Chapter 3
Proposed Development

SCOTTISHPOWER RENEWABLES

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Proposed Development

3.1 Executive Summary

1. ScottishPower Renewables (SPR) intends to construct Earraghail Renewable Energy Development (proposed Development) comprising advanced renewable technologies and incorporating additional development components to improve the overall ecological, environmental and social benefits accruing from the proposed Development. The Earraghail Renewable Energy Development intends to make use of available renewable energy technologies to optimise the renewable energy potential of the Site. The proposed Development comprises up to 13 three-bladed horizontal axis wind turbines up to 180 m tip height, with a rated output of around 78 megawatts (MW) and ground mounted solar arrays of around 5 MW, producing a combined output of around 83 MW or between 230 - 280 GWh of electricity annually. A battery energy storage system (BESS) of around 25 MW would also be installed to store generated renewable energy and provide flexible management of energy delivery and ancillary support services to the National Grid.

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, Scottish Hydro Electric Transmission PLC (SHET).

3. The Site would be accessed from the A83 via Tarbert Holiday Park and the existing timber haulage roads would be used by the proposed Development where possible; however, some new access tracks would be built along with other associated infrastructure. The delivery of the wind turbines would be from Campbeltown Harbour to Machrihanish Airport / A83 Junction. The vehicles would be regarded as abnormal loads and be around 5 m in width. From there the wind turbines will proceed on the A83 to the Site. The tower loads will depart from Machrihanish or Campbeltown Harbour and join on the main route on the A83.

4. For the provision and delivery of construction materials, two different delivery scenarios have been assessed. First, a scenario whereby all construction materials (e.g., concrete for foundations and aggregate for access tracks) are delivered to the Site. The second scenario, and the one preferred by SPR, is for access track aggregate other than the running surface to be sourced from onsite borrow pits, thereby reducing the total number of heavy goods vehicle movements. Both scenarios result in increases in heavy goods vehicles (HGV) movements on the A83, but the more likely scenario at a lower rate compared with the unlikely worst case.

5. Ground mounted solar arrays would be installed in one part of the Site covering an area of around 7.05 ha. The individual solar panels would be installed on metal frames orientated in a southerly direction. The mounting structures would be anchored to the ground using several possible methods such as small piles.

6. A battery energy storage system (BESS) facility would be installed adjacent to the substation and a control building for the proposed Development with a storage capacity of around 25 MW. The batteries themselves would be stored within around eight containers, similar to shipping containers, typically measuring around 12.2 m (length) x 2.43 m (width) x 2.59 m (height) each as illustrated in **Figure 3.2** which shows the indicative substation compound. The final design of the BESS would be based upon the technology available at the time of construction.

7. The construction of the proposed Development would also lead to some other temporary works, such as the development of borrow pits and tree felling. Earthworks and borrow pits would be subject to restoration and net tree loss due to the proposed Development would be compensated in line with requirements of the Control of Woodland Removal Policy.

8. 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 Argyll and Bute Council, and so is not considered within this EIAR

9. SPR also intends for the proposed Development to offer opportunities to the local communities. A range of site enhancements have been identified within the Site that are intended to improve the overall ecological, environmental and social benefits accruing from the proposed Development. These include recreational paths and walks, a viewing point upon Cnoc nan Caorach in the northern part of the Site, a walking bothy and stone seating on the Kintyre Way, native woodland planting, peatland restoration and habitat improvements. Further details are provided in **Chapter 14** and **Figure 14.1**. Full details of the habitat management improvements are included in **Appendix 8.5**.

3.2 Introduction

10. This Chapter describes the way in which the proposed Development would be constructed, including a general description of the proposed renewable energy technologies (i.e. wind turbines, solar arrays and a BESS) 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 renewable energy technologies.

