Chapter 3 Project Description

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List of Abbreviations

Abbreviation	Description
AID	Abnormal Indivisible Loads
AOD	Above Ordnance Datum
CAA	Civil Aviation Authority
CEMP	Construction Environment Management Plan
CMS	Construction Methodology Statement
DEMP	Decommissioning Environmental Management Plan
DMP	Drainage Management Plan
ECoW	Environmental Clerk of Works
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
GCR	Geological Conservation Review
HES	Historic Environment Scotland
HMP	Habitat Management Plan
IR	Infra-red
MOD	Ministry of Defence
OEMP	Operation Environmental Management Plan
PMP	Peat Management Plan
PPP	Pollution Prevention Plan
SAC	Special Area of Conservatrion
SEPA	Scottish Environment Protection Agency

Abbreviation	Description
SSSI	Site of Special Scientific Interest
SM	Schedule Monument
SWMP	Site Waste Management Plan
THC	The Highland Council
TMP	Traffic Management Plan

3. Project Description

3.1 Introduction

3.1.1 This chapter provides a description of the site and the geographical context. It presents a description of the Proposed Development for which consent is being sought, for the purposes of informing the identification and assessment of likely significant environmental effects. This includes details of the infrastructure components, and construction, operation and decommissioning details.

3.2 Site Status and Context

Background and Site Description

3.2.1 The Proposed Development site is located approximately 10 km north-west of Grantown-on-Spey and 14 km east of Tomatin in the Scottish Highlands.

3.2.2 The site comprises an area of approximately 1,458 hectares (ha) of land and the site varies in topography from 290 m Above Ordnance Datum (AOD) in the northern section of the site to 460 m AOD in the southern section of the site.

3.2.3 The site is located in an area of open moorland, bounded to the east by the B9007 and to the west by the Leonach Burn. A number of tributaries to the Tomlachlan Burn intersect the site, with the Tomlachlan Burn running south to north through the centre of the site.

3.2.4 No residential properties (either existing or for which there is a live planning permission) lie within the site boundary or within 2 km of the proposed turbine locations. The principal settlement in the nearby locality surrounding the site is Grantown-on-Spey, which lies around 10 km to the south-east of the site. Inverness, the nearest city to the site, lies around 25 km to the north-west.

Environmental Designations

3.2.5 **Figure 3.1** shows sites with environmental designations within 5 km of the Proposed Development. A brief summary of these is provided below with full descriptions provided in the relevant technical chapters of the EIA Report. All on site designations are shown on **Figure 2.1**.

3.2.6 Between the site boundary and up to 5 km from the site boundary, the relevant designations are as follows:

- one Site of Special Scientific Interest (SSSI): Allt a'Choire;
- one Geological Conservation Review (GCR) site: Allt a'Choire;
- two A-listed buildings and four B-listed buildings;
- seven Scheduled Monuments (SM): Lochindorb Castle, Aitnoch Cairn, Dunearn Fort, Balnught Hut Circle, Little Banchor, Burnside Bridge and Princess Stone; and
- a number of areas of Ancient Woodland, as shown on **Figure 3.1**.

3.2.7 Additionally, between 5 and 10 km from the site boundary, the relevant designations are as follows:

- four SSSIs: Findhorn Terraces, Carn nanTri-tighearnan, Allt na Feithe Sheilich and Moidach More;
- two Special Areas of Conservation (SACs): Carn nanTri-tighearnan and Moidach More;
- three GCRs: Findhorn Terraces, Allt na Feithe Sheilich and Muckle Burn Clunas;

- three SMs: Levrattich Cairn, Ruthven depopulated township, Edinchat Cairn;
- four A-listed buildings and several B-listed buildings; and
- a number of areas of Ancient Woodland.

Cumulative Developments

3.2.8 **Figure 6.27** shows the locations of other relevant large wind developments in planning, consented/under construction, and operational within 20 km of the Proposed Development at the time of writing (October 2021). Potential cumulative effects with these developments have been assessed throughout the EIA Report, where there is sufficient information.

3.2.9 Further detailed discussion on the approach to cumulative assessment is presented in each technical assessment chapter as relevant.

