14 Schedule of Mitigation

14.1 Introduction

14.1.1 The Schedule of Mitigation provides a summary of good practice, mitigation measures and commitments that have been proposed throughout the Environmental Impact Assessment (EIA) Report to prevent, reduce or offset the effects of the proposed development on the environment.

14.1.2 Good practice and mitigation measures have been integral to the design evolution of the proposed development as described in Chapter 3: Design Evolution and Alternatives. A series of environmental and technical constraint lead design reviews were undertaken to minimise potential significant environmental impacts prior to finalising the final design of the proposed development. Areas which were examined in depth include landscape and visual constraints, peat, sensitive habitats, cultural heritage and hydrological constraints.

14.2 Schedule of Commitments

14.2.1 The mitigation measures and best practice commitments in Table 14.1 are those which would be applied prior to construction, during construction and during operation of the proposed development. A number of these measures are embedded mitigation, undertaken through good practice and to adhere to relevant legislation during all stages of the proposed development.

14.3 Overall Statement of Significance

14.3.1 Provided that the proposed mitigation measures are successfully implemented, the residual effects related to most environmental disciplines would not be considered significant effects in the context of the EIA regulations, with the exception of some localised landscape and visual effects and setting effects upon two cultural heritage assets.

14.3.2 All renewable energy developments incorporating wind turbines are likely to give rise to some significant landscape and visual effects. In the case of the proposed development, significant landscape character effects would be confined to a distance of approximately 5km of the proposed wind turbines. It is considered that the landscape can accommodate the proposed development, alongside other existing operational, consented and proposed wind farms.

14.3.3 A moderate significance of effect has been identified on the settings of Bloch Farm (**SM4690**) and Gibbs Hill (**SM4518**) scheduled monuments as a result of the proposed development. Although significant, these impacts are not considered to be so severe that they would reduce the ability to understand or appreciate these assets, and the overall integrity of these assets would therefore not be adversely affected.

Table 14.1: Summary of Mitigation and Commitments

EIAR Chapter	Matter/Effect requiring mitigation	Timing / Phase	Mitigation Measure
Chapter 2: Project Description	Environmental management	Construction	The developer would engage an Environmental Clerk of Works (ECoW) on-site during the construction phase. The Principal Contractor (PC) will ensure construction activities are carried out in accordance with the mitigation measures outlined in this EIA Report and any planning conditions, this will be monitored by the applicant and the ECoW. An outline Construction Environmental Management Plan (CEMP) is provided as Technical Appendix 2.1. This sets out the applicant's requirements for inclusion within a detailed CEMP and other documents including guidance and best practice for adoption during construction of the proposed development. The outline CEMP provides an overview of the following aspects of environmental management required to mitigate any potential environmental incidents during construction: • design philosophy and construction methodologies; • surface and ground water management; • water quality monitoring; • flood risk management; • private water supply management; • waste and resource management; • wastewater and water supply monitoring and control; • noise and vibration control; • dust and other emissions to air control. • spoil management; • peat slide monitoring and control; • oil and chemical delivery and storage; • temporary lighting management; • existing on-site utilities management; • post construction reinstatement; • construction traffic management; • health and safety management; • public liaison provision; and • decommissioning and restoration methodologies. To ensure all mitigation measures outlined within this EIA Report are carried out on-site, contractors will be required to develop a Construction Environmental Management Plan (CEMP) which will form an overarching document for all site management requirements, including: • a Pollution Prevention Plan; • a Peat Management Plan; • a Construction Traffic Management Plan; • a Site Waste Management Plan; • a Borrow Pit Management Plan; • a Path Management Plan; and • a Water Quality Monitoring Plan. The final CEMP would be agreed in advance with Dumfries and Galloway Council (DGC) in consultation with other stakeholders, prior to commencement of construction. Performance against the CEMP would be monitored by the applicant, the ECoW and PC throughout the construction period.
Chapter 5: Landscape and Visual Impact Assessment	Wind turbine layout and height of wind turbines	Operation	The design of the wind turbine layout has taken into account the local and wider landscape and visual receptors to best design a scheme which minimises the impact on the landscape. This takes account of adjacent and nearby windfarms and those in the planning system.
	Aviation Lighting	Operation	The applicant is committed to reducing significant environmental effects predicted during the development of its sites and the following mitigation measures will be deployed at the proposed development as part of the reduced Aviation Lighting Scheme agreed with the Civil Aviation Authority (CAA). • Intermediate level 32 candela lights are not required to be fitted on the turbine towers.

