ScottishPower Renewables

Harestanes West Windfarm

Environmental Impact Assessment Report

Volume 2

Chapter 3: Proposed Development

December 2024

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Abbreviations

AIL	Abnormal Indivisible Loads
ANO	Air Navigational Order
CAA	Civil Aviation Authority
CAR	Controlled Activities Regulations
CEMP	Construction and Environmental Management Plan
CMS	Construction Methodology Statement
CP	Compensatory Planting
FLS	Forestry and Land Scotland
GPP	Guidance of Pollution Prevention
GWh	Gigawatt hour
HGV	Heavy goods vehicles
HVAC	Heating, ventilation and air conditioning
km	kilometres
LGV	Light goods vehicles
PC	Principal Contractor
PMM	Permanent Meteorological Mast
PMP	Peat Management Plan
PPG	Pollution Prevention Guidelines
PPM	Power Performance Mast
PPP	Pollution Prevention Plan
SPEN	ScottishPower Energy Networks
SWMP	Site Waste Management Plan
TMP	Traffic Management Plan

WMP	Water Management Plan

3. Proposed Development

3.1. Executive Summary

1. The Applicant intends to construct Harestanes West Windfarm comprising advanced renewable technologies and incorporating additional development components to improve the overall ecological, environmental and social benefits accruing from the proposed Development. The Harestanes West Windfarm intends to make use of available renewable energy technologies to optimise the renewable energy potential of the Site. The proposed Development comprises up to 12 three-bladed horizontal axis turbines, six with a maximum height of 220m and six with a maximum height of 200m, with a total installed capacity of around 84 MW or about 186 GWh of electricity annually, enough to power the equivalent of 47,596 homes[1].

2. The proposed Development would connect to the National Grid and a new overhead or underground power line would be built and connected to a new substation which would be located within the Site. The grid connection may require consent under Section 37 of the Electricity Act 1989 which is the subject of a separate consenting process to this Section 36 application and would be developed and consented by the electricity network operator, ScottishPower Energy Networks (SPEN). The precise route of the grid connection cabling has not yet been fully determined; however, it is proposed to connect the proposed Development to the electricity transmission network via a wood pole overhead line (OHL) between the proposed Harestanes West Windfarm substation and the existing transmission steel tower BR61, including a new circuit breaker compound, southeast of Dumfries near Mouswald.

3. The Site would be accessed via the access junction on the A701 used for the existing Harestanes Windfarm. It is proposed that all Abnormal Indivisible Loads and heavy goods vehicular traffic would use this access. No heavy goods vehicles access is anticipated to be taken through the village of Ae, however there may be limited access taken through the village by a limited number of light goods vehicles.

4. The proposed Development is anticipated to have an operational life of 40 years, after which it would be decommissioned, and the turbines dismantled and removed. This is the proposed course of operations which is being applied for and any alternative to this action would require separate consent from Dumfries and Galloway Council (DGC), and so is not considered within this EIA Report.

3.2. Introduction

5. This Chapter describes the way in which the proposed Development would be constructed, including a general description of the proposed wind turbine and their associated infrastructure. It also outlines the anticipated construction activities connected with the proposed Development and a description of the operational elements of the wind turbines.

[1] *Calculations from the Scottish Government Renewable electricity output and energy conversion calculator's website: https://www.gov.scot/publications/renewable-and-conversion-calculators/ [accessed September 2024]*

6. The layout for the proposed Development is shown on **Figure 3.1** including proposed infrastructure. Additional details on construction methods are provided in the outline Construction and Environmental Management Plan (CEMP) included in **Technical Appendix 3.1**. Details on the forestry aspects of the proposed Development are included in **Technical Appendix 14.1**.

3.3. Proposed Development

7. The proposed Development is a renewable energy development that intends to make use of available renewable energy technologies to maximise and optimise the renewable energy potential of the Site. For this consent application, the Applicant intends to construct 12 three-bladed horizontal axis wind turbines, six with a maximum height of 220m and six with a maximum height of 200m to blade tip, with a total installed capacity of around 84MW producing between 186GWh of electricity annually. This equates to the annual power consumed by approximately 47,596 average households in Scotland per year[2]. The proposed Development would provide a flexible balance of energy and enabling the delivery of the full potential of renewable energy to meet the demands of the National Grid.