11. 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 15.1.**

3.3 Proposed Development

12. 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, SPR intends to construct a variety of renewable energy technologies, including 13 three-bladed horizontal axis wind turbines up to 180 m to blade tip, with a total rated output of around 78 MW producing between 230 - 280 GWh of electricity annually. This equates to the annual power consumed by approximately 45,307 average households in Scotland per year[1]. The proposed solar array would also generate around 5 MW, which would generate a further 4.34 GWh of electricity annually. BESS would also be installed with storage capacity of around 25 MW of energy. Therefore, the generating capacity for the proposed Development is estimated at around 83 MW and total capacity at around 108 MW. 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.

13. Onsite access tracks have been designed to use existing tracks as far as possible; whilst minimising cut and fill requirements in order 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:

- 13 wind turbines, up to 180 m to blade tip, including foundations and aviation lighting;
- ground mounted solar arrays;
- BESS units;
- crane hardstandings for wind turbine installation;
- transformer/switchgear housings located adjacent to turbines & solar arrays;
- new (10.4 km) and upgraded (12.9 km) access tracks including watercourse crossings where necessary, passing places and turning heads;
- underground electrical cabling;

[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 20 December 2021]

- compound containing substation, control building and BESS;
- one main site construction and maintenance compound and a security compound;
- A permanent lattice construction meteorological mast, up to 105 m high;
- health & safety and other directional site signage;
- search areas for up to three new borrow pit areas; and
- additional development components to improve the overall ecological, environmental and social benefits accruing from the proposed Development, as follows:
    - Ecological and environmental: peatland restoration; habitat improvement; native woodland planting
    - Social: proposed new walking bothy and stone seating on the Kintyre Way; circular walking route and viewpoint near Tarbert.

14. The proposed Development would also require forest restructuring works to enable construction and operation of the renewable energy development.

3.3.1 Grid Connection

15. SPR holds a grid connection agreement to connect the proposed Development to the electricity transmission network via an SSE overhead line (OHL) between Crossaig and Craig Murrail substations. The grid connection point for the proposed Development is subject to confirmation by the network operator/owner.

16. The precise route of the grid connection cabling has not yet been determined and its effects are not identifiable at this stage. The grid connection would be subject to a separate consenting process with the Scottish Ministers once sufficient detail is available. 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. SHET who is the network owner in the area of the proposed Development would own the assets beyond the Site substation (**Figure 3.2**).

3.3.2 Wind Turbines

17. The proposal includes the installation and operation of 13 three-bladed horizontal axis wind turbines at the Site. The proposed turbine locations are shown on **Figure 3.1** and the coordinates for each are provided in **Table 3.1**.

Table 3.1: Turbine Co-ordinates

Turbine No.	OS Easting	OS Northing
1	187956	662033
2	190341	662135
3	190737	660952
4	190110	661402
5	189963	660645
6	190711	661790
7	187801	662725
8	188481	662728
9	189075	662686
10	Removed	
11	190073	662403
12	189156	662083
13	188515	661414
14	188473	660921

18. The wind turbines would each have a rating of around 6 MW based on wind turbine technology which is currently available and would have a maximum height of 180 m to blade tip in a vertical position, in order to minimise the landscape and amenity effects of the proposed Development. 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 Argyll and Bute Council (A&BC).

19. The exact model of wind turbine to be installed as part of the proposed Development would be selected through a competitive procurement process. In each technical assessment undertaken as part of 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**.

20. Each turbine is likely be served by an electrical transformer/switchgear unit that would be located externally adjacent to the turbine base. The switchgear housing would measure up to 10 m(l) x 5 m(w) and 4 m(h). The external finishes would typically be metal, or glass reinforced or moulded plastic. An indicative external transformer/switchgear unit is shown in **Figure 3.4**.

3.3.3 Wind Turbine Foundations and Crane Hardstandings

21. 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**.

22. 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 3.45 m deep (approximately 1.60 m foundation depth + 1.85 m of minimum fill). The sides of the excavation would be graded back and battered to ensure that they remain stable during construction. The wind turbines would be erected using mobile cranes brought on to the Site for the construction phase.