			• Medium intensity steady red (2000 candela) lights will only be required on the nacelles of turbines T01, T02, T05, T06, T07, T08, T10, T13, T14, T15, T17, T18, T20 and T21; and • the lights on these turbines to be capable of being dimmed to 10% of peak intensity when the lowest visibility as measured at suitable points around the wind farm by visibility measuring devices exceeds 5km.
Chapter 6: Archaeology and cultural heritage	Protection of on-site assets	Construction	Appropriate mitigation undertaken during construction would be in the form of: • a watching brief on elements of the ground works that have potential to have direct impacts on unrecorded buried archaeology; and • fencing off and avoidance of known heritage assets in close proximity to the proposed development that could otherwise be accidentally damaged during the construction works.
Chapter 7: Ecology	General	Pre-construction	The applicant has committed to the production of a CEMP to the satisfaction of NatureScot and other relevant stakeholders, before construction commences, and would follow Windfarm Good Construction Guidance, Scottish Renewables et al (2010). An outline CEMP is included within Technical Appendix 2.1. A Species Protection Plan (SPP) will be required to ensure compliance with the Wildlife and Countryside Act (a) to avoid any impacts to species specially protected under Schedule 5 of that Act and (b) to avoid any damage to active setts/holts/hibernacula. The SPP would be agreed in writing with DGC, in consultation with relevant stakeholders, prior to the commencement of development.
	Protected Species	Pre-Construction	Though no species specially protected under Schedule 5 of the Wildlife and Countryside Act or the Badgers Act were found within the potential impact zone of the proposed development, species such as badger, otter and water vole could move into that area in the future. Further surveys for these species will therefore be undertaken immediately prior to construction. If any were found, then appropriate mitigation would be implemented and/or licence sought from NatureScot.
	Wet modified bog	Construction	The outline Habitat Management Plan (HMP) outlines proposals for the restoration of an area of approximately 50ha of wet modified bog across the site, that has been exposed to grazing, and is of a lower quality than would be expected of intact blanket mire. The outline HMP aims to restore underlying conditions for modified blanket bog and improve the quality of blanket mire habitat within the HMP area. This would be achieved by the damming of drains across the habitat management areas, using a special technique developed and used successfully on other similar projects by the applicant.
	Bats	Operation	Preventing wind turbine blades turning when not operational at dusk and dawn, via the wind turbine SCADA system.
Chapter 8: Ornithology	Birds	Pre-construction / Construction	A Breeding Bird Protection Plan (BBPP) would be in place prior to the onset of construction activities. The BBPP will describe survey methods for the identification of sites used by protected birds and will detail protocols for the prevention, or minimisation, of disturbance to birds as a result of activities associated with the proposed development. The final BBPP would be agreed in writing with DGC, in consultation with relevant stakeholders, prior to the commencement of development. Implementation of the BBPP would be monitored by the ECoW.
	Breeding Birds	Construction	The outline HMP outlines proposals to increase the suitability of the moorland habitats for breeding curlew and other breeding waders including snipe and lapwing, thus providing enhanced breeding habitat over 500m from the proposed wind turbines. The final HMP would be agreed in writing with DGC, in consultation with relevant stakeholders, prior to the commencement of development.
Chapter 9: Hydrology, Hydrogeology, Geology and Soils	Impacts arising from construction activities including: • detrimental impacts to on-site and downstream water quality; • detrimental effects to on-site and downstream fisheries as a result of changes to water quality; • increases to on-site and downstream flood risk as a result of poor construction practices (including poor construction of watercourse crossings);	Construction	Mitigation to protect water quality and PWS, mitigate flood risk, and maintain drainage pathways will be implemented as follows: • Appropriate drainage design that incorporates sediment management measures to attenuate and treat runoff from construction activities. • Measures will be designed to encourage water retention within peat/soils. • Appropriate storage and handling of potential pollutants. • Refuelling of construction plant in designated areas. • Adoption and agreement on emergency measures should significant effects occur. • Appropriate design of watercourse crossings to prevent increased flood risk downstream and allow free passage of fish and mammals.