8. Onsite access tracks have been designed to use existing tracks as far as possible; whilst minimising cut and fill requirements to reduce the amount of ground disturbance, amount of material required for construction, loss of sensitive habitats and landscape and visual effects, particularly during construction. The proposed Development includes associated infrastructure including:

- 12 No hardstanding areas at the base of each turbine, with an approximate total area of 3,856 m^2;
- transformer/switchgear housings located adjacent to turbines;
- site entrance from the A701, and 31.5 kilometres (km) of access track with associated watercourse crossings – of which 10.5 km are new access tracks and 21.00 km are upgrades to existing tracks;
- underground cabling linking the turbines with the substation;
- A permanent meteorological mast (PMM) and associated hardstanding area;
- an operations control building with parking and welfare facilities;
- a substation compound;
- a bellmouth and parking area adjacent to the A701;
- two temporary construction compound areas;
- extraction of material from up to three existing quarries owned and operated by Forestry and Land Scotland to provide suitable rock for access tracks, turbine bases and hardstanding;

[2] *From the Scottish Government online renewable electricity output calculator https://www.gov.scot/publications/renewable-and-conversion-calculators/ [accessed August 2024]*

- health & safety and other directional site signage; and
- additional development components to improve the overall ecological and environmental benefits accruing from the proposed Development in the form of peatland restoration, habitat improvement and native woodland planting.

3.3.1. Operational Life

9. The proposed Development is anticipated to have an operational life of 40 years , after which it would be decommissioned, and the turbines dismantled and removed. This is the proposed course of operations which is being applied for and any alternative to this action would require separate consent from DGC, and so is not considered within this EIA Report.

10. It is planned to operate the proposed Development in accordance with the consent on an ongoing basis. Should there be a failure of any renewable energy technology beyond economic repair or if the technology comes to the end of its viable operating life, the Applicant would replace the appropriate renewable energy infrastructure with a similar model of the same dimensions and appearance. Such operations would be similar to construction and these effects are examined in the technical subject area chapters of this EIA Report (Chapters 7 to 15). Should consent be granted, it is anticipated that there would be a condition which would address the requirement to either remove renewable energy infrastructure should they become non-operational for a defined period of time or to replace the infrastructure like for like.

3.3.2. Grid Connection

11. The grid connection point and date of connection for the proposed Development is subject to confirmation by the network operator/owner.

12. The precise route of the grid connection cabling has not yet been fully determined; however, it is proposed to connect the proposed Development to the electricity transmission network via a wood pole overhead line (OHL) between the proposed Harestanes West Windfarm substation and the existing transmission steel tower BR61, including a new circuit breaker compound, southeast of Dumfries near Mouswald.

13. The grid connection is likely to require consent under Section 37 of the Electricity Act 1989 which is the subject of a separate consenting process to this Section 36 application.

3.3.3. Wind Turbines

14. The proposed Development includes the installation and operation of 12 three-blade horizontal axis wind turbines at the Site. The proposed turbine locations are shown in **Figure 3.1** and the coordinates for each are provided in **Table 3.1** below.

Table 3.1 Turbine Coordinates

Turbine No.	OS Easting	OS Northing	Maximum tip height (m)
1	296190	593782	200
2	295607	593196	200
3	295562	592157	220
4	295394	591526	220
5	296170	591307	200

Turbine No.	OS Easting	OS Northing	Maximum tip height (m)
6	296331	590777	200
7	295432	590648	220
8	295878	590315	220
9	295182	590095	200
10	296285	589730	200
11	295568	589633	220
12	296082	589043	220

15. It is expected that the wind turbines would each have an installed capacity of approximately 7 MW based on wind turbine technology which is currently available and would have a maximum height of 220 m to blade tip in a vertical position. The wind turbines would each incorporate a tapered tubular tower and three blades attached to a nacelle that would house a turbine generator and other operating equipment. The turbines would be semi-matt pale grey or a finish agreed with DGC.

16. The candidate turbine model to be installed as part of the proposed Development would be selected through a competitive procurement process. In each assessment in the EIA, a worst-case scenario of the turbine dimensions/characteristics has been used. An indicative turbine for the proposed Development is shown on **Figure 3.3**.

17. Each turbine is likely to be served by an electrical transformer/switchgear unit that would be located externally adjacent to the turbine base. The transformer/switchgear housing would measure no larger than 10 m(l) x 5 m(w) and 4 m(h). The external finishes would typically be metal, reinforced glass, or moulded plastic. An indicative external transformer/switchgear unit is shown in **Figure 3.4**.

3.3.4. Wind Turbine Foundations and Crane Hardstanding

18. Wind turbine foundations would be designed to accommodate the final choice of turbine and to suit site-specific conditions. The final design would depend on the findings of detailed ground investigation at each turbine location. An illustration of a typical wind turbine foundation is provided in **Figure 3.5.**

19. The turbines would have gravity foundations over an area of 26 m diameter and would be laid using reinforced concrete. The depth of the excavation would depend on the ground conditions, foundations would typically be 3.0 m deep. The sides of the excavation would be graded back to approximately 8.5 m from the foundation and battered to ensure that they remain stable during construction. The wind turbines would be erected using mobile cranes bought on to the Site for the construction phase.

