

22 Summary of Residual Effects

22.1 Introduction

22.1.1 This chapter presents a summary of the measures which have been identified within the Environmental Impact Assessment Report (EIAR) to mitigate any likely significant (adverse) environmental effects that may occur during the construction, operation, and decommissioning stages of the Consented Development taking account of the proposed variation to extend its implementation period and operational life. The chapter identifies how the environmental effects arising from the Consented Development will be managed.

22.2 Mitigation through design

22.2.1 Given that the infrastructure of the Consented Development is not changing, the mitigation through design devised previously set out remains valid, and is set out in full below.

22.2.2 The Proposed Development has been designed following an iterative process to avoid environmental effects at source wherever possible. The layout of the Proposed Development has been informed by a thorough understanding of baseline environmental conditions and the particular constraints and opportunities of the Application Site for wind farm development. Consultations have been carried out with external consultees and stakeholders to inform the scheme design and agree solutions to minimise any adverse effects on the environment.

22.2.3 As a result of this iterative design process, the Proposed Development has been specifically designed as far as practicable to avoid or to minimise the occurrence of significantly adverse environmental effects. This type of mitigation is embedded within the scheme design rather than being an add-on. The embedded mitigation measures include the design and siting of individual components of the Proposed Development. The iterative design process is explained in further detail within Chapter 5 (Design Evolution and Alternatives), and the Design and Access Statement.

22.2.4 This commitment to mitigation through design has resulted in relatively few likely significant environmental effects being identified. A small number of likely significant effects do however, arise and for these, additional mitigation over and above that which is 'embedded' is proposed to reduce the significance of the effect.

22.2.5 In addition, mitigation has also been proposed where the effect is not significant, but the identified mitigation will secure environmental best practice.

22.3 Summary of mitigation measures

22.3.1 The summary of mitigation measures including the embedded mitigation measures accorded by the design of the Proposed Development and additional mitigation measures required during the construction, operation and decommissioning phases of the Proposed Development have been provided in Tables 22.1-22.3.

Table 22.1: Environment management during construction

| <i>Description</i> | <i>Nature of impact</i> | <i>Scale of impact</i> | <i>Embedded/applied mitigation</i> | <i>Residual scale of impact</i> |
|---|-------------------------|-----------------------------|---|---------------------------------|
| <i>Socio-Economic</i> | | | | |
| Economic benefits such as local contracts and jobs for local community | Short term, reversible | Minor (Beneficial) | 'Meet the Developer' sessions to enable local community to take advantage of the opportunities arising through a local employment and procurement scheme, which have been used successfully at other developments undertaken by the Applicant. | Minor (Beneficial) |
| <i>Landscape and Visual Impact</i> | | | | |
| Impact on landscape fabric | Short term, reversible | Negligible | None required | Negligible |
| Impact on Landscape Character Area B1 : Yell Peatlands in the vicinity of the construction | Short term, reversible | Moderate to Major (Adverse) | The layout of the turbines has embedded mitigation to avoid landscape effects. Effects on wider extent of Yell Peatlands will be limited because of screening effects of the ridge between the Hill of Arisdale and Ward of Otterswick. | Negligible |
| Visual impacts on receptors in the southeast of Yell due to use of cranes | Short term, reversible | Moderate (Adverse) | None | Moderate (Adverse) |
| Visual impact for vehicles and pedestrians using the section of B9081 to the north of Burravoe where it passes immediately adjacent to the compound | Short term, reversible | Minor (Adverse) | Existing peat cutting activities will cease along with reduction of sheep grazing in accordance with the Habitat Management Plan (HMP). Following completion of construction activities, the temporary compound will be restored through regularisation of degraded areas and re-establishment of vegetative covers. | Minor (Beneficial) |

