Chapter 4: Project Description

Chapter 4
Project Description

Introduction

4.1 This chapter describes the components of the An Càrr Dubh Wind Farm (hereafter referred to as 'the Proposed Development') for which consent under Section 36 of the Electricity Act 1989 is being sought, and which have been assessed through the Environmental Impact Assessment (EIA) process. It includes details about the construction, operation and decommissioning of the Proposed Development, and outlines measures proposed to mitigate effects on the environment during these stages. Turbine 1 (T1) of the Proposed Development is the closest to Inveraray, located approximately 6 kilometres (km) to the north-west, and T13 is the closest to Dalavich, approximately 4.5km to the east.

4.2 This Chapter is supported by the following appendices:

- Appendix 4.1: Forestry
- Appendix 4.2: Outline Construction Environment Management Plan (CEMP)
- Appendix 4.3: Schedule of Mitigation, Good Practice, Enhancement and Monitoring

4.3 Figures 4.1 to **4.17** have also been prepared in support of this chapter. **Figure 4.1a** and **Figure 4.1b** shows the Site Boundary and layout of the Proposed Development overlaid on an ordnance survey (OS) basemap and aerial photography respectively. **Figures 4.2** to **4.17** provide details of the components of the Proposed Development.

Overview of the Proposed Development

4.4 As outlined in **Chapter 1: Introduction**, the main components of the operational Proposed Development will comprise:

- Up to 13 wind turbines (including internal transformers), each with a maximum blade tip height of up to 180 metres (m). The currently considered candidate turbine has a rated capacity of 6.6 megawatts (MW).
- Foundations supporting each wind turbine.
- Associated crane hardstandings and adjacent laydown areas at each turbine location.
- A network of onsite access tracks of approximately 23.1km (of which approximately 6.6km will be upgraded existing track and 16.5km will be new track).
- 105 watercourse crossings and associated infrastructure, i.e. culverts (31 upgraded existing crossing and 74 new crossings).
- A network of underground cables and cable trenches to connect the turbines to the onsite substation.
- A permanent anemometer (meteorological mast) of up to 102.5 metres (m) in height and associated track.
- Vehicle turning heads.
- Onsite passing places (location and size to be determined by the turbine supplier).
- Site signage.
- A permanent compound containing the control building, substation and energy storage facility.
- An Outline Restoration and Enhancement Plan (OREP) for peat, biodiversity, landscape and forestry (provided as **Appendix 8.5: Outline Restoration and Enhancement Plan**).

4.5 In addition to the above components of the operational Proposed Development, construction of the Proposed Development will also require the following components:

- One temporary construction compound;
- The creation of one temporary borrow pit for the extraction of stone, and the reopening/use of two existing borrow pits;
- A concrete batching area (location to be confirmed however this is likely to be in the new borrow pit, or construction compound, as identified by the Contractor and agreed in the CEMP);
- Junction widening and upgrades on the A83 and the A819, and an upgraded access off the A83 into site; and
- Felling of approximately 3.77 hectares (ha) of forestry to facilitate access during construction.

4.6 Two blade transfer areas will also be required to facilitate construction of the Proposed Development; however, these do not form part of this application for consent, as there is a degree of uncertainty associated with the final locations and requirements. These are however described below, as far as is possible, and considered in the 'in combination' assessment section of the relevant assessment chapters.

4.7 The detailed layout of the Proposed Development is shown in **Figures 4.1a** (with OS base map) and **4.1b** (with aerial photograph). Each component of the Proposed Development is described in further detail later in this chapter with supporting figures.

4.8 Table 4.1 details the proposed locations of the turbines.

Table 4.1: Proposed turbine locations

Turbine Number	Easting	Northing
1	204480	711431
2	204460	711855
3	203485	711094
4	203215	711665
5	202838	711959
6	203065	712565
7	203863	712604
8	203567	712148
9	201875	712156
10	202196	712675
11	201800	711645
12	201540	711260
13	201270	710920

The Proposed Development Components

Wind Turbines

4.9 Consent is being sought for the installation and operation of up to 13, three-bladed horizontal axis wind turbines, including internal transformers. The candidate turbine for all turbines is the Siemens Gamesa 155. This has a capacity of 6.6MW, a maximum blade tip height of up to 180m, a rotor diameter or 155m, hub height of 102.5m and a blade length of 76.6m. The final turbine model to be procured will not exceed a maximum blade tip height of 180m, thereby ensuring that the environmental effects identified in this EIA Report, particularly in relation to landscape and visual amenity, continue to be accurately assessed. It should be noted that the overall

capacity rating of turbines could change; however, any more advanced and powerful turbine chosen will again need to comply with the tip height parameters consented. A typical wind turbine is shown on **Figure 4.2**.

Aviation Warning Lighting

4.10 The UK statutory requirements for the lighting of en-route obstacles (i.e. those away from the vicinity of a licensed aerodrome) are set out in Article 222 of the UK Air Navigation Order (ANO) 2016[1]. This Article requires medium intensity (i.e. minimum of 2,000 candela (cd)) steady red aviation warning lights to be mounted as close as possible[2] to the top of all structures whose maximum height is 150m or more above ground level (AGL), and at intermediate levels spaced so far as practicable equally between the top lights and ground level, with an interval of not less than 52m.

4.11 The CAA Policy Statement (2017)[3] modifies the ANO Article 222 requirements for the specific case of onshore wind turbines. It provides that:

- In addition to the 2,000 candela lights, at least three intermediate lights are required, positioned at half the nacelle height, and comprised of three low intensity lights (minimum of 32cd) to provide 360-degree coverage; and
- If horizontal meteorological visibility in all directions of wind turbines is more than 5km, the intensity of the nacelle mounted lights may be reduced to not less than 10% of the minimum peak intensity (i.e. a 2,000cd light operating in a reduced visibility mode would be at 200cd). This can be achieved by installing visibility sensors to measure the atmospheric conditions and visibility range.

4.12 ANO Article 222 (2) requires that *"The person in charge of an en-route obstacle must, subject to paragraph (3), ensure that by night the lights required to be fitted by this article are displayed"*. Schedule 1 of the ANO states *"Night means the time from half an hour after sunset until half an hour before sunrise (both times inclusive), sunset and sunrise being determined at surface level"*. Thus there is no requirement for aviation lights on onshore wind turbines in the UK to be switched on earlier than half an hour after sunset or switched off later than half an hour before sunrise.