20. A main crane hardstanding would be built adjacent to each wind turbine and is likely to have a footprint of 25 m x 25 m, with the total hardstanding areas at the base of each turbine being 2,956 m^2. .The depth of crane hardstanding is expected to be about 0.6 to 1 m depending on underlying ground conditions. The crane hardstanding design and layout would be determined by the wind turbine supplier according to their preferred erection method and site investigation to assess ground conditions. An indicative crane hardstanding design has been considered for the purposes of this assessment and is provided in **Figure 3.6.**

21. The installation area also includes two trestle areas for the blades with a foundation footprint of 20 m by 4 m, a hardstanding for three assist cranepads (17 m x 12 m),), and potentially a hardstand for boom assembly. The crane hardstanding foundation areas would remain in situ for the duration of the operational phase of the proposed Development; however, the laydown areas would be reinstated following the construction phase. Depending on the turbine supplier selected for the Site, an additional hardstanding area may be needed for a Frictional Guy Rope which is needed for turbine installation.

22. Soils that are excavated during construction would be set aside for backfilling of foundations and reuse in restoration of disturbed areas around the turbine locations and hardstandings. Further details of soil storage, including peat management, would be developed through the CEMP and Peat Management Plan (PMP). **Technical Appendix 10.2: Outline Peat Management Plan** contains peat calculations that outline the total volumes of peat that would be excavated and reused onsite by peat type and infrastructure element.

3.3.5. Control Compound, Substation and Control Building

23. A substation and control building would be located within a permanent control compound measuring 75 m by 52 m as indicated on **Figure 3.1** (NGR 296140, 589310). Adjacent to the substation and control building is a proposed temporary construction compound, measuring 75 m by 48 m, that would be reinstated at the completion of the construction phase. An indicative substation and control compound layout is illustrated in **Figure 3.2.**

24. The permanent control compound would comprise of a range of electrical grid equipment, such as, but not limited to:

- control buildings
- ancillary grid service equipment;
- transformers;
- heating, ventilation and air conditioning (HVAC) coolers;
- electrical cabling; and
- other electrical equipment.

25. The substation would be constructed and owned by the electricity grid network operator which is SPEN. The substation and control building would be able to undertake a range of services for the national grid, including exporting and importing power, frequency control, reactive power compensation and re-starting the electrical grid in the event of failure ('black start').

26. The proposed Development would be connected to the substation and electricity network via the onsite control building. Indicative control building elevations are shown on **Figure 3.7**. The control building would also host solar panels on the roof to reduce the carbon footprint of the building and would likely include other energy efficient measures, such as rainwater harvesting for flushing of toilets. A small car park would also be located within in the control compound.

27. A security fence of around 3 m in height would be installed around the perimeter of the ancillary services compound and the Site would be served via a locked access gate (see **Figure 3.2).**

3.3.6. Electric Cables

28. The proposed Development will comprise buried electric cables which will connect the wind turbines to the substation and control building compound. The majority of the underground power cables would run along the side of the access tracks in trenches to the proposed control building compound. The trench route would be clearly marked above ground clearly with identification posts, spaced evenly along the length. The cables would be buried to a depth of approximately 0.9 – 1.0 m, in trenches 0.45 – 0.7 m. Indicative cable trench arrangements are provided in **Figure 3.8**.

3.3.7. Access Tracks, Passing Places and Turning Heads

29. Approximately 31.5 km of access tracks including approximately 10.5 km of upgraded existing track, and 21.0 km of new access track would be required to provide access to the wind turbines control building compound and construction compound. Indicative tracks details are shown in **Figure 3.9.**

30. Tracks would have a 5.5 m running width, which may be increased to comply with the turbine supplier's access requirements on bends and at junctions. Where it is not possible to avoid areas of deepest peat, floating track construction would be used. It is anticipated that there would be approximately 638 m of new floating track, and 866 m of existing track that would be floated, where consistent peat depths of between 1.2 m or greater are identified along with shallow topography in the area (below 5%).

31. Construction passing places would be placed along the track in addition to passing opportunities at site junction and crane hardstandings, at approximately intervals of 500 m. The exact locations of these would be determined prior to construction. The construction traffic passing places would be 25 m by 6 m, with a 6 m splay in/out, to accommodate the largest turbine component delivery vehicles. Indicative cross sections of the proposed access tracks and plan of the passing places is provided in **Figure 3.9**.

32. Turning heads, to enable unloaded vehicles to turn, have been proposed to avoid significant distances of reversing. Typically, these are on tracks longer than 200m or where there is a significant slope gradient between the hardstanding and turning area. The turning heads measure approximately 35 m in length with a 25 m bend radius. The location and specification of turning heads are subject to turbine manufacturer and site health and safety requirements.