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| <i>Description</i> | <i>Nature of impact</i> | <i>Scale of impact</i> | <i>Embedded/applied mitigation</i> | <i>Residual scale of impact</i> |
|---|-------------------------|------------------------|---|---------------------------------|
| <i>Cultural Heritage</i> | | | | |
| Impact on part of the Hamnavoe field boundary and on field boundary of the Heogals | Long term, irreversible | Moderate (Adverse) | Topographical survey and fencing off of visible elements of the pre-historic feature prior to construction. Watching brief during ground-breaking works. | Minor (Adverse) |
| Impact on unknown buried archaeological remains | Long term, irreversible | Minor (Adverse) | Representative watching brief during ground-breaking works. | Negligible |
| All known heritage assets within 50m of the Proposed Development | Short term, reversible | Negligible | All of them will be fenced off with a visible buffer under archaeological supervision prior to the start of the construction phase. | Negligible |
| <i>Ornithology</i> | | | | |
| Impact on Otterswick and Graveland SPA, located adjacent to the Application Boundary | Short term, reversible | Negligible | The main SPA red-throated diver corridor identified during surveys undertaken in 2011 and 2012 has been avoided through the design of the scheme. | Negligible |
| Impact on red-throated divers, greylag geese, golden plover, dunlin, lapwing, ringed plover, curlew, arctic skua, great skua, merlin due to land-take and habitat loss from construction activities | Short term, reversible | Negligible | Ecological enhancement measures proposed for red-throated divers and merlin habitats within the Application Boundary. | Minor (Beneficial) |

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| <i>Description</i> | <i>Nature of impact</i> | <i>Scale of impact</i> | <i>Embedded/applied mitigation</i> | <i>Residual scale of impact</i> |
|---|-------------------------|------------------------|---|---------------------------------|
| Ecology | | | | |
| Impact on Yell Sound Coast SSSI and SAC and East Mires and Lumbister SSSI and SAC | Short term, reversible | Negligible | None | Negligible |
| Impacts on otters | Short term, reversible | Negligible | Targeted otter surveys will be carried out within a 250m buffer zone around proposed watercourse crossing locations and all infrastructure. | Negligible |
| Impact on fishing populations | Short term, reversible | Negligible | General pollution prevention practices to be adopted. | Negligible |
| Loss of habitat due to land take for project components | Short term, reversible | Negligible | <p>Micro-siting (within 50m) will be used to relocate tracks and infrastructure to avoid sensitive habitats.</p> <p>Best practice techniques of vegetation and habitat reinstatement will be adopted.</p> <p>Best practice techniques will be adopted and used in the design and subsequent restoration of borrow pits.</p> | Negligible |

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| <i>Description</i> | <i>Nature of impact</i> | <i>Scale of impact</i> | <i>Embedded/applied mitigation</i> | <i>Residual scale of impact</i> |
|--|--------------------------|---------------------------------|---|--|
| <i>Soils and peat</i> | | | | |
| Peat translocation | Long term, irreversible | Negligible – Moderate (Adverse) | <p>Avoiding areas of deep peat. Possible use of floating roads. Plugging of eroded gullies / opportunities for habitat enhancement.</p> <p>Peat reinstatement for approximately 1.7ha within the Site and reuse of all excavated peat in accordance with the Peat Reinstatement Management Plan (PRMP).</p> <p>Habitat restoration in accordance with Habitat Management Plan (HMP) and subsequent monitoring during operational phase.</p> | Minor (Adverse)- Minor (Beneficial) |
| Disruption and damage to peat habitat | Short term, reversible | Negligible – Moderate (Adverse) | <p>Avoiding areas of deep peat. Use of floating roads. Plugging of eroded gullies / opportunities for habitat enhancement</p> <p>Peat reinstatement and restoration of damaged vegetation. Further monitoring during operational phase in accordance with the Habitat Management Plan (HMP).</p> | Minor (Adverse)- Minor (Beneficial) |
| <i>Geology</i> | | | | |
| Removal of superficial deposits during excavations | Long term, irreversible | Negligible | None | Negligible |
| Potential release of polluting substances | Short term, reversible | Negligible | Appropriate mitigation measures to minimise any leaks or spillages | Negligible |
| <i>Hydrology and hydrogeology</i> | | | | |
| Impact on hydrological / hydrogeological regime | Short term, irreversible | Major (Adverse) | Use of permeable access tracks and hardstanding. 50m avoidance area from watercourses and waterbodies. Avoiding areas of deep peat and excessive vegetation removal. | Minor (Adverse) |