4.13 The International Civil Aviation Authority (ICAO) (a United Nations (UN) body) sets standards and recommendations for aviation lighting in Annex 14 of the Chicago Convention[4]. The UK, as an ICAO Contracting State, has a policy of implementing all ICAO Standards and Recommended Practices unless considered impracticable or inappropriate. Table 6-3 of ICAO Annex 14 sets out the required and recommended light intensities at different vertical elevation angles. It sets out that lights must have a minimum beam spread of 3 degrees. The lowest part of that beam must be at least -1 degrees below the horizontal and the upper limit of it must be at an angle of at least +2 degrees above the horizontal. The minimum average intensity of a medium intensity light at 0 degrees (from the horizontal) is required to be 2,000cd. The minimum intensity at -1 degree below the horizontal is required to be 750cd. There are no required light intensities at elevation angles lower than -1 degrees or above +2 degrees. Given that the required lighting intensities are minimum values, commercially available and tested lights will generally exceed these minimum intensity values to ensure that these levels are met.

4.14 ANO Article 222 (7) allows the CAA to grant permission for lighting on an en-route obstacle that is not in accordance with that specified in Article 222. This may include not fitting lights to every turbine and omitting the lights at half the nacelle height. The Applicant has commissioned a specialist aviation consultant (WPAC) to review the final turbine layout and design a reduced aviation lighting scheme to mitigate the visual effects of such lighting on surrounding receptors at night, whilst still complying with UK air law, CAA policy and Ministry of Defence (MoD) Obstruction Lighting guidance (2020)[5]. Aviation is assessed in **Chapter 14: Other Issues** and in **Appendix 14.2: Aviation Lighting Report**.

Turbine Foundations and Crane Hardstandings

4.15 The turbines will be installed on foundations comprising both stone and steel-reinforced concrete. These typically measure approximately 22m diameter in plan (an area of 408 metres squared ($m^{2)}$) with a concrete depth of approximately 3.5m (see **Figure 4.3**). Each turbine foundation will require approximately 1,632 cubic metres (m^3) of concrete and 200 tonnes of reinforcement. The detailed design, sizing and specification for each foundation will depend on the final turbine type and the specific ground conditions encountered at each turbine location, which will be confirmed during pre-construction surveys.

4.16 Adjacent to each turbine, an area of hardstanding approximately 50m x 35m will be constructed for use as a crane pad. The exact geometry and position of the crane pads will depend on the turbine supplier's specifications, the crane selected for erection, and detailed ground investigations prior to construction. Additional temporary hardstanding areas will be constructed for the secondary crane, these will be approximately 15m x 15m. There will also be temporary laydown areas for the crane boom erection and turbine components. These temporary areas will be reinstated following erection of the turbine. The hardstanding areas will be levelled using cut and fill operations and surfaced in crushed stone to provide a durable surface. These hardstandings are used during the erection process as a platform for the cranes to lift the turbine components into position. During operation, the main crane hardstanding provides safe access for maintenance and repairs which may also require the use of a crane. The main crane hardstanding will therefore be permanent infrastructure. An indicative crane hardstanding arrangement is shown in **Figure 4.4**.

Anemometer Mast

4.17 One permanent steel lattice anemometer mast will be installed to ensure the accurate ongoing measuring and monitoring of wind speed data on the Site. The height of the mast will be up to 102.5m and an indicative plan is provided in **Figure 4.5**. The masts will be installed at the location show on **Figure 4.1**.

Turbine Transformers and Cables

4.18 An electrical transformer will be required for each turbine and will located within the turbine tower. The transformers will be either oil-filled with a bunded footing to remove any risks of spillage or a solid cast resin type which is effectively non-polluting. The transformers will increase the electrical voltage to 33 kilovolts (kV) and will be connected to the control buildings within the onsite substations via underground high voltage cables.

4.19 The underground cables running from the turbines to the substation will be laid in trenches alongside access tracks, indicative details are provided in **Figure 4.6.**

4.20 A Supervisory Control and Data Acquisition (SCADA) system will be installed to gather information from the individual wind turbines and provide the facility to control them from a central location. A fibre optic communications cable will run alongside the power cables to link the turbines to the SCADA system. The wind turbines can be monitored remotely via a telephone or data connection to the SCADA system.

4.21 An underground power supply and SCADA cable will connect the meteorological masts to the nearest turbine, allowing data to be transmitted onwards to the control building. It is anticipated that this will run alongside the 33kV cable route.

Control Building, Substation, Grid Connection and Energy Storage Facility

4.22 The Proposed Development will be connected to the national electricity network (the 'grid'). The grid connection will be subject to a separate application for consent by Scottish and Southern Energy Networks (SSEN), under Section 37 of the Electricity Act 1989. As a result, potential environmental effects as a result of offsite grid connection are not considered within this EIA Report.

4.23 A typical onsite substation compound is shown in **Figure 4.7**. The substation compound will measure approximately 106m x 100m and will be surrounded by a 2.1m high fence. It will contain a control building and electrical equipment, including switchgear, communications equipment, and protection equipment. The control building will also contain toilets and a storeroom. An indicative plan and elevation of a typical control building proposed, is shown in **Figure 4.8**. Waste will be held in a closed system and removed by a licensed contractor at regular intervals. The buildings will be constructed in keeping with the local built environment.

4.24 There is a national requirement to balance the peaks and troughs associated with electricity supply and demand to avoid strains on transmission and distribution networks, and to keep the electricity system stable. Therefore, there will be an energy storage facility with a capacity of up to 20MW in total as part of the Proposed Development to support the flexible operation and further

[1] UK Government (2016) The Air Navigation Order 2016 [online]. Available at: https://www.legislation.gov.uk/uksi/2016/765/contents/made
[2] *"as close as possible to the top of the obstacle"* is interpreted by the CAA as the fitting of lights on the top of the supporting structure (the nacelle) rather than the blade tips.
[3] Civil Aviation Authority (2017) Policy Statement – Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150m Above Ground Level [pdf]. Available at: https://publicapps.caa.co.uk/docs/33/DAP01062017_LightingWindTurbinesOnshoreAbove150mAGL.pdf
[4] ICAO (2018) Annex 14 to the Convention on International Civil Aviation (Volume 1: Aerodrome Design and Operations, Eighth Edition)
[5] Ministry of Defence (2020) MOD Obstruction Lighting Guidance [pdf]. Available at: https://cdn.ymaws.com/www.renewableuk.com/resource/collection/0B792CF1-8B8A-474B-95B6-17886BF724A7/20190002-Windfarm_lighting_review__002_.pdf

decarbonisation of the electricity supply. An indicative plan and elevation drawing of a typical energy storage facility is provided in **Figure 4.9**.