3.3.8. Access from the Trunk Road Network to the Site

33. Access to the turbine area is via the existing access from the existing access junction on the A701 used for the existing Harestanes Windfarm. It is proposed that Abnormal Indivisible Loads (AILs) and heavy goods vehicular traffic would use this access. No heavy goods vehicles (HGV) access is anticipated to be taken through the village of Ae; however, there may be limited access taken through the village of Ae by a limited number of light goods vehicles (LGV) during the initial enabling upgrading works on the access route.

34. The access from the A701 would be upgraded to safely allow the delivery of wind turbines and construction materials. An area of hardstanding immediately adjacent to and north of the public road access from the A701 would also be constructed. This would be used for parking AILs during the construction phase prior to the delivery of turbine components to the turbine area. The proposed site access option is shown in **Figures 3.10** and **3.11**. The access route and site access are addressed further in **Chapter 12: Access, Traffic and Transport**.

35. Local or onsite sourced material, such as stone, will be used where feasible and traffic will avoid impacting on local communities, as far as possible.

3.3.9. Permanent Meteorological Mast

36. One permanent meteorological mast (PMM), up to 105 m in height may be erected, dependent on the final turbine model selected (**Figure 3.12**). The proposed PMM location is shown on **Figure 3.1**. The PPM would require a concrete foundation measuring approximately 14 m x 14 m, with a depth of up to 3 m. The construction method of the foundation would be similar to that used for the turbines. In addition, a crane hardstanding, measuring approximately 30 m x 40 m would be required adjacent to the mast to allow for the erection of the mast. The meteorological mast would have a security fence around its base to control access.

3.3.10. Watercourse Crossings

37. Watercourse and ditch crossings have been avoided in the design of the access track as far as possible; however, there would be three requiring authorisation (under the Water Environment (Controlled Activities) (Scotland) Regulations 2011 as amended, known as CAR). 15 existing watercourse crossings are to be upgraded which require authorisation under CAR. Further details on the watercourse crossings including coordinates are contained in **Table 3.2** and a Watercourse Crossing Assessment is provided in **Technical Appendix 10.5**.

Table 3.2 Watercourse Crossings requiring authorisation

Watercourse Crossing	National Grid Reference	Comments
WC01	NY 0292 9099	Existing crossing of Black Linn
WC02	NY 0216 9396	Existing crossing of Auchencaigroch Burn
WC03	NY 0211 9431	Existing crossing of Auchencaigroch Burn
WC04	NY 0082 9657	Existing crossing of Deer Burn
WC05	NY 0037 9729	Existing crossing of unnamed tributary of Water of Ae
WC06	NY 0035 9810	New crossing of Water of Ae
WC07	NX 9983 9764	Existing crossing of Clerk Grain
WC08	NX 9964 9718	Existing crossing of Grindstone Cleuch
WC09	NX 9941 9674	Existing crossing of unnamed tributary of Water of Ae

Watercourse Crossing	National Grid Reference	Comments
WC10	NX 9906 9658	Existing crossing of Pishnack Burn
WC11	NX 9940 9564	Existing crossing of unnamed tributary of Water of Ae
WC12	NX 9801 9569	Existing crossing of Bran Burn
WC13	NX 9829 9433	Existing crossing of unnamed tributary to Capel Water
WC14	NX 9746 9463	New crossing of Capel Water
WC15	NX 9665 9372	Existing crossing of Bluid Sike
WC16	NX 9562 9126	New crossing of Corse Burn
WC17	NX 9546 9102	Existing crossing of Braidlane Burn
WC18	NX 9543 9093	Existing crossing of Kingstand Burn

3.3.11. Borrow Pits

38. A total of approximately 395,230 m^3 of material, including a 10% contingency to allow for underestimation of requirements and some excavated material being unsuitable, will be required to construct the proposed Development. The proposed Development will require no new borrow pits as aggregate will be won from the existing quarries owned by Forestry Land Scotland (FLS) located within the Site. The three proposed quarries are known as "Branrig", located along the access track east of the Bran Burn watercourse crossing, "Mitchellslacks" located along the north west edge of the turbine area and "Quarriebraes" located west of Turbine 5. **Table 3.3** below provides the grid coordinates for these quarries as well as the proposed volume of aggregates to be won from each. Further detail as to how these will be worked is provided in **Technical Appendix 10.3: Borrow Pit Assessment**.

Table 3.3 Borrow Pit Details

Name	Easting	Northing	Estimated Volume to be Won (m^3)
Branrigg	29849	59552	213,000
Mitchellslacks	29524	59410	216,000
Quarriebraes	29588	59141	12,600

3.3.12. Felling

39. The proposed Development would require 199.19 net ha of woodland to be directly felled in order to facilitate wind turbines and associated infrastructure. Forestry felling will be required in a keyholed radius from each turbine location within woodland to allow for construction, operation and environmental mitigation, including bat habitat standoff distances. For the six turbines of up to 220 m in height, the radius of the area to be keyholed around each turbine would be 98 m. For the six turbines of up to 200 m in height, the radius of the area to be keyholed around each turbine would be 86 m.

