. The site would in effect be in a net gain situation following this time period and can then claim to contribute to national emissions reduction objectives thereafter for its remaining operational life (38 years).

15.35 The potential savings in CO_2 emissions due to the Proposed Development replacing other electricity sources over the lifetime of the windfarm (assumed to be 40 years for the purpose of the carbon calculator) are approximately:

- 167,475 tonnes of CO_2 per year over coal-fired electricity (6.7 million tonnes assuming a 40 year lifetime for the purposes of the carbon calculator);
- 32,322 tonnes of CO_2 per year over grid-mix of electricity (1.3 million tonnes assuming a 40 year lifetime for the purposes of the carbon calculator); or
- 72,205 tonnes of CO_2 per year over a fossil fuel mix of electricity (2.9 million tonnes assuming a 40 year lifetime for the purposes of the carbon calculator).

RISK OF ACCIDENTS AND OTHER DISASTERS

Introduction

15.36 The vulnerability of the Proposed Development to major accidents and natural disasters, such as flooding, sea level rise, or earthquakes, is considered to be low due to its geographical location and the fact that its purpose is to ameliorate some of these issues.

15.37 In addition, the nature of the proposals and remoteness of the site means there would be negligible risks on the factors identified by the EIA Regulations. For example:

- population and human health – the site is remote with low population density and the required safety clearances around turbines has been a key consideration throughout the design process;
- biodiversity – receptors and resources would be unaffected as there would be little risk of polluting substances released or loss of habitat in a turbine failure scenario (highly unlikely);
- land, soil, water, air and climate – there would be little risk of polluting substances released or loss of habitat in a turbine failure scenario (highly unlikely); and
- material assets, cultural heritage and the landscape – there would be no adverse effects on these features in a turbine failure scenario (highly unlikely).

15.38 Despite the risk of major accidents and natural disasters being considered as low, the vegetation and openness of the site does present a potential, albeit remote, fire risk. In March 2018 a large part of the open area of the site was damaged by an uncontrolled fire originating from a contractor working on the Ben Aketil Wind Farm. **Technical Appendix 3.1: Outline Construction Environmental Management Plan (CEMP)** contains measures for reducing the risk of fires occurring during the construction of the Proposed Development and these are considered to be appropriate to the level of potential risk.

Public Safety and Access

15.39 The Renewable UK Onshore Wind Health and Safety Guidelines (2015) note that wind farm development and operation can give rise to a range of risks to public safety including:

- traffic (especially lorries during construction, and abnormal loads for the transport of wind turbine components; including beyond the site boundary);
- construction site hazards (particularly to any people entering the site without the knowledge or consent of the site management);
- effects of catastrophic wind turbine failures, which may on rare occasions result in blade throw, tower topple or fire; and
- ice throw, if the wind turbine is operated with ice build-up on the blades.

15.40 The RenewableUK guidance (2015) states that *"Developers should ensure that risks to public safety are considered and managed effectively over the project lifecycle, and should be prepared to share their plans for managing these risks with stakeholders and regulators; effective engagement can both build trust, and help to reduce the level of public safety risk by taking account of local knowledge".*

15.41 Site security and access during the construction period would be governed under Health and Safety at Work Act 1974 and associated legislation. Public access along the existing access track to Ben Aketil Wind Farm would remain in place as far as possible, however no public access would be permitted along any new access track to the site during construction. However, the Land Reform (Scotland) Act (2003), which came into effect in February 2005, establishes statutory rights of responsible access on and over most land. The legislation offers a general framework of responsible conduct for both those exercising rights of access and for landowners. Once the construction period and commissioning of the wind farm is complete, no special restriction on access is proposed.

15.42 Informal recreational access would benefit from the presence of the turbines within the site by providing a means to readily access the hill. A Preliminary Access Management Plan (PAMP) is provided in **Technical Appendix 14.2** accompanied by a proposed paths plan which shows the informal recreational routes throughout the site and local area including the potential for a link path from the Proposed Development to the Edinbane Wind Farm access tracks (subject to land agreement). Appropriate warning signs would be installed concerning restricted areas such as the substation compound, switchgear and metering systems. All onsite electrical cables would be buried underground with relevant signage.