Description of the Proposed Development

3.2.10 The Proposed Development will comprise 17 wind turbines, associated transformers and switchgear at each turbine as well as an energy storage system. The overall capacity of the turbines will be approximately 102 MW, supported by additional energy storage provision with an output capacity of 10 MW. The associated infrastructure will include:

- site access;
- access tracks
- crane hardstandings;
- underground cabling
- on-site substation and maintenance building;
- energy storage facility;
- temporary construction compound;
- laydown area;
- potential excavations/borrow workings; and
- permanent meteorological mast.

3.2.11 The Proposed Development will re-use and share the existing infrastructure from the operational Tom nan Clach Wind Farm where possible, this includes the site entrance and access track from the B9007 across the northern boundary of the site.

Micro-siting

3.2.12 Whilst the location of the infrastructure described above has been determined through an iterative environmental based design process, there is the potential for these exact locations to be altered through micro-siting allowances prior to construction. A micro-siting allowance of up to 50 m in all directions is being sought in respect of each turbine and its associated infrastructure in order to address any potential difficulties which may arise in the event that pre-construction surveys identify unsuitable ground conditions or environmental constraints that could be avoided by relocation. No micro-siting will be undertaken that results in an increase in the significance of adverse effects. It is proposed that the micro-siting of all infrastructure will be subject to an appropriately worded planning condition.

3.2.13 The assessments within this EIA report have included the considerations of this 50 m micro-siting and it does not alter the conclusions formed as to worst case effects.

Turbines and Turbine Foundations

3.2.14 The Proposed Development will comprise 17 wind turbines (refer to **Figure 1.2**).

3.2.15 The proposed locations of the wind turbines have been defined in order to enable the EIA to describe fully the Proposed Development for which permission is being sought. The British National Grid coordinates denoting where each of the wind turbines are proposed to be located are listed in **Table 3-1** below.

Table 3-1: Turbine Coordinates

Wind Turbine	Easting	Northing
T01	292594	837820
T02	292949	837488
T03	293538	837541
T04	292315	837034
T05	293164	836834
T06	292461	836523
T07	292803	836222
T08	292178	835859
T09	292312	835392
T10	293288	835421
T11	293665	835121
T12	291882	834796
T13	292921	834660
T14	293596	834527
T15	291981	834304
T16	292481	834044
T17	293032	834026

3.2.16 Each of the wind turbines comprises of the following components:

- three blades;
- tower;
- nacelle;
- hub; and
- transformer and switchgear.

3.2.17 Each wind turbine will have a nacelle mounted on a tapered tubular steel tower. The nacelle will contain the gearbox or direct drive, the generator, the transformer and other associated equipment. The hub, and rotor assembly, including three blades, will be attached to the nacelle.

3.2.18 An elevation drawing of a typical wind turbine is illustrated in **Figure 3.2**. The wind turbines will be of a typical modern, three-blade, horizontal axis design in semi-matt white or light grey with no external advertising or lettering except for statutory notices. The specific wind turbine manufacturer and model has not yet been selected as this is subject to an on-going tendering exercise and will be confirmed post consent. Therefore, for the purposes of the EIA, likely wind

turbine dimensions and operational attributes, have been established as maximum development parameters.

3.2.19 The switchgear will be sited either within the base of each tower or externally sited, on the ground inside its own enclosure, a few metres from the tower. For the purpose of the EIA it has been assumed that the switchgear enclosure would be external and have approximate dimensions 3.6 m long by 3.5 m wide by 3.8 m high.

3.2.20 Wind turbine foundations are expected to comprise gravity bases. Until detailed ground investigations have been undertaken the exact size and depth of foundations required cannot be determined. Therefore, for the purposes of this EIA Report, the following approximate dimensions have been used:

- a round reinforced concrete slab approximately 30 m in diameter; and
- depth of the foundations approximately 3.5 m.

3.2.21 An illustration of a typical wind turbine foundation is provided in **Figure 3.3**. The actual foundation design will be specific to the site conditions as verified during detailed site investigations undertaken before construction commences. In the unlikely event that ground conditions are unsuitable for the standard foundation design described above, an alternative foundation design may be required.