23. A crane hardstanding would be built adjacent to each wind turbine and is likely to have a footprint of 50 m x 36.5 m, with the depth dependent on the underlying bearing strata. The depth of crane hardstandings is expected to be about 1.2 to 1.5 m depending on underlying ground conditions. The actual crane hardstanding design and layout would be determined by the wind turbine supplier according to their preferred erection method. An indicative crane hardstanding design has been considered for the purposes of this assessment and is provided in **Figure 3.6**.

24. The crane hardstanding would include laydown areas for the blade fingers which results in a non-regular foundation footprint with a disturbance area of 9 m x 2 m, plus up to 3 smaller crane hardstandings along the access track typically 11 m x 19 m. These areas would remain *in situ* for the operational phase of the proposed Development.

25. 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).

3.3.4 Solar Arrays

26. The solar area is proposed to cover an area of 7.05 ha, which would be located to the east of the Site. These areas have been selected due to the slope and angle of the land and to avoid environmental constraints, as outlined in **Chapter 2**.

27. The solar arrays would comprise rows of individual solar panels. Each panel would have a capacity of around 500 Wp. Each solar panel would be fitted to a metal frame and angled in the direction of the sun. The solar array's frames would be installed first and the mounting structures would be anchored to the ground using several possible methods such as small piles (**Figure 3.7**). Like most modern solar photovoltaic panel designs, the proposed solar arrays would include black frames and grid lines, which breaks up the flat, smooth panel surface.

28. Solar arrays would be spaced between 5 m and 7 m apart and would be located between 0.5 m to 1 m above the ground. In between the solar panels, small tracks may need to be installed to enable access for maintenance depending on ground conditions. These tracks would be designed for four-wheel drive vehicles.

29. Low voltage cables buried underground would run from each of the solar arrays to a collector station and then onwards to the Site substation.

3.3.5 Battery Energy Storage System (BESS)

30. A BESS, in the form of around eight battery containers, would be installed within the compound along with a control building and substation for the proposed Development (**Figure 3.2**). The batteries would have an energy storage capacity of around 25 MW (approximately 1/3 turbine capacity). The batteries would also store excess power generated by the proposed

Development and provide grid support services providing stability to the electricity supply network, the importation of electricity from the national grid and the integration of more renewable energy generation.

31. The battery containers would be of steel construction, very similar to shipping containers in appearance. It is likely that each container would typically measure 12.1 m (length) 2.4 m (width) 2.5 m (height) with ancillary equipment such as inverters. The final design of the BESS would be based upon the technology available at the time of construction. It is likely that a separate switchgear container for the necessary electrical plant to operate the batteries would be required, and this too would be accommodated within the compound.

32. The battery technology type for the proposed Development will meet all the relevant safety and environmental standards. Any requirements for environmental (e.g., PPC permitting) or health and safety consents (e.g. COMAH) will be discussed, confirmed and agreed with the relevant authority prior to construction. Sufficient space within the substation construction compound remains to accommodate the battery energy storage alongside any bunding or drainage required. The final choice of battery model will ensure compliance with the above parameters. The number, dimensions, housing type, finish, arrangement, security fencing and landscaping of energy storage elements will be subject to Argyll and Bute Council consultation and approval prior to construction.

3.3.6 Substation and Control Building

33. A substation and control building would be located within a larger compound, measuring 100 m by 75 m, which would also house the BESS containers, described in the previous section (**Figure 3.2**). The substation would be constructed and owned by the electricity grid network operator which is Scottish Hydro Electric Transmission. The substation and control building for the renewable energy technologies would be able to undertake a range of services for the national grid, including exporting and importing (to the BESS) power, frequency control, reactive power compensation and re-starting the electrical grid in the event of failure ('black start').

34. The substation would comprise of a range of electrical grid equipment, such as, but not limited to:

- transformers;
- heating, ventilation and air conditioning (HVAC) coolers
- electrical cabling; and
- other electrical equipment.

35. The proposed Development would be connected to the substation and electricity network via the onsite control building located at NGR 188534 661912. An indicative control building compound and elevations are shown on **Figure 3.9**. The control building would also host solar panels on the roof to reduce the carbon footprint of the building and will likely include other energy efficient measures, such as electric vehicle charging points and rainwater harvesting for flushing of toilets. A small car park will also be located adjacent to the control building.