40. Of the 199.19 net ha of forestry to be felled, approximately 126.66 ha would be replanted following completion of the construction phase, and 72.53 ha would be required to be kept clear of forestry during the operational phase of the proposed Development. Further details are provided in **Technical Appendix 14.1**.

3.3.13. Compensatory Planting

41. The construction of the proposed Development is predicted to result in a net loss of woodland within the Site. The area available for stocked woodland in the study area would decrease by 72.53 ha. Further details are provided in **Technical Appendix 14.1: Foresty Technical Report**.

42. The Applicant is committed to providing appropriate Compensatory Planting (CP) in accordance with the criteria of the Scottish Government's Control of Woodland Removal Policy. The extent, timing, location and composition of such improvements are to be agreed with Scottish Forestry and the landowner(s) in the form of a restoration plan. This will take into account any revision to the felling and restocking plans prior to the commencement of operation of the proposed Development.

3.3.14. Riparian and Native Woodland Planting

43. The Applicant has identified an opportunity for biodiversity enhancement through riparian and native woodland planting. Within Habitat Management Plan Area A, as identified on **Figure 3.1,** where ground conditions are not suitable for bog restoration, native broadleaf planting will be undertaken. The area of planting will be approximately 15 ha. Within Habitat Management Plan Area B, 13.3 Ha of riparian planting will be undertaken along the existing watercourses.

44. Details of the habitat management proposals are described in **Technical Appendix 8.9: Outline Habitat Management Plan**.

3.3.15. Habitat Management Plan

45. The Applicant has identified areas of opportunity within the Site which have been affected by historical land use (e.g., forestry and land drainage) for native woodland planting, peatland restoration and habitat improvement, and these areas have been agreed with the relevant landowners.

46. Within Habitat Management Plan Area A, as identified on **Figure 3.1**, the Applicant will remove approximately 7.53 ha of commercial plantation forestry, and is committed to the restoration of 2.82 ha of degraded blanket bog habitat. The Applicant has conducted similar restoration measures successfully on other windfarm projects to restore bog habitats.

47. The timing of any forestry works required to accommodate the habitat management improvements would be agreed with the landowners.

48. Details of the habitat management proposals are described in the Habitat Management Plan (HMP) which is provided in **Technical Appendix 8.9: Outline Habitat Management Plan**.

3.3.16. Design Principles and Embedded Mitigation

49. A number of design principle and environmental measures, otherwise known as embedded mitigation, have been implemented and incorporated into the proposed Development as standard practice, as described in **Chapter 2: Site Description and Design Evolution.**

50. Throughout the design, embedding mitigation has been a feature of the process that has led to the final design of the proposed Development; and this embedded mitigation, therefore, forms part of the proposed Development which has been assessed in this EIA Report.

51. Reference to good practice and standards, guidelines and legislation relied upon in the assessment methodology are referred to within each of the individual specialist topics in **Chapters 7 to 14** of this EIA Report. Such environmental measures are also included in the outline CEMP (**Technical Appendix 3.1**).

3.3.17. Micrositing

52. During the construction process there may be a requirement to microsite elements of the proposed Development infrastructure (e.g. due to unsuitable ground conditions, environmental constraints). It is proposed that a 50 m micrositing tolerance of all site infrastructure would be applied to the proposed Development. Within this distance any changes from the consented locations would be subject to approval of the Ecological Clerk of Works (ECoW) as required and in consideration of other known constraints. It is anticipated that the agreed micrositing distance may form a condition of consent for the proposed Development.

3.3.18. Consents Prior to the Commencement of Development

53. Prior to commencing construction on the Site, it may be necessary for the Applicant to obtain a number of other statutory authorisations and consents to enable the proposed Development to be implemented. Where relevant these are covered in the technical Chapters (**Chapters 7 to 14**) of this EIA Report.

3.4. Construction

3.4.1. Construction Programme

54. The proposed Development would be constructed over a period of approximately 24 months, anticipated to commence in 2029. Construction would include the principal activities listed within the indicative construction programme as provided in **Table 3.4.**

Table 3.4: Indicative Construction Programme

Activity	Months																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Site Establishment																								
Forestry felling																								
Access road upgrades																								
Construction of new access tracks and crane hardstanding																								
Turbine foundation construction																								
Substation civil and electrical works																								
Cable trenching and installation																								
Crane delivery																								
Turbine delivery, erection and commissioning																								
Site reinstatement and restoration works																								

3.4.2. Construction Employment

55. The number of people employed during the construction period would vary depending on the stage of construction and the activities ongoing onsite. It is anticipated that the peak workforce requirement would be around 150 construction staff. Peak daily vehicle movements during the construction phase would be 320 two-way trips, consisting of 50 cars/LGVs and 292 HGVs[3].