Traffic

15.43 Accident data for the roads local to the site (A850 from the site access junction to the A87) has been reviewed and is presented in **Chapter 12: Site Access, Traffic and Transport**. An assessment of the potential effects on road safety has been undertaken. In summary, the Proposed Development would create a temporary increase to HGV traffic levels within the study area during construction but these levels would remain well within the design capacity of the local road network. The accident records for the study area are low, with only two serious accidents occurring over the five year study period. Therefore, the level of effect is considered to be minor adverse and not significant.

Construction

15.44 With regard to risks and accidents during the construction phase, the construction works for the Proposed Development would be undertaken in accordance with primary health and safety legislation, including the Health and Safety at Work Act 1974 and the Construction (Design and Management) (CDM) Regulations 2015 which will include a requirement to produce emergency procedures in a Construction Phase (Health & Safety) Plan in accordance with the Regulations. The CEMP (an outline for which is provided in **Technical Appendix 3.1**) would specify measures for reducing the risk of accidents during the construction of the Proposed Development and these are considered to be appropriate to the level of potential risk.

15.45 Nonetheless, the risk of accidents and other disasters is covered where relevant in individual topic Chapters, for instance, the potential for environmental incidents and accidents such as spillages are considered in **Chapter 8: Ecology**, **Chapter 9: Ornithology** and **Chapter 10: Hydrology, Hydrogeology and Soils**. Flood risk is also assessed within **Chapter 10**.

Extreme Weather

15.46 As far as the risk of turbine failure during high winds is concerned, the turbines would cut-out and automatically stop as a safety precaution in wind speeds over 25m/s.

15.47 Wind turbines are susceptible to lightning strike due to their height and appropriate measures are considered during the design of turbines. Turbines are installed with lightning protection systems designed to conduct lightning strikes down to earth to minimise the risk of damage to turbines. Modern wind turbine blades are manufactured from a glass-fibre or wood-epoxy composite in a mould, such that the reinforcement runs predominantly along the length of the blade. This means that blades are designed to stay attached to the turbine if struck by lightning and in all cases, turbines will automatically shut down if damaged by lightning.

15.48 Ice build-up on blade surfaces can occur in cold weather conditions. Wind turbines can continue to operate with a very thin accumulation of snow or ice but will shut down automatically as soon as there is a sufficient build up of snow or ice to cause aerodynamic or physical imbalance of the rotor. Potential icing conditions affecting turbines can be expected two to seven days per year (light icing) in Scotland (WECO, 1999). Ice detector modules can be incorporated into the turbine if required and if needed they would be fitted with heaters. In the event that a turbine was shut down during conditions suitable for ice formation, the potential for ice throw to occur after start-up is high. Monitoring systems would be in place to ensure that the turbines that have been stationary during icing conditions are restarted in a controlled manner to ensure public safety. The risk to public safety is considered to be very low due to the few likely occurrences of these conditions along with the particular circumstances that can cause ice throw.

Seismic Activity

15.49 No fault lines are present on or in the immediate vicinity of the site, and there are no records of any earthquakes occurring in the vicinity of the site within the last 48 years (Earthquake Track, 2022). Earthquakes in Scotland are typically no greater than 3 on the Richter Scale and, therefore, minor and unlikely to cause significant damage to buildings and infrastructure.

15.50 It is very unlikely that an earthquake would occur on the vicinity of the site resulting in any damage to the Proposed Development. Should a wind turbine be damaged, the risk to public safety is considered to be negligible due to the remote location and careful design layout of the infrastructure.

POPULATION AND HUMAN HEALTH

15.51 **Chapter 7: Landscape and Visual, Chapter 10: Hydrology, Hydrogeology and Soils, Chapter 12: Site Access, Traffic and Transport, Chapter 13: Noise** and **Chapter 14: Socio-economics and Land Use** contain assessments which relate to the health and wellbeing of the local population. These Chapters assess the effects of the Proposed Development, both positive and negative, provide an analysis of the significance of these effects and also put forward measures to mitigate against negative effects on people and their health.

15.52 **Chapter 16: Schedule of Commitments**, provides an overview of the mitigation put forward as part of these assessments in order to reduce any negative effects of the Proposed Development to an acceptable level.

15.53 Further to the topics covered in **Chapters 7 to 16**, including this Chapter, it is not expected that there would be any other effects from the Proposed Development which would have significant effects on population and human health.