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| <i>Description</i> | <i>Nature of impact</i> | <i>Scale of impact</i> | <i>Embedded/applied mitigation</i> | <i>Residual scale of impact</i> |
|--|--------------------------|------------------------------|--|---------------------------------|
| Impact on water quality | Short term, irreversible | Major (Adverse) | Pollution prevention measures (PPG1, PPG21 and PPG22) and measures in CEMP or equivalent. | Minor (Adverse) |
| Noise | | | | |
| Noise generation from construction activities | Short term, reversible | Negligible | Residents will be provided with information regarding the working schedule. All vehicles and mechanical plant will be fitted with effective exhaust silencers. Inherently quiet plant will be selected where possible. | Negligible |
| Air quality | | | | |
| Generation of dust during construction activities | Short term, reversible | Minor – Negligible (Adverse) | Site specific Dust Management Plan. | Negligible |
| Highways and transportation | | | | |
| Impact on users of/residents adjacent to A968, Yell and B-9081 due to construction traffic | Short term, reversible | Minor – Moderate (Adverse) | Construction Traffic Management Plan to be implemented. | Negligible |
| Transportation of abnormal indivisible loads | Short term, reversible | Minor – Moderate (Adverse) | Road upgradation works to be undertaken along with a review of clear heights with utility providers, trimming of vegetation and confirmation with police regarding the transportation strategy. | Minor (Adverse) |

Table 22.2 : Environment management during operation

| <i>Description</i> | <i>Nature of impact</i> | <i>Scale of impact</i> | <i>Embedded/Additional mitigation</i> | <i>Residual scale of impact</i> |
|---|-------------------------|------------------------|--|---------------------------------|
| <i>Socio-Economic</i> | | | | |
| Creation of jobs | Short term, reversible | Minor (Beneficial) | 'Meet the Developer' sessions to enable local community to take advantage of the opportunities during operation phase | Minor (Beneficial) |
| Wider socio economic benefits due to creation of community fund and development of business | Short term, reversible | Minor (Beneficial) | None | Minor (Beneficial) |
| Impact on tourism and recreation | Long term, reversible | Minor (Adverse) | Layout optimised to minimise the visual impact on recreational receptors | Minor (Adverse) |
| <i>Landscape and visual impact</i> | | | | |
| Impact on Shetland National Scenic Areas | Long term, reversible | Minor (Adverse) | The layout of the turbines has embedded mitigation to avoid landscape effects. The lower elevation and the screening of turbines by the intervening landform on Yell will limit the views from the rugged coastline which contributes to the special qualities of the National Scenic Area | Negligible |
| Impact on local landscape areas | Long term, reversible | Negligible | None | Negligible |

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| <i>Description</i> | <i>Nature of impact</i> | <i>Scale of impact</i> | <i>Embedded/Additional mitigation</i> | <i>Residual scale of impact</i> |
|---|-------------------------|----------------------------|---------------------------------------|---------------------------------|
| Effects on following landscape characters: | | | | |
| LCA B1 : Yell Peatland | Long term, reversible | Moderate – Major (Adverse) | None | Moderate – Major (Adverse) |
| LCA F5: Scattered Settlements/Crofting and Grazing Land | | | | |
| LCA G: Coastal Edge | | | | |
| Visual Effects experienced from Viewpoints: | | | | |
| White Wife Burravoe Old Haa | Long term, reversible | Moderate – Major (Adverse) | None | Moderate – Major (Adverse) |
| B9081 at Whirly | | | | |
| Ulsta | | | | |
| B9081 at South Ward | | | | |
| Reafirth | | | | |
| Mossbank | | | | |
| Lunna Ness near Outrablister | | | | |
| Brough Lodge, Fetlar | | | | |
| Gossaborough Beach | | | | |
| Hill of Arisdale | | | | |
| Access Route ARY06, Neapaback, Burravoe | | | | |

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| <i>Description</i> | <i>Nature of impact</i> | <i>Scale of impact</i> | <i>Embedded/Additional mitigation</i> | <i>Residual scale of impact</i> |
|--|-------------------------|--------------------------------|---|---------------------------------|
| Residential visual amenity | | | | |
| Effects on residential amenity for 34 residential receptors located within 2km of the turbines | Long term, reversible | Minor – Moderate (Adverse) | Appropriate separation distances will be maintained between the turbines and properties and the location of the turbines will be outside the main views available from each property | Minor (Adverse) |
| Cultural Heritage | | | | |
| Impact on settings of designated cultural heritage assets | Long term, reversible | Negligible –Moderate (Adverse) | A landscape survey around the summit of the Hamars of Houlland coupled with improved access to and information on the features identified and surveyed will be carried out and presented to increase the community's understanding of its historic landscape and local heritage. Interpretation boards describing and interpreting the identified heritage features as well as the wider landscape will also be placed within a marked heritage trail within this part of the Study Area as shown in Figure 3.20. | Negligible –Moderate (Adverse) |
| Ornithology | | | | |
| Collision risk to red-throated divers , greylag geese, golden plover, dunlin, lapwing, ringed plover, curlew, arctic skua, great skua and merlin | Long term, reversible | Negligible (Adverse) | Final design of Proposed Development avoids identified nesting/breeding sites and takes into account flight activity. Ecological enhancement measures proposed for red-throated divers and merlin habitats within and outwith the Application Boundary | Negligible (Adverse) |