Temporary Construction Compounds

4.25 One temporary construction compound measuring approximately 130m x 85m will be located at 204085, 711000, as shown in **Figure 4.1**. The construction compound will consist of a hardstanding area upon which will be accommodated temporary site offices, car parking, storage, and welfare facilities for site staff. An indicative construction compound is shown in **Figure 4.10.**

4.26 The compound will contain provision for fuel storage, an electrical generator, and a temporary septic tank. The fuel storage area will be above ground with necessary secondary containment in accordance with the Scottish Environment Protection Agency (SEPA) standards (PPG7 and GPP8) and will be situated a minimum of 50m from watercourses to reduce the risk of pollution.

4.27 The compound site will be restored to its current condition once construction is complete, and turbines are operational.

Borrow Pits, Stone, Concrete and Sand

4.28 To minimise the volume of stone bought onto the Site for construction of the Proposed Development, and any associated environmental effects, if suitable, stone will be sourced from three borrow pits to provide the material necessary for new or upgraded tracks and hardstanding construction. Two of the borrow pits proposed for use are existing and one is new, as illustrated on **Figure 4.1a** and **4.1b**. Borrow pit details are shown in **Table 4.2**.

Table 4.2: Borrow pit details

Borrow Pit Search Area	Approximate Size	Location
Borrow Pit 1	90m x 60m (New)	201700, 711665
Borrow Pit 2	75m x 35m (Existing)	207600, 709980
Borrow Pit 3	100m x 70m (Existing)	208785, 708470

4.29 It is estimated that approximately 93,780m^3 of stone aggregate will be required for construction of the Proposed Development (including permanent access tracks, structural fill beneath turbine foundations and crane hardstandings), with the borrow pit search area having the estimated capacity to provide for approximately 50% (47,000m^3) of this requirement. Concrete and sand will be sourced from a local quarry and delivered to the Site in line with the details set out in **Chapter 12: Traffic and Transport**.

Access from the Public Road Network

4.30 The Proposed Development will be accessed via the A83 (T), south of Inveraray near Auchnabreac. The access will head north to join the existing 'Inveraray bypass' (also known as Upper Avenue) just south of the Scottish Water treatment works, located to the west of Inveraray Golf Club. This short section of track is shown within the discrete red line application boundary on **Figure 4.1.a.7**. Some widening and realignment will be required along this section of track. The access then joins the A819 for approximately 1.2km before accessing the Site, south of Electric Cottage. The Inveraray bypass only be used by AIL traffic and no other vehicles. All other vehicles will access the Site via the A83 (T) and the Site entrance from the A819.

4.31 Details of the proposed vehicle movements during construction and operation of the Proposed Development are provided in **Chapter 12**. **Chapter 12** also provides detail on the proposed abnormal loads' route to the Site which is supported by **Appendix 12.1: Transport Assessment**.

Junction Design

4.32 Three junction upgrades are required to facilitate access to the Site. A junction design is required off/onto the A83 as shown, indicatively on **Figure 4.12**. A further two junction upgrades are required off/onto the A819 as shown indicatively on **Figure 4.13a** and **Figure 4.13b**.

Onsite Access Tracks

4.33 In total, approximately 23.1km of track will be utilised for the Proposed Development. Approximately 6.6km of existing will be upgraded and 16.6km of new access track will be constructed for the Proposed Development, as shown on **Figure 4.1**. The nominal track running width will be approximately 6m and existing tracks will be upgraded to this width. Adjacent to this track will be an assumed 1m width verge at either side for cabling and appropriate drainage subject to local ground conditions. Track widths may be slightly wider in some sections to accommodate bends in the track alignment. Turning heads will be installed at appropriate locations to accommodate abnormal load turning (see **Figure 4.1a** and **4.1b**).

Track Design

4.34 The design of the access track layout was based on the following objectives, which fundamentally seek to balance environmental objectives by making the Proposed Development footprint as small as possible, whilst ensuring health and safety objectives for site working are maintained:

- To facilitate safe access to each turbine, avoiding steep slopes, ground with potential instability, deeper areas of peat and maintaining a 50m buffer from watercourses where possible;
- To minimise watercourse crossings except where crossings are necessary;
- To minimise requirements for passing places and turning areas;
- To minimise environmental effects, including effects on deep peat and associated habitats, and areas of Ground Water Dependant Terrestrial Ecosystems (GWDTEs);
- To keep overall new track length to a minimum, reducing stone requirements and associated potential environmental effects;
- To build health and safety aspects into track design from as early a stage as possible, including avoiding slopes which are too steep for access and creating clear definitions between turbine working areas and access tracks; and
- To follow the existing ground topography as much as possible, minimising the necessity for cut and fill engineering works and associated visual effects.

4.35 Where possible and where reasonably practical, tracks will be of a 'floating' design where peat is over 0.5m deep. Where peat depths are below 0.5m, cut tracks will be used. Whilst these general principles have been adhered to, the decision of what type of track to use has been determined on a case by case basis and, in addition to considering peat depths, the gradient of the terrain has also been taken into account. In total, approximately 5.6km of new tracks will be of a floating design, with the remaining 9.9km of new tracks being of cut design. The extent of cut and floating track is shown on **Figure 4.1a** and **4.1b**. A typical access track design for both cut and floating track is shown in **Figure 4.11**.

4.36 The exact details of track construction methodologies will vary depending on local topographic and ground conditions, but the approximate balance of construction types expected is explained below under 'Construction Details'.

Watercourse Crossings

4.37 To access the turbines and associated infrastructure, 106 watercourse crossings will be required, of which 34 will be upgrades to existing crossings and 72 are new.

4.38 Watercourse crossings will be subject to appropriate SEPA CAR licencing and will be designed to allow the conveyance of a 0.5% Annual Probability (AP) (200 year) flood event plus an allowance for climate change and freeboard. Additionally, mitigation will be put in place to control and attenuate runoff during all phases of the development and crossings will be regularly check and maintained during operation. Typical water crossing methods are shown in **Figure 4.14**.

4.39 Monitoring of water quality and water flow will be undertaken during construction of the Proposed Development and a water quality monitoring plan will be devised prior to construction through consultation with SEPA. Further information in relation to watercourse crossings and water quality monitoring is provided in **Chapter 7: Geology, Hydrology, Hydrogeology and Peat** and associated appendices.