36. A metal palisade security fence (painted green or otherwise agreed with A&BC) of around 3 m in height would be installed around the perimeter of the substation compound and the site would be served via a locked access gate as shown in **Figure 3.2**.

3.3.7 Electric Cables

37. The proposed Development will comprise buried electric cables which will connect the renewable energy technologies 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 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 1 m. Indicative cable trench arrangements are provided in **Figure 3.10**.

3.3.8 Access Tracks, Passing Places and Turning Heads

38. Approximately 23.4 km of access tracks including approximately 12.9 km of upgraded track would be required to provide access to the wind turbines, control building compound, solar arrays and construction compound. Indicative track details are shown in **Figure 3.10**.

39. Tracks would have a typical 4.5 m running width, wider 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 2.66 km of floating

track, where consistent peat depths of between 1.2 m or greater are identified along with shallow topography in the area (below 5 %).

40. Construction passing places would be placed along the track in addition to passing opportunities at site junction and crane hardstandings. The exact locations of these would be determined prior to construction.

3.3.9 Access from the Trunk Road Network to the Site

41. Access to the Site is via the A83 at Tarbert Holiday Park to the north of the Site. The A83 is fed by several public and private roads.

42. For the provision and delivery of construction materials, two different delivery scenarios have been assessed. First, a scenario whereby all construction materials (e.g., concrete for foundations and aggregate for access tracks) are delivered to the Site. The second scenario, and the one preferred by SPR, is for access track aggregate other than the running surface to be sourced from onsite borrow pits, thereby reducing the total number of heavy goods vehicle movements. Both scenarios result in increases in heavy goods vehicles (HGV) movements on the A83, but the more likely scenario at a lower rate compared with the unlikely worst case.

43. Following consent, a detailed access assessment would be undertaken which would identify the requirements for any road modifications, vegetation or tree trimming required along the access route.

44. The proposed Development also includes an upgraded site entrance which is designed to safely allow the delivery of wind turbines and construction materials. The proposed site access option is shown in **Figure 3.11**.

3.3.10 Permanent Meteorological Mast (PMM)

45. One permanent meteorological mast, up to 105 m in height may be erected, dependent on the final turbine selected (**Figure 3.12**). The mast 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. The proposed PMM location is shown on **Figure 3.1**.

3.3.11 Watercourse Crossings

46. Watercourse and ditch crossings have been avoided in the design of the access track layout as far as possible; however, there would be four new watercourse crossings within the Site. Nine of these watercourse crossings are to be for access to the wind turbine area along the existing access track, and seven further crossings of minor watercourses would be required within the turbine area. 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

Watercourse crossing	National Grid Reference (NGR)	Comments
WC01	NR 8443 6578	Existing bridge crossing Abhainn Achachoish, approximately 7 m wide.
WC02	NR 8529 6585	Existing culverted crossing of Abhainn Achachoish, 0.9 m diameter. Evidence of bank instability in areas with tall steep banks
WC03	NR 8607 6644	Existing culverted crossing of Allt Airigh nan Eun, 1 m diameter. Well defined incised channel with evidence of bank instability and erosion.
WC04	NR 8645 6677	Existing culverted crossing of tributary to Abhainn Achachoish, 0.6 m diameter. Narrow channel appears to be incised into peat upstream of crossing.
WC05	NR 8667 6700	Existing culverted crossing of tributary to Abhainn Achachoish, 0.6 m diameter. Narrow channel, forms small waterfall into trackside drainage on upstream side of track.