• impacts to PWS on and near the proposed development; and • peaty gleys as a result if interrupting surface and sub-surface drainage pathways.		• Identification of subsurface hydrological pathways prior to construction. The mitigation will be laid out in detail in the CEMP, which for hydrological elements can include, but not limited to the following: • Pollution Prevention Plan; and • Water Quality Monitoring Plan. • The final CEMP would be agreed in writing with DGC, in consultation with relevant stakeholders, prior to the commencement of development.
Water abstractions	Construction	Abstraction of water for construction and batching activities may be required from a suitable source yet to be identified. An application for license under the Controlled Activities Regulations (CAR) would be made to SEPA. Should a suitable source not be identified, a water bowser would be used. Good practice that would be followed in addition to the CAR licence regulations includes: • water use would be planned so as to minimise abstraction volumes; • water would be re-used where possible; • abstraction volumes would be recorded; and • abstraction rates would be controlled to prevent significant water depletion in a source.
Water course quality	Construction	The sub catchments of the River Esk, River Sark and Wauchope Water have been highlighted as being at risk of potential construction effects due to the nature of the works within the catchments as well as their high sensitivity. Water quality monitoring before and during the construction phase would be undertaken, to ensure that the tributaries of the main channels identified at risk from the proposed development have no significant impacts to water quality and/or quantity. Monitoring would be carried out at a specified frequency (depending upon the construction phase) on these catchments. This monitoring would continue throughout the construction phase and immediately post construction. Monitoring would be used to allow a rapid response to any pollution incident as well as assess the impact of good practice or remedial measures. Monitoring frequency would increase during the construction phase if remedial measures to improve water quality were implemented. A Water Quality Monitoring Plan (WQMP) would be developed during detailed design (SEPA, DGC and Galloway Fisheries Trust would be consulted on the WQMP) and would be contained within the CEMP. The performance of the good practice measures would be kept under constant review by the water monitoring schedule, based on a comparison of data taken during construction with a baseline data set, sampled prior to the construction period.
Water course crossings	Construction	4 new watercourse crossings are required during the construction phase and would remain in place during the operational phase. Good practice in relation to new water crossings involves the following aspects: the design of the watercourse crossings would be agreed with SEPA prior to construction and be regulated in accordance with CAR; the appropriate crossing type would be identified from SEPA's good practice guidance and would take into account any ecological and hydrological constraints; and the crossing would be sized and designed so as to minimise effect upon flood risk (sized to accommodate at least the 200 year flow).
Peat management	Construction / Pre-operation / Operation	A Stage 1 Peat Management Plan has been prepared for the proposed development and accompanies this application. A Stage 2 PMP would be prepared following further site investigation work which would ensure that, after avoidance and minimisation, residual peat is beneficially used for reinstatement and carbon sequestration. The Stage2 PMP would be agreed in writing with DGC, in consultation with relevant stakeholders, prior to the commencement of development.