3.4.3. Construction Hours

56. The construction working hours for the proposed Development would be 7am to 7pm Monday to Friday and 7am to 4pm on weekends, though noisy activities on weekends would be restricted to reduce disturbance to nearby properties. It should be noted that out of necessity due to weather conditions and health and safety requirements, some generally quiet activities, for example, abnormal load deliveries (which are controlled by Police Scotland) and also the lifting of the turbine components, may occur outside the specified hours stated. The timing of the delivery of abnormal loads (i.e. wind turbine blades) will be agreed with the relevant authorities after detailed investigation.

3.4.4. Construction Access

57. The anticipated abnormal load route for wind turbine components is likely to be from King George V Dock near Glasgow to the existing site access for the operational Harestanes Windfarm adjacent to the A701. Due to their dimensions, the vehicles would be classed as abnormal loads and would require a 5 m wide by 5 m high transport window. From there, the wind turbine components will proceed on the network of upgraded existing forestry haul tracks from the A701 to the turbine hard standings as shown in **Figure 3.1**.

3.4.5. Construction Lighting

58. Artificial lighting may be required during the construction phase to ensure safe working conditions, during periods of limited natural light. Examples include vehicle and plant headlights, construction compound lighting, floodlights and mobile lighting units, to be used around specific construction activities. It is intended that the type of lighting would be non-intrusive (e.g. directed towards works activity and away from the Application Boundary), to minimise impact on local properties and other sensitive receptors.

3.4.6. Forestry Felling to Accommodate Construction

59. As stated above, commercial coniferous plantations present on the Site will require partial felling to accommodate the new turbines, access tracks and other infrastructure. As indicated on **Table 3.4**, the felling required to accommodate the proposed Development would be undertaken at an early stage of construction. Felling required to accommodate habitat management improvements (as shown in **Technical Appendix 8.6**) would be undertaken in accordance with a programme agreed with FLS as landowner.

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[3] Turbine components will be delivered on AILs. After delivery, when the AIL vehicle leaves the Site, it is classed as an HGV. Calculations take this into account. However, no AILs are anticipated during the peak month of construction. Cars/LGV movements assume single car occupancy as a worst-case scenario.

3.4.7. Recreational Access During Construction

60. During the construction phase of the proposed Development, where possible recreational access to the Site will be maintained along publicly accessible paths such as the Romans and Reivers Route and the network of walking and mountain biking trails within and near the Site. Where access along an existing route is not possible, a diversion will be agreed and implemented. There will likely be occasions when access to the Site for members of the public is not possible for short periods during the construction phase for health and safety reasons (e.g. during delivery of certain infrastructure components).

61. Changes to access arrangements within the Site will be detailed in an Access Management Plan prepared in advance of construction commencing. These will include an arrangement for communicating changes in access to relevant stakeholders. The Access Management Plan details will be discussed with DGC's Outdoor Access Manager and shared with key stakeholders such as Ae Community Council.

3.4.8. Construction Compounds

62. Two temporary construction and maintenance compounds would be required for the duration of the construction phase as shown in **Figure 3.1.** These are located at NGR 298245, 594439 and NGR 295255, 592951. The construction compounds would each have a footprint of around 126 m x 75 m (9,450 m^2) and contain the following:

- temporary modular building(s) to be used as a Site office;
- welfare facilities;
- parking for construction staff and visitors;
- reception area;
- fuelling point or mobile fuel bowser;
- secure storage areas for tools; and
- waste storage facilities.

63. **Figure 3.13** illustrates a typical construction and maintenance compound although the layout may differ depending on site topography and contractor requirements. Crane hardstanding areas, along with the construction and maintenance compound, would be used for laydown during construction. Water would also be required for welfare facilities and to dampen track during dry weather. However, this would be minimal and would likely be collected via rainwater harvesting.

64. A small parking area has been provided for close to the entrance to the Site at NGR 304207, 590154. This would allow for AILs to park up after coming off the A701 public road before access to the turbine area.

3.4.9. Materials Sourcing and Waste Management

65. The proposed Development would require a range of construction materials (e.g. aggregates and concrete).

66. Excavated material from the turbine bases and access tracks would be used onsite for restoration and reinstatement. Onsite concrete batching would not take place and concrete will be delivered to the Site.

67. A Site Waste Management Plan would be developed for implementation during construction, as discussed in the CEMP (**Technical Appendix 3.1**). This outlines details of the materials requirements and waste generation during construction and how the Applicant intends to consider the management of these aspects.

3.4.10. Temporary Peat Storage

68. Temporary storage of peat would be avoided wherever possible by transporting the peat to an allocated reuse location as soon as practicable following excavation. This would help to retain its structural integrity as far as possible, would minimise volumes of peat requiring storage and would help to prevent the peat drying out. It is important, both for the peat itself and for the surrounding environment, that the peat is not allowed to substantially erode or become dry while it is stored.