AIR QUALITY

15.54 Construction activities can result in temporary effects from dust if unmanaged. This can result in nuisance effects such as soiling of buildings and, if present over a long period of time, can affect human health. As the nearest property is just over 2km away from the site, effects associated with dust or vehicle emissions are considered to be unlikely. Consideration is given within **Chapter 8: Ecology** and **Chapter 10: Hydrology, Hydrogeology and Soils** to the potential impacts that dust generation could have on any identified sensitive ecological or hydrological receptors and measures to control dust is detailed in the outline CEMP (**Technical Appendix 3.1**). Otherwise, air quality is scoped out of the EIA.

AVIATION

15.55 Aviation operators were contacted as part of the EIA consultation process. Three potential aviation constraints on wind turbines at the site were identified. These are as follows:

- Safeguarding criteria and operation of Benbecula Airport;
- NATS En Route primary surveillance radar (PSR) at Ben Hynish, Tiree; and
- Military low flying.

Benbecula Airport

15.56 Highlands & Islands Airports Limited (HIAL) initially identified that Turbine 8 (of the Scoping layout, Layout D, **Figure 2.3**) may impact upon the safeguarding criteria and operation of Benbecula Airport. HIAL requested that further assessment was undertaken to understand any impact on the infrastructure and operation of the airport. An assessment undertaken by Straten CSL showed that there would be no effect on the safeguarding criteria and operation of Benbecula Airport; and after further consultation with HIAL, they have confirmed that the final design layout would not conflict with the safeguarding criteria.

15.57 HIAL also requested that the turbines would be lit as documented in The Air Navigation Order 2016, Article 222; however, this Article applies to 'en route obstacles' over 150m only and would therefore not apply to the proposed turbines. However, aviation safety lighting (infrared, non-visible) is proposed on the turbines as noted in **paragraph 15.60**.

NATS En Route PSR, Tiree

15.58 Consultation has been ongoing with NATS Safeguarding regarding the potential visibility of the proposed turbines to their radar on Tiree; as they believe that without suitable mitigation an adverse impact would result on their air traffic operations. An agreement is being entered into between NATS (En-Route) Plc, NATS (Services) Ltd (NATS) and the Applicant for the design and implementation of an identified and defined mitigation solution in relation to the Proposed Development.

Military Low Flying

15.59 The Ministry Of Defence (MOD) has stated concerns with the Proposed Development relating to the potential of the turbines to create a physical obstruction to air traffic movements. The Proposed Development falls within Low Flying Area 14 (LFA 14), an area within which fixed wing aircraft may operate as low as 250 feet, or 76.2m, above ground level to conduct low level flight training. However, aviation safety lighting (infrared, non-visible) is proposed on the turbines to ensure that there is no impact to low flying aircraft.

15.60 It is accepted that planning conditions relating to aviation and infra-red lighting for the Proposed Development could be employed to ensure no significant effects.

TELECOMMUNICATIONS AND OTHER INFRASTRUCTURE

15.61 Wind turbines can potentially cause interference to telecommunication links through reflection and shadowing to electro-magnetically propagated signals including terrestrial fixed microwave links managed by telecommunications operators.

15.62 In order to determine the potential impact of the Proposed Development and inform the turbine layout, consultation was undertaken with key stakeholders to identify relevant microwave links and Ultra High Frequency (UHF) telemetry links. Historically, Ofcom has provided on request a list of parties that operate licensed fixed links within a given search radius of a defined location. Since 2018, this process was under review following the implementation of General Data Protection Regulations (GDPR) and has not been formally restarted. Therefore, consultation was undertaken directly with the most prevalent operators in order to obtain link details. At the time of writing, no further information from Ofcom has been made available. The following link operators were contacted:

- Airwave (Motorola Solutions);
- Arqiva;
- Atkins;
- British Telecom (BT);
- MBNL;
- Joint Radio Company (JRC);
- Virgin Media O2; and
- Vodafone.

15.63 No objection to the Proposed Development was received from Airwave (Motorola Solutions), Atkins and Virgin Media O2.

15.64 A number of telecommunication links have been identified in the southern part of the site, operated by Arqiva, BT, MBNL, JRC and Vodafone. Where relevant, the probability of a significant impact on fixed radio links was assessed on the basis of site proximity to transmitter-receiver paths and calculation of Ofcom-recommended clearance zones. Link paths and buffers were used as constraints to development and informed the final turbine layout. Further consultation with each operator was undertaken, detailed in the following section, where relevant to understand if there were likely to be any potential operational issues.