Table 22.2 : Environment management during operation

| <i>Description</i> | <i>Nature of impact</i> | <i>Scale of impact</i> | <i>Embedded/Additional mitigation</i> | <i>Residual scale of impact</i> |
|--|-------------------------|------------------------|--|---------------------------------|
| Impact due to ecological enhancement measures proposed for red-throated divers and merlin habitats within and outwith the Application Boundary | Long term, irreversible | Beneficial | None required | Beneficial |
| <i>Ecology</i> | | | | |
| Impact due to noise generation from turbines | Long term, reversible | Negligible | None required | Negligible |
| <i>Hydrology and hydrogeology</i> | | | | |
| Impact on water quality | Short term, reversible | Major (Adverse) | Pollution prevention measures (PPG1, PPG21 and PPG22). | Minor (Adverse) |
| <i>Noise</i> | | | | |
| Generation of noise due to operation of wind turbines | Long term, reversible | Negligible | None required | Negligible |
| <i>Highways and transportation</i> | | | | |
| Increase in local traffic (2 vehicle movements per week and occasional abnormal load) | Short term, reversible | Negligible | None required | Negligible |

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| <i>Description</i> | <i>Nature of impact</i> | <i>Scale of impact</i> | <i>Embedded/Additional mitigation</i> | <i>Residual scale of impact</i> |
|---|-------------------------|------------------------|--|---------------------------------|
| Shadow flicker | | | | |
| Residential properties, Gossabrough | Long term, reversible | Significant (Adverse) | Programming the turbines to switch off during potential shadow flicker occurrences | Negligible |
| Residential properties, East Yell and Burravoe | Long term, reversible | Not significant | None required | Not significant |
| Telecommunications | | | | |
| Impact on BT microwave link between Symbister and Yell | | No Impact | Layout changed to have all turbines at least 25m outside of the second Fresnel zone of the link | No Impact |
| Impact on link managed by Airwave Solutions | | No impact | A lattice tower will be constructed in the south eastern corner of the Site to redirect the signal around the turbines to the existing tower at Mid Yell | No impact |
| Aviation | | | | |
| Impact on Scasta Airport's existing NDB (L) Runway 24 Instrument Approach procedure | Long term, Reversible | Significant (Adverse) | Use of aviation lighting. Amendment to some operating procedures. | No residual effects |
| Impact on Sumburgh primary surveillance radar | - | No Impact | None required | No impact |

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| <i>Description</i> | <i>Nature of impact</i> | <i>Scale of impact</i> | <i>Embedded/Additional mitigation</i> | <i>Residual scale of impact</i> |
|---------------------------------------|-------------------------|------------------------|---------------------------------------|---------------------------------|
| Impact on Fitful Head Secondary Radar | Surveillance - | No Impact | None required | No impact |
| Impact on MOD, Met Office and NATS | - | No Impact | None required | No impact |

Table 22.3: Environment management during decommissioning

| <i>Description</i> | <i>Nature of impact</i> | <i>Scale of impact</i> | <i>Embedded/Additional mitigation</i> | <i>Residual Scale of impact</i> |
|---|-------------------------|-----------------------------|---------------------------------------|---------------------------------|
| <i>Socio-economic</i> | | | | |
| Temporary job opportunities and wider economic benefits | Short term, reversible | Minor (Beneficial) | None required | Minor (Beneficial) |
| <i>Landscape and visual impact assessment</i> | | | | |
| Impact on landscape fabric | Short term, reversible | Negligible | None required | Negligible |
| Impact on Landscape Character | Short term, reversible | Moderate to Major (Adverse) | None required | Negligible |