Crane Hardstandings

3.2.22 To enable the construction of the turbines, a crane hardstanding area and turning area at each turbine location will be required to accommodate assembly cranes and construction vehicles. This will comprise a crushed stone hardstanding area measuring approximately 95 m long by 40 m wide with a typical thickness of approximately 1 m. The actual dimensions will be subject to the specifications required by the selected turbine manufacturer and crane operator and following detailed site investigations prior to construction commencing.

3.2.23 The crane hardstandings will remain in place during the lifetime of the Proposed Development to facilitate maintenance work.

3.2.24 Indicative crane hardstandings are illustrated as part of the site layout on **Figure 1.2** and **Figure 3.4**. Detailed construction drawings with final dimensions will be provided prior to commencement once the final turbine model has been selected.

Access

3.2.25 There are two proposed site access points, both from the B9007. The access to the north will utilise the existing access track for Tom nan Clach Wind Farm and enters the site just after crossing the Tomlachlan Burn.

3.2.26 The southern existing access is located approximately 2.5 km further south at the eastern part of the site boundary.

3.2.27 The Proposed Development will include approximately 14.5 km of new access tracks of which approximately 1.5 km would be floated over deep peat if, following detailed site investigations, deep peat cannot be avoided by micro-siting. This stretch of track over deep peat would be floated to avoid the requirement for excavation of peat. This would involve placing of a geotextile membrane on existing topsoil and vegetation followed by aggregate layers. Floating roads would be designed to ensure suitability for site traffic during construction and operation. Access track composition is shown on **Figure 3.5**.

3.2.28 The total length of roads for the Proposed Development is approximately 17.03 km and can be sub-divided into the categories detailed in **Table 3-2**. Typical access track cross sections are shown on **Figure 3.6**.

Table 3-2: Access Track Composition

Type	Description	Length (km)	Percentage of Total
Existing	Existing access tracks	1.58	9.28
Existing/Upgraded	Existing tracks, to be upgraded where necessary.	0.95	5.58
New	New tracks to be created.	14.5	85.14
Total		**17.03**	**100%**

3.2.29 A Transport Assessment (refer to **Chapter 12** and **Appendix 12.1**) has been prepared in support of the application for the Proposed Development. This assessment provides greater details on access routes to the site for construction vehicles and includes a review of the proposed route, construction traffic impacts, and an abnormal load route review.

3.2.30 Prior to construction, appropriate highway safety measures will be agreed with The Highland Council (THC) and secure by condition, and any necessary signage and traffic control measures will be implemented throughout the construction phase on the agreed basis. A Construction Traffic Management Plan (TMP) is outlined within **Chapter 12**.

Watercourse Crossings

3.2.31 A number of watercourses will be crossed by the proposed access tracks within the site. The new access tracks within the site will require new crossings to be put in place, or existing crossings may require some localised upgrading, for the following watercourses, as detailed **Table 3-3** below (refer to **Figure 1.2** and **Figure 9.1**). Further details of the water crossings (existing and proposed) are included in **Appendix 9.1** and discussed within **Chapter 9**.

3.2.32 It is proposed that the final solution and detailed design for all water crossings, including any potential upgrades or amendments required to existing crossings, will be addressed through an appropriately worded condition and in accordance with the requirements of the *Water Environment (Controlled Activities) (Scotland) Regulations 2011.*

Table 3-3: New Water Crossings Detail

ID	Easting	Northing	Type	Proposed Crossing Type
WCX1	293246	837883	Existing	Bridge
WCX2	291977	834477	New	Circular Culvert
WCX3	292009	834404	New	Circular Culvert
WXC4	292686	835163	New	Box Culvert
WCX5	292624	833879	New	Circular or Box Culvert
WCX6	292708	833816	New	Circular Culvert
WCX7	292989	834254	New	Circular Culvert
WCX8	293368	834994	New	Circular Culvert

ID	Easting	Northing	Type	Proposed Crossing Type
WCX9	293382	834992	New	Circular Culvert
WXC10	293795	834564	New	Circular Culvert

Construction Compound

3.2.33 Two secure construction and material storage compounds will be required during the construction period. The locations of these compounds are shown in **Figure 1.2**. Each compound will comprise an area of approximately 100 m by 100 m. An indicative layout of a typical construction compound is provided in **Figure 3.7**.