Watercourse crossing	National Grid Reference (NGR)	Comments
WC06	NR 8760 6735	Existing culverted crossing, 1.6 m diameter. Well defined channel incised into bedrock in places.
WC07	NR 8786 6722	Existing culverted crossing of unnamed watercourse, 1.1 m diameter. Well defined channel, incised into bedrock in places.
WC08	NR 8807 6676	Existing culverted crossing of unnamed watercourse, 1.0 m diameter. Well defined channel flowing over bedrock.
WC09	NR 8805 6585	New crossing of Allt Beithe. Small watercourse, appears to be incised into peat, surrounding area boggy.
WC10	NR 8746 6311	Existing culverted crossing of tributary to Garbh Allt, 0.6 m diameter. Poorly defined watercourse up to 1 m wide with evidence of recent flooding and erosion of low peat banks.
WC11	NR 8785 6243	Existing culverted crossing of tributary to Garbh Allt, 2.8 m diameter. Small meandering channel incised in bedrock.
WC12	NR 8904 6204	Existing culverted crossing of Allt Càrn Chaluim, 1.2 m diameter. Well defined channel flowing over bedrock with peat banks showing evidence of instability and erosion.
WC13	NR 8971 6230	Existing culverted crossing of tributary to Skipness River, 2 m diameter. Well defined channel with heavily vegetated banks.
WC14	NR 8989 6191	Existing culverted crossing of tributary to Skipness River, 1.8 m diameter. Small channel appears to be incised into peat with evidence of flooding and erosion of banks.
WC15	NR 9036 6180	Existing culverted crossing of tributary to Skipness River, 0.4 m diameter. Poorly defined narrow channel appears to have been modified by forestry operations downstream of the crossing.
WC16	NR 9030 6072	New crossing of Eas a' Chromain. Small meandering channel heavily overgrown with reeds throughout, appears to be incised into peat.

3.3.12 Borrow Pits

47. The proposed Development will require new borrow pits to secure material for construction, but opportunities to use the existing borrow pits on the Site will also be explored with the landowner.

3.3.12.1 Existing Borrow Pits

48. Three existing borrow pits are present within the Site that are used by the landowner, Forestry and Land Scotland (FLS), for the expansion and maintenance of the system of timber haulage roads within the forestry plantation. Up to two existing borrow pits might be used during the construction phase (**Figure 3.1**). The use of these borrow pits would provide a greater volume of rock than would be needed for the construction of the proposed Development but allows for the current uncertainty of the quality of the rock at these locations.

3.3.12.2 New Borrow Pits

49. Three new borrow pits have been identified (**Figure 3.1**), to provide a total of approximately 335,000 m^3 of material, including a contingency to allow for underestimation of requirements and some excavated material being unsuitable, to construct the proposed Development (coordinates provided in **Table 3.3** and details presented in **Technical Appendix 10.3**).

Table 3.3: Borrow Pit Information

Borrow Pit No.	NGR Reference	Approximate Dimensions (W, L, H) (m)	Volume (m^3)
BP 1	NR 86400 66620	100 x 80 x 28	85,000

BP 2	NR 88360 62060	195 x 115 x 20	200,000
BP 3	NR 90070 61800	88 x 94 x 15	50,000

50. The physical constraints of rock suitability and topography, and the requirement to plan for a suitable restoration scheme, have been primary considerations in the borrow pit design. The preferred option has been to open three borrow pits, to supply rock aggregate for all of the proposed Development if required. The rock at the Site has been assessed visually by an experienced geotechnical specialist as potentially suitable for track and hardstanding construction; however, rock exposure within the study area is limited and there may be local variations that restrict suitability of some of the aggregate, particularly for track running surfaces. An intrusive site investigation would be undertaken pre-construction to confirm these findings and this EIA has considered the worst-case scenario of not being able to source rock aggregate from the onsite borrow pits.

51. All three borrow pits are adjacent to the existing forestry tracks on the Site access and have been designed to minimise visibility where possible.

52. It is not proposed to retain any of the new proposed borrow pits post-construction as this would require regular maintenance and inspection. Materials are available locally so any requirement for rock aggregate during the operational phase would be met from those sources. It is anticipated that there would be a consent condition to agree the restoration approach.

3.3.13 Construction Lighting

53. 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.