Table 22.3: Environment management during decommissioning

| <i>Description</i> | <i>Nature of impact</i> | <i>Scale of impact</i> | <i>Embedded/Additional mitigation</i> | <i>Residual Scale of impact</i> |
|---|-------------------------|------------------------|--|---------------------------------|
| Visual impacts on receptors in the southeast of Yell due to use of cranes | Short term, reversible | Moderate (Adverse) | None required | Negligible |
| <i>Ornithology and Ecology</i> | | | | |
| Scoped out because: | | | | |
| (i) the future baseline conditions (environmental and other developments) cannot be predicted accurately at this stage; | | | | |
| (ii) the proposals for decommissioning are not known at this stage; and | | | | |
| (iii) the best practice guidance on decommissioning methods will likely change during the life-time of the Proposed Development and so cannot be predicted at this stage. An additional consultation one year in advance of the year of decommissioning proposed. | | | | |
| <i>Hydrology and hydrogeology</i> | | | | |
| Impact on hydrological / hydrogeological regime | Long term, irreversible | Minor (Neutral) | Removal of impermeable surfaces and habitat restoration. | Negligible |
| Impact on water quality | Short term, reversible | Minor (Adverse) | Pollution prevention measures (PPG1, PPG21 and PPG22) and or future equivalents. | Negligible |
| <i>Noise</i> | | | | |
| Noise generation from decommissioning activities | Short term, reversible | Negligible | Residents will be provided information regarding the working schedule. All vehicles and mechanical plant will be fitted with effective exhaust silencers. | Negligible |

Table 22.3: Environment management during decommissioning

| <i>Description</i> | <i>Nature of impact</i> | <i>Scale of impact</i> | <i>Embedded/Additional mitigation</i> | <i>Residual Scale of impact</i> |
|---|-------------------------|------------------------|--|---------------------------------|
| Inherently quiet plant will be selected where possible. | | | | |
| <i>Air quality</i> | | | | |
| Impact on dust receptors (recreational routes, residential and ecology) | Short term, reversible | Negligible (Adverse) | Dust Management Plan (DMP) | Negligible |
| <i>Highways and transportation</i> | | | | |
| Increase in Local Traffic | Short term, Reversible | Minor (Adverse) | Decommissioning Phase Traffic Management Plan (DTMP) | Negligible |

- 22.3.2 The mitigation measures identified in Tables 22.1 – 22.3 will be guaranteed for the Proposed Development through the imposition of planning conditions; a draft schedule of conditions for consideration is provided in Appendix 22.1.

22.4 Monitoring

- 22.4.1 Along with mitigation, environmental monitoring will be undertaken during the construction and operation phases of the Proposed Development. The monitoring requirements for the construction phase will be detailed out in the CEMP. The monitoring activities will include but will not be limited to the following.

Ornithology

- 22.4.2 Monitoring of a range of ornithological receptors will be undertaken prior to construction, during construction and during operation. As a general principle, NatureScot's (previously SNH's) post-consent and post-construction monitoring guidance (SNH, 2009) (or any subsequent updates) will be followed, and procedures agreed with SIC. An independent and fully qualified ECoW will be employed during construction of the Proposed Development.
- 22.4.3 Pre-construction surveys will be carried out and used to inform and adjust the construction programme to avoid disturbance to Schedule 1 and Annex 1 breeding birds (offences under the Wildlife and Countryside Act 1981 (as amended by the Nature Conservation (Scotland) Act 2004)). This survey will form the basis of a detailed Bird Biodiversity Protection Plan which will form a part of the Construction Environment Management Plan to ensure that construction activities do not result in disturbance of important avian receptors present. Suitable disturbance free buffer zones will be identified around any Schedule 1 breeding birds if found to be present.

Water quality monitoring

- 22.4.4 Water quality monitoring at locations upstream and downstream of the proposed watercourse crossings will be undertaken before, during and for one year after construction. Analysis would include both visual recording and field monitoring using portable water sampling equipment, undertaken by an experienced hydrologist. The following determinants would be monitored: pH; turbidity; dissolved oxygen (% saturation); Dissolved Organic Compounds (DOC); and suspended solids (μS). During determination of the original application, Marine Scotland raised queries about water quality monitoring which were subsequently addressed through the FEI submission (Appendix 1.2) and the application of suitably worded planning conditions.