3.2.34 The compound areas will house temporary portable cabin structures to be used as the main site office and welfare facilities, including toilets, clothes drying and kitchen, with the provision for sealed waste storage and removal. They will also be used for the storage and assembly of wind turbine components, parking for vehicles, containerised storage for tools and small parts, and storage for cables, oil and fuel.

3.2.35 The proposed locations of the compounds are on firm ground and avoid habitats of highest sensitivity. Prior to commencing construction work, a detailed appraisal of the areas will be required, including an assessment by the project ecologist and also trial pits and /or boreholes to confirm the nature of the sub-strata.

3.2.36 The detailed location, size and engineering properties of the construction compounds will be confirmed prior to the start of construction, after the turbine supplier and model have been confirmed.

3.2.37 On completion of construction works, it is proposed that all temporary structures be removed and the compound areas be restored.

Substation & Energy Storage

3.2.38 The electrical power produced by the individual turbines will be fed to an onsite substation and energy storage facility via underground cables. The location of the proposed substation and energy storage facility is located in the centre of the site as shown on **Figure 1.2**. The design of the substation and control room building is relatively flexible and where appropriate may be clad in local materials to match in with the surroundings. Technology continues to develop in the field of energy storage, therefore the design of that element of the compound is proposed to be secured by an appropriately worded condition.

3.2.39 The wind farm array cables on site will be laid in trenches, typically approximately 0.5 m deep and 1 m wide, laid on a sand bed and backfilled using suitably graded material. The trenches will also carry earthing and communication cables for the operation of the Proposed Development. Cabling will mainly be located adjacent to the access tracks within the wind farm itself.

3.2.40 The substation and energy storage facility will be approximately 130 m by 100 m, to incorporate a substation and control room building, energy storage facility, and potentially some external electrical equipment. The substation and control building will accommodate all the equipment necessary for automatic remote control and monitoring of the Proposed Development, in addition to the electrical switchgear, fault protection and metering equipment required to connect the Proposed Development to the electricity transmission network. Depending on the nature of the connection, there may be external electrical infrastructure adjacent to the control building. Subject to economic viability, a separate energy storage facility with battery capacity

with an output of around 10 MW will be located adjacent to the control building. Details of the final design of all components of the substation and energy storage compound are proposed to be secured through an appropriately worded condition. An indicative substation elevation drawing, and energy storage facility elevation drawing are provided in **Figure 3.8**.

Borrow Pits

3.2.41 To minimise the volume of imported material brought onto the site and any associated environmental impact, borrow pits located within the site will be used to source stone for access track and compound construction. A borrow pit is an area where material has been excavated for use at another location.

3.2.42 Three borrow pit search areas have been identified within the Proposed Development boundary; these are shown on **Figure 1.2**.

3.2.43 Detailed site investigations prior to construction will be carried out to further confirm the rock type, rock characteristics and suitability, as well potential volumes to be extracted from the search area. The final borrow pit(s) identified during the geotechnical evaluation will be defined within the Construction Environmental Management Plan (CEMP) (refer to **Appendix 3.1 Outline CEMP**). The pollution control measures to be implemented during usage of the borrow pit(s) and its reinstatement will also be covered within this document.

3.2.44 The borrow pit(s) will require the use of plant to both win and crush the resulting rock to the required grading. It is anticipated that rock will be extracted by breakers and other relevant methods that may be required.

3.2.45 Environmental considerations have influenced the location of the borrow pit search areas to minimise the effect on ecology, hydrology and landscape, and to allow successful reinstatement measures to be put in place as appropriate. Following construction, the borrow pit(s) will be restored and reinstated to agreed profiles.

Meteorological Monitoring Mast

3.2.46 There will be a steel lattice tower meteorological monitoring mast located within the site boundary at the location shown in **Figure 1.2**.

3.2.47 The mast will be used to record wind speeds across the site and each will measure up to 110 m in height. An elevation drawing of a typical mast is provided as **Figure 3.9**.