69. Procedures to control the hydrology of stored peat would be covered by the CEMP (**Technical Appendix 3.1**) and the outline PMP (**Technical Appendix 10.2**). These would include:

- excavated materials would not be stored immediately above excavation faces, in order to prevent overburden-induced failure;
- local drainage lines, areas of very wet ground and locally steep slopes would be avoided for excavated material storage, including peat;
- peat turves would be stored vegetation-side up;
- careful handling of upper-layer peat divots, from areas where peat turves cannot be excavated, would help to retain vegetated blocks the right way up;
- catotelmic peat would be stored separately from vegetated peat blocks, in mounds up to 1 m high;
- limited smoothing or 'blading' of stockpiled catotelm peat, topsoil and subsoil would help to shed rainwater and prevent ponding of water on the stockpile;
- in periods of dry weather, light spraying of the temporary peat stores would be applied in order to minimise drying;
- all temporary storage areas for excavated peat and soils would be at least 50 m from any watercourse;
- runoff from stored peat and soils would be managed to avoid impacts to habitats and watercourses. Where necessary, drainage control measures such as use of silt fences or straw bales would be put in place; and
- monitoring of peat storage areas may be required during wet weather or snowmelt. This would be undertaken by the Contractor, with findings reported to the ECoW.

70. The catotelm layer would not be used for the dressing of roads and hardstandings. The detail for peat storage areas and dimensions would be determined when site work has

commenced, and the peat condition and requirements are better understood. Further detail is provided in the in **Technical Appendix 10.25**.

3.4.11. Site Restoration

71. Excavated soil and peat would be used in site restoration and rehabilitation at the end of the construction period, in order to promote fast re-establishment of vegetation cover on worked areas and areas of bare soil or peat that are not required for the operational phase of the development. Some of the excavated peat would be reserved for peatland restoration in parts of the Application Boundary. Soils and peat would be stored for as short a time as practicable, in order to minimise degradation through erosion and desiccation.

72. Further detail on site restoration would be provided within the CEMP, an outline of which is provided in **Technical Appendix 3.1**.

3.4.12. Environmental Management and Good Practice Construction

73. The construction of the proposed Development would be based on the adoption of good practice, supported by robust project management and the supervision of an ECoW. Details of the good practice and the role of the ECoW is set out in the outline CEMP (**Technical Appendix 3.1**).

74. Good practice includes the adoption of Pollution Prevention Guidelines (PPGs) and replacement Guidance for Pollution Prevention (GPPs). The services of other specialist advisors would be retained as appropriate, such as an Archaeological Advisor, to be called on as required to advise on specific environmental issues. The Principal Contractor (PC) would ensure construction activities and procedures set out in the CEMP are carried out in accordance with the mitigation measures outlined in this EIA Report and any planning conditions, and this would be monitored by SPR and the ECoW.

75. To ensure all mitigation measures outlined within this EIA Report are carried out onsite, contractors would be required to develop a site-specific CEMP which would form an overarching document for all site management requirements, including the following:

- Traffic Management Plan (TMP);
- Construction Methodology Statement (CMS);
- Pollution Prevention Plan (PPP) (including monitoring, as appropriate);
- Site Waste Management Plan (SWMP); and
- Water Management Plan (WMP).

3.5. Operation and Maintenance

3.5.1. Operational Lifespan

76. There is no proposal to limit the lifetime of the proposed Development. Therefore, the assessment of all technical areas considers the effects of the operational phase of proposed Development without time limitations. Should decommissioning of any of the

proposed Development be required it is considered that the environmental effects of decommissioning would be similar to, or less than, those during construction.

77. The proposed Development would operate for the duration of its planning consent as a renewable energy development. Should consent be granted it is anticipated that there would be a condition which would deal with the requirement to remove any part of the proposed Development if they cease to operate for a defined period of time.

3.5.2. Electricity Generation

78. The wind turbines would start to generate electricity at wind speeds of around 3 m/s. Electricity output would increase as the wind speeds increase up to a maximum of around 15 m/s, when the wind turbines would reach their maximum capacity. The turbines would continue to operate at a maximum capacity up to wind speeds of around 25 m/s when they would begin to pitch the blades out of the wind and come to a gradual stop as a safety precaution.

3.5.3. Lighting

79. All the wind turbines would above 150 m to blade tip and, therefore, will require to be lit with medium intensity (2000 candela) steady red aviation warning lights (with dimming option to 200 candela when visibility is good) to comply with Civil Aviation Authority (CAA) requirement in accordance with Article 22 of the UK Air Navigational Order (ANO) 2016. A reduced lighting scheme has been discussed and agreed with the CAA and is presented as **Technical Appendix 14.3.**

80. The potential visual effects of the proposed aviation lighting are assessed in **Chapter 7**.

81. There would be permanent lighting installed as part of the control building. Detailed design of the control building has not been conducted at this stage (**Figure 3.7** shows an indicative elevation of the control building). It is expected that planning permission would include a planning condition requiring the submission and approval of the detailed control building design prior to commencement of works.