Micrositing

4.40 It is proposed that the turbines and other infrastructure will be subject to a 50m micrositing allowance which will be applied should adverse ground conditions be encountered during pre-construction ground investigations, or when more optimal ground

conditions are available. Movement of infrastructure will, however, be dependent on other onsite constraints and subject to advice from an Ecological Clerk of Works (ECoW). This allowance will ensure that the final position of the turbines and associated infrastructure are not varied to such a degree as to cause a notable change in the predicted environmental effects outlined in the EIA Report. Beyond this distance, any relocation of components will require either written approval from Argyll and Bute Council (ABC) in consultation with statutory consultees or will be treated as a formal variation to the application.

Blade Transfer Areas

4.41 As noted above, two blade transfer areas will be required to facilitate construction of the Proposed Development. The anticipated layout of the blade transfer areas is shown on **Figure 4.16** and potential locations are shown in **Figure 4.17**, although these are still to be finalised with the relevant landowners and are therefore subject to change. As such, the blade transfer areas do not form part of the Proposed Development and are therefore not included in the application for consent, but instead are considered in the 'in combination' assessment in the relevant chapters of the EIA Report. The blade transfer areas will be approximately 150m x 40m and will include an access junction and two crane pads, as well as storage for up to three blades, with all infrastructure designed in accordance with turbine manufacturer standards. It is anticipated that once the locations are finalised, these blade transfer areas will be subject to a planning application to ABC. It is expected that they will be used by other wind farm developers in the area, before being reinstated.

Construction Details

4.42 The construction phase for the Proposed Development will consist of the following principal activities:

- Forestry felling and timber removal;
- Construction of temporary construction/security compound and car parking;
- The working of borrow pits (as required);
- Concrete batching;
- Construction of control building, substation and energy storage facility;
- The upgrading/creation of site access tracks, including passing places, turning heads, junctions and drainage;
- Construction of turbine foundations and crane hardstandings at each turbine location;
- Excavation of trenches and laying of electrical and control cables adjacent to the Site tracks connecting the turbines to the control building;
- Delivery to site and erection of wind turbines and anemometer mast (including the installation of aviation warning lighting);
- Testing and commissioning of site equipment including wind turbines; and
- Site restoration and implementation of habitat management measures.

Forestry Felling and Timber Removal

4.43 To facilitate construction and operation of the Proposed Development, it will be necessary to permanently fell 3.77ha of existing forestry located along the access to the Site. Careful consideration has been given to the alignment of the access with the objective of minimising the amount of permanent felling required, in line with the Scottish Government's Policy on Control of Woodland Removal (CoWRP)[6] which provides guidance for managing forestry removal on development sites. The principle aims of the CoWRP are to provide a strategic framework for appropriate woodland removal and to support climate change mitigation and adaptation. Whilst felling for the Proposed Development has been minimised as far as possible, 3.77ha of woodland will require to be permanently removed for the purposes of conversion to another type of land use.

4.44 In line with the CoWRP, woodland removal with compensatory planting is mostly likely to be appropriate where it will contribute meaningfully to:

- Helping Scotland mitigate and adapt to climate change;
- Enhancing sustainable economic growth or rural/community development;
- Supporting Scotland as a tourist destination;
- Encouraging recreational activities and public enjoyment of the outdoor environment;
- Reducing natural threats to forests or other land; or
- Increasing the social, economic or environmental quality of Scotland's woodland cover.

4.45 The Proposed Development meets the acceptability criteria for woodland removal as the change of land use with compensatory planting will contribute significantly to *"helping Scotland to adapt to climate change"* by providing a renewable energy development and helping to reduce net greenhouse gas emissions.

4.46 Replanting in situ of the felled areas will not be possible as it will be necessary to maintain future access for the swept path of abnormal loads during operation and maintenance of the Proposed Development. Compensatory planting of 3.77ha is therefore proposed within the Site, in line with the CoWRP and other relevant guidance. Compensatory planting will meet the UK Forestry Standards and will be approved by Scottish Forestry through a Compensatory Planting Plan. Further details of the proposed planting are set out in the OREP in **Appendix 8.5** which details measures proposed to benefit peat, biodiversity, forestry and landscape across the Site.

4.47 The affected forestry is located within Coille Bhraghad, Argyll Estates and is part of the Argyll Woodlands Long Term Forest Plan (LTFP). Coille Bhraghad comprises predominantly commercial coniferous woodland but with areas of native woodland listed on the Native Woodland Survey of Scotland (NWSS) dataset which includes Plantations on Ancient Woodland Sites (PAWS). The Coille Bhraghad forest also includes areas listed on the Ancient Woodland Inventory (AWI) Scotland dataset. The felling requirements for the Proposed Development are minimal and mainly integral with the current forest tracks as noted further below; it is therefore considered that a wind farm forest plan is not required, and no amendments to the existing Argyll Woodlands LTFP are proposed.

4.48 Where possible, to reduce the amount of permanent woodland removal, the access for the Proposed Development follows the existing forest tracks with some felling required to accommodate widening on bends for oversail of abnormal load vehicles and smoothing out of alignments. This includes a widening to oversail limits beyond the infrastructure footprint close to the site of the memorial to Wren Gertrude Canning at Grid Reference: NN 08323 07582, although there will be no direct effects on the monument itself (discussed further in **Appendix 10.2: Historic Environment Assessment** of the EIA Report). There are also three short sections of new track alignment through the forest crop along the access (at NGR 207695 708434 to facilitate a right angle turn of the track as it heads north-west, east of Steallair Bàn Loch at NGR 207253 708943 to avoid a bend and bridge on the existing forest track, and at NGR 207270 710108 where the track exits the forestry).

4.49 The age and species of the tree crops to be felled is variable, however the estimated area of felling required is 0.96ha of broadleaved trees and 2.81ha of coniferous plantation. Of the 3.77ha to be felled, 3.19ha is classified as Ancient Woodland, interpreted as semi-natural woodland from maps of 1750 and 1860, or continuously wooded since and which have developed semi-natural characteristics. Overlapping with this area, 1.48ha is classed as PAWS in the NWSS; PAWS are defined as having been planted with non-native species during the 20th century. The remaining 0.57ha is plantation forestry and is without AWI or NWSS listing.

4.50 The tree size that will be felled for the access to the Proposed Development ranges from a few large trees to small dimension conifers, all utilisable material from timber harvesting will be exported from Site to the appropriate wood processing mills. The area of younger trees will be treated in accordance with the marketing opportunities at the time, such as for biomass. Any residue will be treated in accordance with the guidance on forestry waste management.