	Peat landslide hazard	Construction	A Design and Geotechnical Risk Register would be compiled by the appointed PC to include risks relating to peat instability, as this would be beneficial to both the applicant and the PC in identifying potential risks that may be involved during construction. Good construction practice and methodologies to prevent peat instability within areas that contain peat deposits are identified in the Peat Slide Risk Assessment (Technical Appendix 9.3). Detailed design and construction practices would need to take into account the particular ground conditions and the specific works at each location throughout the construction period. An experienced and qualified engineering geologist / geotechnical engineer would be appointed as a supervisor, to provide advice during the setting out, micro-siting and construction phases of the proposed development.
	Operational effects including: detrimental impacts to on-site and downstream water quality through degradation of the proposed development infrastructure and poor storage of materials; detrimental effects to on-site and downstream fisheries as a result of changes to water quality (as described above); and increases to on-site and downstream flood risk as a result of degradation of infrastructure and/or poor.	Operation	Mitigation in the form of an Operational Drainage and Monitoring Plan (designed prior to construction) which will include: Appropriate drainage design that incorporates sediment management measures to attenuate and treat runoff from the proposed development; Appropriate storage and handling of potential pollutants; and Adoption of a long-term monitoring programme to monitor degradation of infrastructure (including the removal of blockages from watercourse crossings). The plan can detail the appropriate monitoring methods, including: Visual monitoring and completion of checklists signed off by SEPA; and regular water quality monitoring for a period post construction to determine potential long terms effects of the proposed development on water quality.
Chapter 11: Noise	Construction noise	Construction	An outline CEMP is provided as Technical Appendix 2.1. The final CEMP would be agreed in writing with DGC, in consultation with relevant stakeholders, prior to the commencement of development. This would include measures to control construction noise including: as proposed in Chapter 2, construction works that may give rise to audible noise at the surrounding properties and heavy goods vehicle deliveries to the site would be limited to the hours 0700 to 1900 Monday to Saturdays, unless otherwise approved in advance by DGC (except in case of an emergency); all construction activities shall adhere to good practice as set out in BS 5228; all equipment would be maintained in good working order and any associated noise attenuation such as engine casing and exhaust silencers shall remain fitted at all times; where flexibility exists, activities would be undertaken away from residential properties, set back by the maximum possible distances; a Construction Traffic Management Plan would be developed to control the movement of vehicles to and from the site; construction plant capable of generating high noise and vibration levels would be operated in a manner to restrict the duration of the higher magnitude levels; and in particular, if noise-generating activities could occur outside of the stated working hours, this could potentially lead to increased effects of potentially minor significance, but it is considered unlikely that significant effects could arise due to construction due to the large distances involved for the proposed activities in the wide majority of cases.
	Blasting operations	Construction	Unless otherwise agreed in consultation with DGC, for example due to large separation distances, if blasting is to be employed at some of the borrow pits, the potential noise and vibration effects of blasting operations would be reduced (unless otherwise agreed with DGC due to important separation distances) according to the guidance set out in the relevant British Standards and PAN50 Annex D: • blasting should take place under controlled conditions with the agreement of the relevant authorities, at regular times within the working week, that is, Mondays to Fridays, between the hours of 0800 and 1800 or between the hours of 0800 and 1300 on Saturdays; • vibration levels at the nearest sensitive properties are best controlled through on-site testing processes carried out in consultation with DGC. This site testing-based process would include the use of progressively increased minor charges to gauge ground conditions both in terms of propagation characteristics and the level of charge needed to release the requisite material. If

			required, the use of on-site monitoring at neighbouring sensitive locations during the course of this preliminary testing can then be used to define upper final charge values that would ensure vibration levels remain within the criteria set out previously, as described in BS 5228-2 and BS 6472-2; • blasting operations would adhere to good practice as set out in BS 5228-2, and in PAN50, Annex D, Paragraph 95 in order to control air overpressure; and • a scheme would be submitted to DGC for approval of blasting details, which would outline the mitigation measures to be adopted
	Operational noise	Operation	Impact is deemed to be acceptable as proposed development meets noise limits specified by relevant guidance both alone and in the cumulative scenario with an appropriate noise management strategy in place. The selection of the final wind turbine to be installed at the site would be made on the basis of enabling the ETSU-R-97 noise limits to be achieved at surrounding properties, including any relevant tonality corrections. No additional mitigation measures are required due to absence of identified significant effect.
Chapter 13: Other Issues	Shadow Flicker	Operation	Impacts of shadow flicker on residential receptors within 10 rotor diameters of the wind turbine locations will be controlled by installing shadow flicker shut down modules in the wind turbines and shutting down individual wind turbines during times when wind and climactic conditions are such that shadow flicker could occur.