3.3 Construction

3.3.1 The Proposed Development will be constructed over a period of approximately 18 months. Normal construction hours will be between 07:00 and 18:00 Monday to Friday and 07:00 to 13:00 on Saturdays. No working will, under normal conditions, be undertaken on Sundays or public holidays, however it is noted that if required, certain activities such as abnormal load deliveries may occur outside of these specified hours. Advance warning of any works out with the normal working hours will be provided to THC Environmental Health Officer (EHO) and local residents. Details of the construction programme will be provided to THC in the CEMP prior to the commencement of construction.

3.3.2 An indicative construction programme is detailed in **Table 3-4**.

Table 3-4: Indicative Construction Programme

Task	Month Number																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Mobilisation																		
Access & Site Tracks																		
Foundations																		
On-site Cabling																		
Substation civils works																		
Substation construction																		
Crane Hardstanding																		
Off-site Cabling																		
Turbine Delivery																		
Turbine Erection																		
Commissioning & Testing																		
Site Reinstatement																		

Construction Materials

3.3.3 The main materials likely to be required in part or total for the construction of the track, turbine and substation foundations, and hardstanding areas are described below:

- crushed stone
- geotextile;
- cement;
- concrete;
- steel reinforcement; and
- electrical cable.

3.3.4 Necessary excavations will be made, initially by stripping back the soil from the area to be excavated. This soil will typically be stored separately either in a mound adjacent to the excavation area for backfill, if required, or stored at a designated area on site for further use or reinstatement of temporary works areas. The handling of soils will be undertaken in accordance with best practice techniques.

3.3.5 For the purposes of the transport assessment, it has been assumed that concrete will be batched on site within the identified concrete batching areas and materials will be delivered to site on a spread programme.

3.3.6 Should surface water run-off or groundwater enter the excavation during construction of the turbine foundations, appropriate pumping measures away from watercourses will be implemented to ensure the works are safely carried out and the excavation is sufficiently dry to allow concrete placement. Once the concrete is cast, the excavated material will be used for backfill and compacted to the required design density. Once this backfill is completed, the crane hardstanding areas will be constructed.

3.3.7 The proposed method for constructing the wind turbines is as follows. The turbines will be erected using a large mobile crane or crawler crane, positioned on the hardstanding adjacent to the turbine base. A smaller tail crane will be positioned adjacent to the delivery position of the turbine components. The two cranes will lift the tower sections and blades into their assembly positions, and the main crane will lift the tower sections, nacelle and blades into their operational positions.

3.3.8 As soon as practical, once installation is complete, the immediate construction area will be restored to its original profile, although the crane hardstandings will be retained for future maintenance. The soils will be replaced and reseeded where appropriate and as advised by an onsite Environmental Clerk of Works (ECoW). Any surplus soils will be used to restore track edges after construction. This progressive reinstatement has been found to assist with re-establishment of the local habitats as it minimises the time soils are in storage.

Traffic & Transportation

3.3.9 A detailed Transport Assessment has been undertaken which provides details regarding transport and access to the site (refer to **Chapter 12**).

3.3.10 Construction traffic associated with the construction and maintenance of the Proposed Development falls into two main categories, namely Abnormal Indivisible Loads (AIL) and Construction / Maintenance Loads. The abnormal loads are those that will require an escort, either by Police Scotland or a private contractor. Construction / Maintenance Loads are those that do not require any specific escort or permissions and are only influenced by normal traffic regulations.

3.3.11 The Applicant will ensure that vehicles will be routed as agreed with THC, Transport Scotland and Police Scotland, to minimise disruption and disturbance to local residents and road users.

Pollution Prevention & Health and Safety

3.3.12 Prior to commencement of construction activities, a pollution prevention strategy, contained within a CEMP, will be agreed with the Scottish Environment Protection Agency (SEPA) to ensure that appropriate measures are put in place to protect watercourses and the surrounding environment. Further details regarding the contents of the CEMP are provided later in this chapter.

3.3.13 As with any development, during the construction stage there is the potential for threats to the quality of the water environment in waterbodies, watercourses 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 (refer to **Chapter 9** for further details).