Arqiva

15.65 Arqiva is responsible for providing the BBC, ITV and the majority of the UK's radio transmission network and is responsible for ensuring the integrity of Re-Broadcast links. Arqiva's radio transmission networks normally operate with a 100m buffer either side of a radio link, free from interference by tall development.

15.66 Arqiva operate two Re-Broadcast links which cross the site boundary:

- TV link from Transmit Station at Skriaig to Receive Station at Scoval; and
- FM radio link (BBC R2 and BBC Radio Nan Gaiheal) from Transmit Station at Skriaig to Receive Station at Clettraval.

15.67 Arqiva advised that these links should be protected. A detailed analysis of the possible wind turbine locations and the paths of the links was undertaken to ensure that no interference would result.

15.68 During the site design process described in **Chapter 2: Site Description and Design Evolution**, the location of the proposed turbines was improved to ensure that they were located outwith the buffer zones identified.

15.69 The closest operational link to the proposed turbines is the FM radio link. Arqiva has confirmed through detailed consultation that the final turbine layout would be acceptable and not cause interference issues to the link.

British Telecom (BT)

15.70 BT operate a fixed radio link path of 28km which runs from Skriaig to Scoval. It is understood that it is a 6Ghz core link providing a critical service, and therefore it is critical there is no interference.

15.71 BT normally request a 100m buffer either side of a radio link to be free from interference by tall development. However, in the case of the Proposed Development, BT has undertaken a detailed analysis of the location of the proposed turbines in relation to their link and has confirmed that the turbine layout would be acceptable to them. It should be noted however that the location of Turbine 8 should not move any closer to the link to the south as the clearance distance is limited. The 50m micrositing allowance for Turbine 8 would therefore be limited to the west, north and east.

MBNL

15.72 MBNL operate a 1GHZ fixed link which runs through the southern part of the site in a north west to south east orientation, to the south of the proposed turbines. A 100m buffer clearance was requested by MBNL through consultation. In response to the location of the link, the proposed turbine array was moved northwards to ensure that there would be no interference.

Joint Radio Company (JRC)

15.73 JRC analyses proposals for wind farms on behalf of the UK Fuel and Power Industry. This is to assess their potential to interfere with radio systems operated by utility companies in support of their regulatory operational requirements. A microwave link operated by SSE Energy was identified by JRC to run through the southern part of the site in a north west to south east orientation, to the south of the proposed turbines. A detailed assessment was undertaken by JRC to ensure that no interference would be caused to the link by the Proposed Development. JRC recommended that to avoid signal reflections from the proposed turbines, they should be sited at least 200m from the link path. In response to the location of the link, the proposed turbine array was moved northwards to ensure that there would be no interference.

Vodafone

15.74 Vodafone operate two fixed links of 13GHz and 15GHz which run in a north west to south east orientation through the southern part of the site, to the south of the proposed turbines. Ofcom guidance was applied to calculate appropriate buffer zones on the links. In response to the location of the links, the proposed turbine array was moved northwards to ensure that there would be no interference.

TELEVISION RECEPTION

15.75 Wind turbines have the potential to adversely affect analogue television reception through either physical blocking of the transmitted signal or, more commonly, by introducing multi-path interference where some of the signal is reflected through different routes.

15.76 The Proposed Development is located in an area which is served by a digital transmitter and is unlikely to be affected by the Proposed Development as digital signals are rarely affected. In the unlikely event that television signals are affected by the Proposed Development, mitigation measures will be considered by the Applicant. Television reception is scoped out of the EIA.

WASTE AND ENVIRONMENTAL MANAGEMENT

15.77 **Chapters 7 to 14** put forward suggestions on how to mitigate any negative impacts from the Proposed Development with regards to waste and environmental management. These are summarised in **Chapter 16: Schedule of Commitments**.

15.78 **Technical Appendix 3.1: Outline CEMP** provides a general overview on how waste and other environmental issues would be managed during the construction phase. **Technical Appendix 10.2: Soil and Peat Management Plan** also details how excavated peat is controlled, stored, re-used and disposed of during the construction phase of the Proposed Development.

15.79 It is expected that a site-specific waste management plan for the control and disposal of waste generated onsite would be required by condition, should the Proposed Development receive planning consent.

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