4.51 Commercial forests are dynamic, and their structure continually undergoes change due to normal felling and restocking by the landowner; natural events, such as windblow, pests or diseases; and external factors, such as a wind farm development. Whilst forestry is not regarded as a receptor for the purposes of the EIA for the Proposed Development, further details on forestry felling, management and waste are provided in **Appendix 4.1**. **Figure 4.1.1** shows the location of Collie Bhraghad, **Figure 4.1.2** shows the baseline forestry within the Site and forestry felling for construction (felling for wind farm access) is shown on **Figure 4.1.3a** and

[6] Forestry Commission Scotland (now Scottish Forestry) (2009) The Scottish Government's Policy on Control of Woodland Removal [online]. Available at: https://forestry.gov.scot/publications/285-the-scottish-government-s-policy-on-control-of-woodland-removal

4.1.3b. **Figure 4.1.4a** shows AWI within the felling areas and **Figure 4.1.4b** shows PAWS .The likely environmental effects of the proposed felling have then been considered in the specialist assessments, where relevant, in **Chapters 6** to **14**.

Construction of Temporary Construction Compound and Car Parking

4.52 The construction of the construction compound will be formed by stripping organic and soft surface material and laying geotextile and crushed rock to create a firm regular surface of approximately 50cm deep. Perimeter drainage will intercept rainfall and then channel water to temporary filtration and dispersion structures, utilising where possible the natural contours of the landscape. The stripped surface material will be stockpiled nearby for reinstatement.

4.53 Depending on the time of year and the stage of the construction programme, temporary lighting may be required at the temporary compounds working hours.

Working of Borrow Pits

4.54 Excavation of material from the borrow pits will be carried out using standard quarrying techniques, which may include blasting and mechanical excavation. However, all blasting work will be undertaken by a specialist contractor who will assume responsibility for blast design and implementation. The extent of any blasting requirement cannot be determined until intrusive site investigation tests are completed. Once borrow pits have been excavated, the batching plants will be constructed, and batching will commence as necessary.

Concrete Batching

4.55 Concrete batching is expected to be undertaken onsite. All turbine and substation foundation concrete will be mixed onsite, with deliveries of cement powder and water (bowsers) being delivered by HGV tankers. It is proposed that the facility will be located within the construction compound or the new borrow pit with suitable pollution prevention measures in place, which will be developed in conjunction with the ECoW and incorporated into the CEMP. Whilst it is not proposed to abstract water for batching, this will be subject to a separate abstraction license from SEPA, if required.

Construction of Control Building, Substation, Grid Connection and Energy Storage Facility

4.56 A switching station and control building compound measuring 105m x 100m is proposed in the north of the Site at 202625, 711700. This will be constructed as per Scottish and Southern Distribution requirements and will house all the equipment required for connecting the Proposed Development to the distribution network and also the battery storage facility, with the batteries housed within steel containers. Nearby a new control building will also be constructed and this will accommodate welfare, metering equipment, switchgear, central computer systems and electrical control panels. External to the control building there will also be an auxiliary transformer and standby generator with close coupled fuel storage tank.

Construction and Upgrading of Tracks

4.57 Approximately, 6.6km of existing track will be utilised, and 16.5km of new track will be built for the Proposed Development. The tracks will be constructed to have a nominal running width of approximately 6m with local widening on corners and passing areas and will be surfaced with coarse aggregate. Access tracks have been designed to have a camber of 2.5% to ensure they are free draining. Adjacent to this track will be a 0.5m wide verge at either site (8m max width in total) for cabling and drainage, subject to local ground conditions. Passing places will be sited to ensure intervisibility to allow large slower moving vehicles to pass smaller construction vehicles. Turning heads are provided to minimise the amount of reversing required onsite.

Construction of Turbine Foundations and Hardstandings

4.58 Construction of turbine bases, hardstandings and laydown/storage areas will require the excavation of surface organic and soft surface material through to underlying rock. This excavated material may be used to partially backfill the excavation and provide material for landscaping and surfacing reinstatement. As such, this material will be stored near to the excavation until required. The underlying rock will be levelled to provide a workable platform for the assembly of reinforcing bars and formwork used to contain the poured concrete.

Installation of Cabling

4.59 The cabling connecting each turbine to the control building will be laid in a trefoil arrangement as shown in **Figure 4.6**. Detailed construction and trenching specifications will depend on ground conditions encountered. Typically, cables will be laid in a trench with dimensions 1.4m deep. To minimise ground disturbance, cables will be routed along the side of the access tracks where practicable. Cables will be laid within a sand or granular bedding to prevent damage from sharp stones. Trenches will be backfilled with excavated material and the surface redressed. If sand bedding is used, clay bunds will be placed at intervals within the bedding to prevent unnatural flows of groundwater.

Erection of Turbines

4.60 The erection process for each turbine will take approximately 2 to 5 days, although this will depend on weather conditions, as generally, turbines are erected in wind speeds not exceeding 8 to 10 metres per second (m/s) for health and safety reasons.

Drainage Design

4.61 An outline drainage strategy is provided in **Appendix 4.4**. This includes details of a proposed trackside drainage layout which will include a network of surface drainage water ditches adjacent to the tracks. Permanent check dams will be spaced at regular intervals within the drainage ditches. Check dams are required to reduce the velocity and slow down sediment transportation while also preventing channel scour. Full details will be developed by the contractor at the detailed design stage.

4.62 The Surface Water Drainage Strategy for the Proposed Development will comprise the management of surface water runoff from the hardstanding and roof areas. The Proposed Development does not include any impermeable surfaces. The turbine hardstanding areas consist of compacted gravel which will increase runoff but is not fully impermeable. As such, it is proposed that interception drains are placed at the downslope of the Site compound and wind turbine platforms, intercepting and attenuating runoff. Discharge to of surface water will be achieved by water spilling over the crest of the drain and flowing overland towards the catchment downstream, maintaining hydrological continuity. An example drainage design is shown in **Figure 4.15**.

Construction Employment

4.63 The construction period for the Proposed Development will last up to 18 months. The number of construction staff present onsite will vary according to the construction phase and activities being undertaken. Staffing levels will generally decrease as construction is progressed through the commissioning phase. The estimated number of site staff at any one-time during construction of the Proposed Development will be approximately 35. The precise numbers will depend on the ongoing activities at any time. The peak workforce numbers will be during civil works which are estimated to last for up to a 13-month period.

4.64 In addition to the direct employment opportunities, the construction of the Site will bring benefits to local business such as in the supply of materials or services for construction and in accommodation for workers and catering (see **Chapter 13: Socio-Economics**).