3.5.4. Maintenance

82. The proposed Development would be maintained throughout its operational life by a service team comprising up to five full time equivalents made up of operation management, operations technicians and support functions. During periods of scheduled maintenance up to four technicians who may be based in the local area would be required for up to seven weeks per year, whilst additionally the technicians would be required to undertake unscheduled maintenance throughout the year.

83. This team would either be employed directly by the Applicant, or by the turbine manufacturers. Management of the proposed Development would typically include wind turbine maintenance, health and safety inspections and civil maintenance of tracks, drainage and buildings.

84. Maintenance includes the following:

- scheduled routine maintenance and servicing;
- unplanned maintenance or call outs;

- HV and electrical maintenance;
- blade inspects; and
- civil maintenance of tracks and drainage.

3.6. Decommissioning

85. Should consent be granted, it is anticipated that there would be a condition of the consent requiring removal of any operational part of the proposed Development (i.e. decommissioning) if it ceases to function for a defined, extended period of time, without permission of the planning authority. The proposed Development components are anticipated to have an operational life of **40 years**, after which they would be decommissioned and the turbine dismantled and removed or replaced.

86. During decommissioning the turbines would be dismantled and removed, along with any associated above ground electrical equipment. This decommissioning work would be the responsibility of the Applicant, or any subsequent owner of the proposed Development. Underground cables would be left in place and foundations would be removed to a depth of 0.5 m below ground level to avoid environmental impacts from deeper removal. Prior to decommissioning of the proposed Development, a method statement would be prepared and agreed with the DGC.

3.7. Climate Change, Carbon Considerations and Commitments

87. The proposed Development would generate around 84 MW or between 186 GWh[4] per year of renewable carbon-free energy. As highlighted in **Chapter 2**, this would support the UK and Scotland's targets for cutting carbon dioxide (CO_2) emissions and especially supports the recent commitments to cut CO_2 emissions to net zero by 2045 in Scotland. Carbon dioxide is a greenhouse gas which is contributing to climate change.

88. Whilst the proposed Development would generate renewable energy free from carbon emissions, it is recognised that there would be carbon emissions generated during the construction of the proposed Development. Carbon emissions would result from the component manufacturing, transportation and installation of the proposed Development. There is also the potential for carbon fixers and sinks to be lost through the clearing of trees and vegetation during construction. Replacing trees and other carbon-fixing activities such as peatland restoration and habitat improvement are proposed as part of the proposed Development, as described in **Section 3.3.15** of this Chapter. However, it is important to consider the balance between carbon reduction associated with renewable energy development and that which is produced through the manufacturing and construction of the proposed Development.

89. The Applicant has undertaken an assessment of this carbon balance using a Scottish Government tool specifically designed for wind energy development. Further details, the methodology used, and the results of the carbon balance assessment are presented in

[4] *Calculations from the Scottish Government Renewable electricity output and energy conversion calculator's website: https://www.gov.scot/publications/renewable-and-conversion-calculators/ [accessed September 2024]*

Chapter 14. In summary, the proposed Development is expected to take around 2.22 years to repay the carbon exchange to the atmosphere (the CO_2 debt) through construction of the renewable energy development; beyond this period the Site would then be contributing to CO_2 reduction and progress towards the related national targets. There will also be considerable indirect carbon savings through the electrification of heat, transport and industrial energy supply.

90. The proposed Development and the Applicant is making a long-term commitment to meeting the requirements for renewable energy generation and reductions of carbon emissions to the atmosphere. The Applicant would also continue to investigate opportunities for enhancing the renewable energy potential of the Site, subject to further consent application and environmental assessment considerations. However, in summary, the proposed Development as it stands represents a positive contribution to the reduction of CO_2 emissions targets.

References

Civil Aviation Authority Statement (June 2017). Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150 m Above Ground Level. Available at: https://publicapps.caa.co.uk/docs/33/DAP01062017_LightingWindTurbinesOnshoreAbove150mAGL.pdf [Accessed August 2024].

Forestry Commission Scotland. The Scottish Government's Policy on Control of Woodland Removal. Available at: https://www.forestry.gov.scot/publications/349-scottish-government-s-policy-on-control-of-woodland-removal-implementation-guidance/viewdocument/349 [Accessed August 2024].

The Air Navigation Order 2016.

The Electricity Act 1989.

The Air Navigation Order 2016.

The Scottish Government online renewable electricity output calculator https://www.gov.scot/publications/renewable-and-conversion-calculators/ [Accessed August 2024].