3.3.14 Felling

54. The proposed Development would require 110.79 ha of woodland to be directly felled in order to facilitate wind turbines and associated infrastructure and solar infrastructure. Forestry felling will be required in a 108 m keyholed radius from each turbine location within woodland to allow for construction, operation and environmental mitigation, including bat habitat standoff distances. Of the 110.79 ha, of forestry to be felled, approximately 27.18 ha could be replanted following completion of the construction phase. Further details are provided in **Technical Appendix 15.1**.

3.3.15 Compensatory Planting

55. The construction of the proposed Development is predicted to result in a net loss of woodland development area. The area available for stocked woodland in the study area would decrease by 83.61 ha. Further details are provided in **Technical Appendix 15.1**.

56. SPR 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 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.

3.3.16 Habitat Management Plan

57. SPR have identified areas of opportunity within the Site for native woodland planting, peatland restoration and habitat improvement, and these areas have been agreed with FLS as landowner.

58. Consultation with Scottish Forestry during the course of the project has confirmed that peatland restoration would be an acceptable substitute for compensation planting under the Control of Woodland Removal Policy (CWR). Appendix C of CWR identifies the following criteria for areas where woodland removal may occur without a requirement for compensatory planting:

- enhancing priority habitats and their connectivity;
- enhancing populations of priority species;
- enhancing nationally important landscapes, historic environment and geological SSSIs;
- improving conservation of water resources;

- improving conservation of soil resources; and
- public safety.

59. Therefore, the proposed native woodland planting, peatland restoration and habitat improvement should not require CP for the forestry felled. Subject to agreement of the restoration plan with Scottish Forestry, these areas are anticipated to contribute towards CP requirements for forestry felled to accommodate other elements of the proposed Development.

60. The timing of any forestry works required to accommodate the habitat management improvements would be agreed with FLS as landowner.

61. Details of the habitat management proposals are described in the Habitat Management Plan (HMP) which is provided in **Technical Appendix 8.5**.

3.3.17 Design Principles and Embedded Mitigation

62. A number of design principles 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.**

63. 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.

64. 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 **15** of this EIA Report. Such environmental measures are also included in the outline CEMP (**Technical Appendix 3.1**).

3.3.18 Micrositing

65. 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.

3.3.19 Consents Prior to the Commencement of Development

66. Prior to commencing construction on the Site, it may be necessary for SPR 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 **15**) of this EIA Report.

3.4 Construction

3.4.1 Construction Timetable

67. The proposed Development would be constructed over a period of approximately 24 months, anticipated to commence in 2024. Construction would include the principal activities listed within the indicative construction programme as provided in **Table 3.4**.

3.4.2 Construction Employment

68. 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.

3.4.3 Construction Hours

69. 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

70. The delivery of the wind turbines would be from Campbeltown Harbour to Machrihanish Airport / A83 Junction. The vehicles would be regarded as abnormal loads and be around 5 m in width. From there the wind turbines will proceed on the A83 to the site. The tower loads will depart from Machrihanish and join on the main route on the A83.

71. For other technologies that will be installed on site, it is likely that they will be delivered using standard articulated lorries utilising the existing road network.

72. One access point is currently included in the proposed Development. This comprises an existing access at Tarbert Holiday Park to the north of the Site. **Figure 3.1** illustrates the location of the access point and **Figure 3.11** illustrates the design of the access point.

3.4.5 Forestry Felling to Accommodate Construction

73. 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 8.5**) would be undertaken in accordance to a programme agreed with FLS as landowner.

3.4.6 Recreational Access During Construction

74. 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 Kintyre Way. Where access along the 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).

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 Argyll and Bute Council's Outdoor Access Manager and shared with key stakeholders such as Skipness and Tarbert Community Council and the Kintyre Way Scottish Charitable Incorporated Organisation (SCIO).

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 hardstandings																								
Turbine foundation construction																								
Substation civil and electrical works																								
BESS compound and installation																								
Cable trenching and installation																								
Crane Delivery																								
Turbine delivery, erection and commissioning																								
Solar foundation construction and solar infrastructure delivery, erection and commissioning																								
Site reinstatement and restoration works																								

3.4.7 Construction and Maintenance Compounds

75. A construction and maintenance compound would be required for the duration of the construction phase as shown in **Figure 3.1** which is located at NGR 184301 665702. The construction compound would have a footprint of around 100 m x 75 m (7,500 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.