Construction Programme

4.65 Construction of the Proposed Development is estimated to last up to 18 months and a detailed construction programme will be prepared by the Principal Contractor at the outset of construction. Many of the Proposed Development's construction operations will be carried out concurrently, although predominantly in the order identified, reducing the overall length of the construction programme. Site restoration will be programmed and carried out to allow the restoration of disturbed areas as early as possible and in a progressive manner. An ECoW will be onsite during construction in certain areas/months as agreed with ABC.

4.66 An indicative programme for the construction activities of the Proposed Development is shown in **Table 4.3**.

Table 4.3: Indicative construction programme

Activity	Month																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Inveraray Bypass						■	■	■	■	■	■	■	■	■	■	■	■	■
Site Establishment	■	■															■	■
General Site Deliveries	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Imported Stone	■	■	■	■	■	■												
Reinforcement				■	■		■	■										
Concrete Deliveries				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Cable and Ducting Deliveries								■		■		■						
Cabling Sand								■	■	■	■	■	■	■	■	■	■	■
Geotextile Deliveries				■		■		■										
Substation Building							■	■	■	■	■	■	■	■	■	■	■	■
Cranes											■			■				
Batteries Deliveries															■	■		
Forestry Extraction	■	■																
Turbine Deliveries											■	■	■	■				
AIL Escorts											■	■	■	■				
Commissioning																■	■	■
Staff	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

4.67 Anticipated construction traffic deliveries at the Site per month during the construction period, assuming the principal activities listed above, is set out in **Table 10** of **Appendix 12.1**. This shows that the peak of construction occurs in Month 6 with 147 journeys (48 Car/Lights and 99 HGV journeys). As mentioned above, a CTMP will be implemented to minimise disturbance on the local road network during construction. Further specific measures proposed to avoid or minimise effects during construction are discussed on a topic-by-topic by topic basis in **Chapters 6** to **14**.

Working Hours

4.68 In general, working hours for construction will be from 07:00 to 19:00 Monday to Friday and 07:00 to 13:00 on Saturday, though component delivery and turbine erection may take place outside these hours. No working is proposed on Sundays and public holidays unless otherwise agreed with ABC.

4.69 Exceptions to the proposed working hours will be made for foundation pours and turbine erection. Concrete pouring for an individual turbine foundation must take place continuously and so activity will only cease when the pour has been completed. Turbine erection can only occur during periods of low wind speeds and so to minimise the construction programme, lifting operations may need to be scheduled out with the above hours. In addition, it may be necessary to complete a particular lifting operation to ensure the structure is left safe.

Reinstatement

General Approach

4.70 Following construction, the Site will be reinstated by the contractor. Where a re-turfing method is appropriate, such as along track verges, the surface layer of soil and vegetation will be stripped and stored separately from the lower soil layers and replaced as intact as possible once construction is complete. Local reinstatement will be carried out to retain the structure and composition of the original plant communities, as well as forming a stable area over reformed ground, thus reducing erosion by rain, run-off and wind. Bare soil areas will be allowed to re-vegetate naturally in combination with reseeding using a low density (~20kg per hectare) seed mix which mirrors local vegetation to help bind the soil more quickly.

Site Tracks

4.71 Site tracks are required throughout the operational phase to permit access for maintenance and repair operations. They will also be necessary to allow access during the decommissioning stage.

4.72 Generally, the sloping verges of access tracks will be dressed with site sourced turf or seed bank material. If suitable material is generated during the construction of the track, this material can be used to form a low-lying bund along the downhill side of the track, to be dressed as per the track verges. This will assist in reducing the visibility of the track.

Turbine Bases and Crane Hardstandings

4.73 Turbine foundations will be capped with soil material, which may form a raised mound above the existing ground level. These will be re-turfed with the removed material, but where vegetation is sparse or unlikely to regenerate, reseeding with an appropriate local seed mix may be undertaken as outlined above.

4.74 The condition of turfs will be monitored regularly during the first two months following reinstatement. If necessary, water will be imported to the Site to ensure the re-establishment of this vegetation.

4.75 Hard-standing areas at each turbine location will be retained for use during operation and decommissioning, however the edges will as far as possible be blended to the adjacent contours and natural vegetation allowed to re-establish.

Construction Compound

4.76 The temporary construction compound will be reinstated into the surrounding landscape and restored to its original condition.

Peat Management

4.77 Whilst the Proposed Development has been designed to minimise disturbance to peatland, it has not been possible to avoid areas of peatland entirely. Consequently, an Outline Peat Management Plan (PMP) is presented at **Appendix 7.3** and includes the following information:

- Estimation of the volume of soil and peat likely to be excavated during construction;
- Identification of opportunities to minimise excavation volumes;
- Options for onsite reuse of excavated material; and
- Good practice methods to be employed in relation to handling and storage of excavated soil and peat.

4.78 The final adopted PMP will ensure that excavated soil and peat is appropriately managed and re-used onsite. It is anticipated that all excavated peat can be reused within the Site for reinstatement of ground, at both the point of excavation as well as in the landscaping of track shoulders and hardstandings. Prior to construction and on completion of ground investigations and micrositing, the PMP will be refined and agreed with SEPA and NatureScot.

4.79 In accordance with Scottish Government Guidance[7], the Proposed Development has been designed to avoid peat landslide hazard. A Peat Stability Assessment has been carried out and a copy of the report is included at **Appendix 7.4: Peat Landslide Hazard and Risk Assessment** with further consideration in **Chapter 7**.

Environmental Management

4.80 Prior to the construction of the Proposed Development, the Applicant will develop a detailed CEMP with the appointed Principal Contractor, an outline of the content of which is provided in **Appendix 4.2**. The CEMP will establish the project management structure and clearly identify the roles and responsibilities in the management and reporting on the construction phase environmental aspects. The CEMP will be used to ensure that all relevant planning conditions and mitigation identified within the EIA Report to protect the environment are implemented through agreed procedures and working methods. Adherence to the CEMP, as well as referenced legislation and guidance documents, will be a contractual requirement for the appointed Principal Contractor and their sub-contractors, and is likely to form a condition to the Section 36 consent.

4.81 The purpose of the CEMP will be to:

- Provide a mechanism for ensuring that construction methods avoid, minimise and control potentially adverse significant environmental effects, as identified in the EIA Report;
- Ensure that good construction practices are adopted and maintained throughout the construction of the Proposed Development;
- Provide a framework for mitigating unexpected effects during construction;
- Provide assurance to third parties that agreed environmental performance criteria are met;
- Establish procedures for ensuring compliance with environmental legislation and statutory consents; and
- Detail the process for monitoring and auditing environmental performance.