3.3.14 Any fuel or oil held on site will only be of an amount sufficient for the plant required. This will be stored in a bunded area and an oil interceptor will be installed in the construction compound to prevent pollution in the event of a spillage.

3.3.15 High standards of health and safety will be established and maintained. At all times, all activities will be undertaken in a manner compliant with applicable health and safety legislation and with relevant good practice as defined under applicable statutory approved codes of practice and guidance.

3.3.16 Further details of site specific storage and management of fuel and oil and protection of watercourses during construction is presented in **Chapter 9**.

Construction Environmental Management Plan (CEMP)

3.3.17 As part of the construction contract, to ensure that all mitigation measures as set out within this EIA Report are carried out on site, the contractor responsible for undertaking the construction works shall produce and adhere to a CEMP. The CEMP shall be developed in accordance with '*Good Practice During Wind Farm Construction'* (Scottish Government *et al*., 2019).

3.3.18 The CEMP shall describe how the Applicant will ensure suitable management of the following environmental issues during construction of the Proposed Development:

- noise and vibration;
- dust and air pollution;
- surface and ground water;
- ecology (including protection of habitats and species);
- agriculture (including protection of livestock and land);
- cultural heritage;
- waste (construction and domestic);
- pollution incidence response (for both land and water); and
- site operations (including maintenance of the construction compound, working hours and safety of the public).

3.3.19 The CEMP is anticipated to include or cross-reference to, the following documentation:

- Construction Methodology Statement (CMS);
- Traffic Management Plan (TMP);
- Pollution Prevention Plan (PPP);
- Site Waste Management Plan (SWMP);

- Drainage Management Plan (DMP);
- Peat Management Plan (PMP) (refer to an outline plan in **Appendix 9.4**); and
- Habitat Management Plan (HMP) (refer to an outline plan in **Appendix 8.3**).

3.3.20 The contractor and/or Applicant shall consult with THC, SEPA, NatureScot and Historic Environment Scotland (HES) on relevant aspects of the CEMP. The contractor shall amend and improve the CEMP as required throughout the construction and decommissioning period.

3.3.21 The CEMP shall contain details of all environmental mitigation required during construction and details on how the contractor will implement and monitor this mitigation. The CEMP will also contain details on how the contractor will liaise with the public and landowners and how queries or complaints will be responded to.

3.3.22 Specific requirements of the CEMP for each of the environmental topics assessed within the EIA are provided in the relevant EIA Report chapters and an outline CEMP is provided in **Appendix 3.1**.

Pre-construction Surveys

3.3.23 Detailed surveys have informed the design process of the Proposed Development. However, certain design elements are dependent on turbine model and manufacturer, therefore detailed construction details will be decided once the turbine has been selected.

3.3.24 Pre-construction surveys will be undertaken to update the ecological and ornithological baseline and to perform detailed geotechnical ground surveys, further details of these are provided in the relevant technical chapters.

3.3.25 The Applicant will engage an Environmental Clerk of Works (ECoW) onsite during the construction phase. The ECoW be responsible for pre-construction surveys and will monitor the construction process on site to provide advice and ensure that the measures within the CEMP are followed.

3.4 Operation & Maintenance

3.4.1 The lifetime of the Proposed Development is envisaged to be 35 years from the final commissioning to commencement of decommissioning.

3.4.2 During operation, regular maintenance and servicing will be performed on each turbine. It is anticipated that the turbines will be monitored remotely and routine maintenance inspections and servicing visits by site management/technicians will occur at least twice per year per turbine. Additionally, there may be a need to conduct irregular, ad hoc maintenance in the event of a breakdown.

3.4.3 In the unlikely event that a major turbine component requires replacement, vehicles will use the new access tracks and crane pads, which will be retained during the operational phase to allow access.

3.4.4 Health and safety will be controlled as set out in the construction phase.

Operation Environmental Management Plan (OEMP)

3.4.5 The Applicant will implement an Operation Environmental Management Plan (OEMP). Similar to the CEMP, the OEMP will set out the mitigation measures proposed in the EIA Report and how the Applicant will manage and monitor environmental effects throughout the operation of the Proposed Development. The OEMP will also be developed in consultation with THC, SEPA, NatureScot and HES where relevant.