4.82 The CEMP will be updated when necessary to account for changes or updates to legislation and good practice methods throughout the construction phase. The CEMP will also be amended to incorporate information obtained during detailed ground investigations which will be undertaken post planning and prior to construction activities. Compliance with the CEMP (including procedures, record keeping, monitoring and auditing) will be overseen by a suitably qualified and experienced ECoW.

4.83 The CEMP will contain the following documents, which the Principal Contractor and their sub-contractors will be required to adhere to throughout the construction process:

- A Pollution Prevention Plan (PPP);
- Construction Method Statements (CMS);
- A Peat Management Plan (PMP) (following the principles set out in the Outline PMP at **Appendix 7.3**);
- A Site Waste Management Plan (SWMP);
- A Construction Traffic Management Plan (CTMP) (following the principles set out in **Chapter 12** and **Appendix 12.1**);
- A Public Access Management Plan; and
- A Site Restoration Plan.

4.84 The CEMP will also contain the following information:

- The name, qualifications, and CV of the nominated person(s) with the responsibility for all environmental matters, for approval;
- A completed register of contacts confirming the contact details for all key personnel for managing environmental issues, including the Applicant's representatives, the ECoW, Principal Contractor contacts and appropriate regulator contacts;
- The construction programme and detailed working method statements;
- A site-specific action plan, providing a register of environmental risks and outlining the requirement for accompanying site-specific mitigation, monitoring and reporting procedures; and
- Audit and inspection procedures.

4.85 The CEMP and associated plans will be submitted to ABC, and others as appropriate, prior to the commencement of works. A copy of the CEMP will be kept in the construction site office for the duration of the works and will be always available for review.

4.86 The Principal Contractor will be responsible for the continual development of the CEMP to take account of monitoring and audit results during the construction phase and changing environmental conditions and regulations.

4.87 The services of other specialist advisers will be retained as appropriate, to be called on as required to advise on specific environmental issues.

4.88 Performance against these documents will be monitored by the Applicant's Construction Project Manager and the ECoW throughout the construction period. They will ensure that the works carried out are in accordance with the relevant best practice guidance documents.

4.89 Regular meetings will be held throughout the construction period to discuss environmental management, providing updates on the performance of the environmental mitigation measures and identifying any actions for performance improvement. The meetings will be attended by the ECoW, the Applicant Construction Project Manager, the Principal Contractor, Site Manager and any other relevant personnel or regulatory agency representative as required.

Good Practice Construction Measures

4.90 Good practice measures will be employed as standard techniques during the construction and operation of the Proposed Development. Therefore, these are not considered to be mitigation as such, but an integral part of the design, construction, and operation of the Proposed Development. This is considered a realistic scenario given the current regulatory context and accepted good practice across the Industry.

4.91 Good practice measures to minimise the effects of the Proposed Development on geology, hydrology, hydrogeology, and soil have been provided below.

4.92 During construction, there will be a suitably qualified environmental manager appointed with responsibilities including training, liaison with SEPA and ensuring applicable licences are held. This role will have authority for halting works if necessary. Emergency procedures will be detailed and subsequently agreed with SEPA, including contact lists and the personnel responsible.

4.93 Good practice measures will include (but are not limited to) measures associated with:

- Pollution incidents;
- Erosion and sedimentation;
- Modification of surface water drainage patterns;
- Modification of groundwater levels and flows;
- Compaction of soils; and
- Peat stability.

4.94 Further details on these measures, which are an inherent part of the Proposed Development, can be found in **Appendix 4.2**.

Outline Restoration and Enhancement Plan

4.95 An OREP for peat, biodiversity, landscape and forestry has been provided at **Appendix 8.5**. The plans and benefits set out within the OREP include:

Peat Resource Restoration

4.96 The Site offers opportunities for extensive peat resource management and enhancement, over and above mitigation of the Proposed Development's effects, via restoration of currently eroded areas of peat. Degraded parts of the site are visible primarily as hagged areas (either vegetated or bare), with degradation of the Site's peat resource having occurred both via natural erosion and via

[7] Scottish Government (2017) Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments

artificial drainage from the Site's substantial network of moorland drains. Over 800 drain segments have been mapped across the Site, totalling over 65km in length. Peat resource restoration will involve:

- Infill of hagged peat;
- Reprofiling of hagged peat; and
- Drain blocking.

4.97 The above measures will result in a benefitted area of approximately 132ha of peatland through infilling and reprofiling of hagged peat and 310ha of peatland benefitting from drain blocking. This will not only enhance the Site's peat resource but also provide enhanced opportunities for associated peatland biodiversity, including invertebrates and plant species, which in turn will benefit breeding moorland birds and foraging raptors.

Ecology

4.98 Peatland condition is highly variable across the Site with large extents of peatland habitats showing a substantial degree of modification and erosion. Grazing, specifically, has affected the habitat composition of the peatland resulting in extensive areas of peatland habitat within the Site being in 'modified' condition. In relation to protected species, there is suitable habitat for water vole across the Site with a number of active colonies recorded. Otter was confirmed to be present within the Site but no resting sites were recorded. Red squirrel and pine marten field signs were recorded within the forested areas east of the Site. Ecological restoration and enhancement will involve:

- Native riparian and non-riparian tree planting;
- Grazing management and cutting/burning control;
- Water vole monitoring; and
- Boxes for pine marten and red squirrel.

4.99 With respect to biodiversity, riparian and non-riparian tree planting will be established on suitable soils where woodland could naturally establish. The approach follows the mitigation hierarchy by compensating for the loss of woodland habitat resulting from the Proposed Development, and further enhancing the Site through additional planting. New woodland habitats will provide foraging and sheltering opportunities for a variety of species. Riparian planting will also improve watercourse quality.

4.100 Fencing around tree planting and peat infill areas is proposed as a means of supporting successful restoration and establishment of trees. With respect to biodiversity, reduction in grazing pressure on sensitive upland habitats, in combination with the peat resource management that is proposed, is likely to improve the peatland habitat condition of the wider Site and positively affect live prey abundances for golden eagle. The measures set out above would allow vegetation to establish and recover. It is recognised that stock-proof fences can themselves create areas of erosion where grazing animals follow the fence line, and so careful planning will be required in relation to this intervention.

4.101 Small upland water vole populations are very sensitive to non-predictable events, including predation. Monitoring of the population on Site would allow assessment of the density of, and variation within, the population. Monitoring of strategically located mink raft(/s) would act as a warning system of a possible predation issue. Pine marten and red squirrel boxes would enhance the provision of sheltering opportunities for these species within the forested parts of the Site.

Ornithology

4.102 The key objective for any habitat management measures at the Site is to provide improved nesting and foraging opportunities for moorland bird species through peat resource restoration and interventions relating to specific species (including ground nesting waders, raptors and black grouse) away from development infrastructure, whilst balancing the need to avoid potentially adverse effects on golden eagle via changes to their habitat. The implementation and monitoring of a sensitive burning and cutting regime will promote opportunities for breeding black grouse and hen harrier.

Landscape and Visual

4.103 Key current characteristics of the Site in landscape and visual terms with implications for the OREP include 'scarring' associated with hagged/eroded peat, which is a visual detractor, visually 'harsh' edges to existing areas coniferous plantation, which would benefit from being softened by additional planting of native tree species and a lower diversity of vegetation cover than the Site's potential, due to current and historic grazing pressures.

4.104 In terms of landscape and visual qualities peat restoration and additional tree planting of native species offers opportunities to create a more intact and higher quality, more diverse landscape, including by softening harsh coniferous plantation edges.

4.105 Subject to the principles set out within the OREP, as outlined above, is taken into account when the detailed Restoration and Enhancement Plan is drafted and agreed post-consent, the proposals described in the OREP offer opportunities for substantial, interrelated environmental enhancements at the Site with respect to peat, biodiversity, landscape and forestry.

Waste Management

4.106 Materials will be generated, and will require management, during construction, in particular the topsoil removed and stockpiled prior to construction area activities, and construction waste such as packaging and used formwork.

4.107 Measures to reduce potential environmental effects associated with the storage and transportation of waste will include:

- The careful location of stockpiles and other storage areas;
- The use of good practice in the design of storage areas and the use of suitable containers;
- The use of sheeting, screening, and damping where appropriate and practicable;
- The control and treatment of runoff from soil and soil stockpiles;
- Minimising storage periods; and
- Minimising haulage distances.

4.108 All materials will be identified, classified, quantified and, where practicable, appropriately segregated. Any materials that cannot be reused will be disposed of according to relevant waste management legislation which will serve to address a number of possible environmental effects. This includes:

- The Duty of Care imposed by Section 34 of the Environmental Protection Act 1990; and
- The Waste Management Licensing Regulations 1994 (as amended), particularly provisions relating to registered exemptions from waste management licensing.

4.109 All materials removed from site will be handled in accordance with relevant waste and environmental regulations. Waste will be transferred using a registered waste carrier to a licensed waste disposal site or recycling centre.

Health and Safety

4.110 All construction activities will be managed within the requirements of the Construction (Design and Management) Regulations 2015 and will not conflict with the Health and Safety at Work etc. Act 1974. The design of the Proposed Development has taken full account of these regulations. To further reduce possible health and safety risks, a Health and Safety Plan for the project will also be drawn up. All staff and contractors working on the construction will be required to comply with the safety procedures and work instructions outlined in the Plan at all times.

4.111 To ensure that hazards are appropriately managed, risk assessments will be undertaken for all major construction activities, with measures put in place to manage any hazards identified.

Construction (Design and Management) Regulations 2015

4.112 All construction activities will be managed within the requirements of the Construction (Design and Management) Regulations 2015 and will not conflict with the Health and Safety at Work etc. Act 1974. The design of the Proposed Development has taken full account of these regulations. To further reduce possible health and safety risks, a Health and Safety Plan for the project will also be drawn up. All staff and contractors working on the construction will be required to comply with the safety procedures and work instructions outlined in the Plan at all times.

4.113 To ensure that hazards are appropriately managed, risk assessments will be undertaken for all major construction activities, with measures put in place to manage any hazards identified.

Operational Details

4.114 The Proposed Development has been designed to have an operational lifespan of up to 40 years.

4.115 The Site will not be manned on a full-time basis, and it is envisaged that the amount of traffic associated with the Proposed Development will be minimal. Traffic generated will comprise routine service and maintenance team visits, together with the occasional need for more extensive maintenance or repair. Wind turbine operations will be overseen by suitably qualified contractors.

4.116 Once operational, staff will be employed to operate the Proposed Development and undertake routine maintenance work during its 40-year lifetime. Routine maintenance and servicing will take place two to four times per year. Servicing will include the performance of tasks such as maintaining bolts to the required torque, adjustment of blades, inspection of blade tip brakes and inspection of welds in the tower. Other visits to the Site will take place more frequently to ensure that the turbines are operating at their maximum efficiency. In the event of any unexpected events onsite, appropriate repair works will be carried out. Maintenance activities are estimated to employ up to an additional equivalent of 2.5FTE.

4.117 The vehicle used for the majority of these visits is likely to be a small four-wheel drive vehicle, although there may be an occasional need for an HGV or crane to access the Site for heavier maintenance and repairs.

4.118 On-going track maintenance will generally be undertaken in the summer months when tracks are dry. Safe access will be maintained all year round.

Decommissioning

4.119 Following the 40-year operational life of the Proposed Development, an application may be submitted to retain or replace the turbines, or they could be decommissioned.

4.120 Decommissioning will involve the following:

- Dismantling and removal of wind turbines and electrical equipment; and
- Restoration of the turbine areas, hardstandings and new tracks.

4.121 Turbine components and electrical equipment would be dismantled and removed in a similar fashion to their delivery and erection. Craneage would be used to split the turbines into sections which would then be transported from the site by HGVs unless the components are sold on, in which case, they would be removed as abnormal loads. Turbine components would be cut up offsite in controlled environments ready for reuse, recycling or appropriate disposal.

4.122 The removal of the top of the turbine base would be undertaken requiring an excavated trench around the upstand to provide a working area. Breakout of the top part of the plinth would be undertaken using an excavator mounted jack hammer. The cables would be cut level with the remaining concrete. Once the broken-out concrete has been removed, the area would be reinstated by backfilling with soil/peat to an agreed method statement, as outlined in the restoration section above.

4.123 The high voltage and SCADA cables would be left in place to avoid unnecessary ground disturbance.

4.124 The CEMP would be updated as required to ensure best practice was adopted during decommissioning of the Proposed Development. This could include measures such as draining and removing hazardous liquids prior to the dismantling of the Proposed Development components.

4.125 Overall, it is estimated that the decommissioning period for the Proposed Development would be approximately 12 months.

4.126 An assessment of the decommissioning of the Proposed Development has not been undertaken as part of the EIA as: i) the future baseline conditions (environmental and other developments) cannot be predicted accurately at this stage and ii) the proposals for refurbishment/decommissioning are not known at this stage. A decommissioning strategy would be submitted by the Applicant to ABC for agreement prior to any decommissioning works taking place, and this is likely to form a condition to the consent.