Aviation Lighting

3.4.6 As structures over 150 m high there is a statutory requirement for aviation lighting on the Proposed Development. Proposed lighting has been agreed with the Civil Aviation Authority (CAA) and Ministry of Defence (MOD), but will need final approval again with the CAA, prior to construction.

3.4.7 The specification of the lighting is provided below and detailed in full in **Chapter 14**.

- Medium intensity steady red (2000 candela) lights on the nacelles of turbines T01, T03, T14, T15 and T17 (five total);
- a second 2000 candela light on the nacelles of the above turbines to act as alternates in the event of a failure of the main light;
- the lights on these turbines to be capable of being dimmed to 10% of peak intensity when the visibility as measured at the wind farm exceeds 5 km;
- infra-red lights to MOD specification installed on the nacelles of all perimeter turbines, that is all turbines except T06, T09, T12 and T15; and
- All peripheral turbines will also have infra-red (IR) lighting meeting the requirements of the MOD.

3.5 Decommissioning

3.5.1 At the end of the Proposed Development's operational lifespan of 35 years, it will be decommissioned, unless further consents are sought. It is expected that decommissioning will take approximately 12 months. The environmental effects of decommissioning are considered to be similar to those during construction, excluding the loss of habitat which will have already occurred under construction.

3.5.2 Prior to decommissioning, a Decommissioning Environmental Management Plan (DEMP) will be produced to reflect then current legislation and policy and will be agreed with the relevant statutory authorities.

3.5.3 During decommissioning vehicles will access the site by the same route used for delivery and construction of the Proposed Development.

3.5.4 It is anticipated that certain components of the turbines will be dismantled and removed from site for disposal and/or recycling as appropriate and in accordance with regulations in place at the time. it is proposed to leave the buried portion of the foundations of the turbines in situ on decommissioning. This is considered to have less impact on the hydrological system which will have established itself during the lifetime of the wind farm than complete removal of the foundations.

3.6 Climate Change & Carbon Considerations

3.6.1 Increasing atmospheric concentrations of greenhouse gases (GHGs), including carbon dioxide (CO2) - also referred to as carbon emissions - are 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 Government climate change and renewable energy policy and commitments. The relevant aspects of such policies are summarised in **Chapter 5**.

Energy Generation

3.6.2 Whilst the Proposed Development will reduce carbon emissions by replacing the need to burn fossil fuels for power, carbon emissions will result from the component manufacturing, transportation and installation processes associated with the Proposed Development. There is also the potential for carbon fixers and sinks to be lost through the clearing of vegetation during construction. There must, therefore, be a sufficient balance between the carbon reduction associated with renewable energy development and that which is produced through construction/ fabrication processes and lost through site preparation.

3.6.3 The combined electrical output capacity from the wind turbine generators within the Proposed Development will be around 102 MW, with the exact capacity depending on the model and type of turbine selected. It would be expected that the site would generate around 261.2 GWh per year (again depending on the turbine selected).

3.6.4 The average electricity consumption per household in the UK quoted by RenewableUK is 3,578 kWh (RenewableUK, 2020). Assuming generation of 261.2 GWh annually, the Proposed Development would generate enough power to supply over 72,500 average UK households.

3.6.5 Although future wind yields cannot be guaranteed, if the Proposed Development continued to generate, on average, at this load factor over its proposed 35 year lifespan, it is expected that a total of approximately 7,836 GWh of renewable energy could be generated.

Carbon Emissions Savings

3.6.6 A technical review of energy displacement by the UK Energy Research Centre (UKERC) considered over two hundred studies and papers from all round the world for the UK Government and concluded that *"it is unambiguously the case that wind energy can displace fossil fuel-based generation, reducing both fuel use and carbon dioxide emissions"* (UKERC, 2006).

3.6.7 Whilst the wind turbines will reduce carbon emissions by replacing the need to burn fossil fuels for power, there is the potential for carbon fixers and sinks to be lost through the clearing of vegetation and materials for construction. There must therefore be a sufficient balance between the carbon reduced and that which is produced and lost through associated processes.

3.6.8 The Scottish Government's online Carbon Calculator Tool V1.6.1 has been completed for the Proposed Development (ref. PKO9-2SKA-RRJU v1). Input parameters are based on the proposed site design, infrastructure dimensions, results from peat depth surveys and laboratory testing of peat, and other information gained from site survey work, desk study and, where applicable, assumptions relating to groundwater, drainage, and habitat regeneration.

3.6.9 The output from the Carbon Calculator indicates the expected total carbon dioxide loss for the Proposed Development (from manufacture of turbines, construction, decommissioning, and carbon sink losses, also taking account of gains due to restoration of borrow bits) is 199,515 tonnes of carbon dioxide (tCO2 eq). Input and output parameters are detailed in **Appendix 3.3**.

3.6.10 Scottish Government guidance on wind farm carbon savings (Scottish Government, 2018), states: "*carbon emission savings from wind farms should be calculated using the fossil fuel sourced grid mix as the counterfactual, rather than the grid mix*." Taking account of the expected total CO2 loss from the Carbon Calculator result, the Proposed Development would be expected to result in a saving of approximately 108,965 tonnes of carbon dioxide (tCO2) per annum, meaning a total of over 3.8 million tonnes over the 35-year operational lifetime of the Proposed Development, through displacement of carbon-emitting generation. (RenewableUK, 2018).

3.6.11 The expected carbon payback time of the Proposed Development is 1.8 years. This is the period of time for which a wind farm needs to be in operation before it has, by displacing generation from fossil-fueled power stations, avoided as much carbon dioxide as was released in its lifecycle.

3.6.12 As recommended in current guidance estimated savings are for replacement of fossil fuel electricity generation but, while this could be the case in the short term, it is not the most probable scenario in the longer-term. The grid-mix of electricity generation represents the overall carbon emissions from the grid per unit of electricity and includes nuclear and renewables as well as fossil fuels. Based on the grid-mix results, the Proposed Development is expected to result in a saving of approximately 61,403 tCO2 per annum with an expected carbon payback time of 3.3 years.

3.7 Public Access

3.7.1 There are no core paths listed across the Proposed Development site. The infrastructure associated with the Proposed Development will provide improved access across the site throughout the operational life of the Proposed Development.

3.7.2 The Proposed Development also presents the opportunity to open up, and improve, access in and around Lochindorb. In recognition of the local and regional importance of Lochindorb, the Applicant is proposing to develop an Outdoor Access Plan. The Plan commits to further consultation with outdoor recreation and access groups to develop detailed proposals to:

- Improve access in and around Lochindorb;
- Upgrade existing paths;
- Install waymarkers and interpretation panels;
- Upgrade areas of peat; and
- Explore the installation of EV charging points.

3.7.3 An Outline Outdoor Access Plan is included in **Appendix 3.2** It provides supporting information to the planning application in the form of consideration of public access rights and opportunities for new and enhanced access routes within the site and the wider landowner's landholding. The proposals detailed in this are indicative and will be consulted upon after consent is granted.

3.8 Community Benefit

3.8.1 The Proposed Development would also provide community benefit funding for the local area of up to £510,000 annually. Some of this fund would be used to address fuel poverty, which affects around a third of households, with a fifth in extreme fuel poverty. Local households would be given grants directly to make improvements to their home, increasing energy efficiency and reducing their fuel bills, delivering a substantial benefit for the local area.

3.8.2 Measures to maximise the supply chain opportunities for local businesses and proposals for community benefit funding that can optimise local economic and community development are also proposed.

4. References

Renewable UK (2021). *UKWED Figures Explained*. Available at: http://www.renewableuk.com/en/renewable-energy/wind-energy/uk-wind-energy-database/figures-explained.cfm

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Scottish Government (2018). *Calculating potential carbon losses and savings from wind farms on Scottish peatlands – Technical Guidance Version 2.10.0.* Available at: https://www.gov.scot/publications/carbon-calculator-for-wind-farms-on-scottish-peatlands-factsheet/

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UKERC – United Kingdom Energy Research Council (2006). *The Costs and Impacts of Intermittency: An assessment of the evidence on the costs and impacts of intermittent generation on the British electricity network.* Available at: http://www.ukerc.ac.uk/support/Intermittency