76. **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.

77. A small security compound area has been provided for close to the entrance to the Site at NGR 184301 665702. This would be used to control access onto the Site during construction and would consist of a portacabin, welfare facilities and parking. The security compound would be a temporary construction and would be reinstated after the construction of the proposed Development is complete.

3.4.8 Materials Sourcing and Waste Management

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

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

80. 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 SPR intends to consider the management of these aspects.

3.4.9 Temporary Peat Storage

81. 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.

82. Procedures to control the hydrology of stored peat would be covered by the CEMP (**Technical Appendix 3.1**) and the Peat Management Plan (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.

83. 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 10.2**.

3.4.10 Site Restoration

84. 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.

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

3.4.11 Environmental Management and Good Practice Construction

86. 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**).

87. 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.

88. 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:

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

3.5 Operation and Maintenance

89. As highlighted in **Section 3.3.1**, the proposed Development would operate in perpetuity as a renewable energy development. 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 if it ceases to function for a defined, extended period of time, without permission of the local planning authority.

90. 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 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.

91. The solar arrays would generate power during the hours of daylight. The BESS would respond to the need of the national grid and would start operating once connected to the Site substation and grid connection.

3.5.1 Lighting

92. Wind turbines would be up to 180 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 CAA requirement in accordance with Article 222 of the UK Air Navigation Order (ANO) 2016 which comes into effect at 150 m.

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

94. The Site is in an area that is remote from military aviation infrastructure and is approximately 60 km away from Glasgow Prestwick Airport (GPA). The Site is outside the GPA Control Area, within Class G (uncontrolled) airspace which extends from the ground to Flight Level (FL) 195 (approximately 19,500 feet above mean sea level (amsl) and is predominantly used by General Aviation and military aircraft. In uncontrolled airspace the responsibility to see and avoid other traffic and obstacles rests with pilots.

95. The MOD was consulted during the Site design phase and at the Scoping stage and no objection was raised. It requested that the perimeter turbines be fitted with MOD accredited aviation safety lighting in accordance with the Civil Aviation Authority, Air Navigation Order 2016. Glasgow Prestwick Airport (GPA) was consulted at Scoping and raised no issues regarding aviation lighting.

3.5.2 Maintenance

96. 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.

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

98. Maintenance includes the following:

- scheduled routine maintenance and servicing;
- unplanned maintenance or call outs;
- HV and electrical maintenance; and
- blade and solar array inspections; and
- civil maintenance of tracks and drainage.

3.6 Decommissioning

99. 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 Argyll and Bute Council, and so is not considered within this EIAR.

100. 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 SPR, or any subsequent owners 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 Argyll and Bute Council.

3.7 Climate Change, Carbon Considerations and Commitments

101. The proposed Development would generate around 89MW or between 230 - 280 GWh 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.

102. 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** 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.

103. SPR 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 **Chapter 15**. In summary, the proposed Development is expected to take around 1.1 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.

104. As SPR is applying for consent in perpetuity, the proposed Development and SPR is making a long-term commitment to meeting the requirements for renewable energy generation and reductions of carbon emissions to the atmosphere. SPR 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.

3.8 Improved Recreation and Public Access

105. SPR is committed to providing a variety of other benefits above and beyond the renewable energy infrastructure and habitat enhancements identified above. These are identified by component below. The features would be constructed at or around the same time as the other elements of the proposed Development, with the aim of them becoming available to use by members of the public at the commencement of the operational phase of the proposed Development. The responsibility for installing and maintaining these features would lie with SPR for the duration of the operational life of the proposed Development, though SPR would likely choose to engage with locally-based third parties to provide both the construction and maintenance of them.

3.8.1 Walking Route and Viewpoint Location

106. During the course of the EIA, design and public consultation activities undertaken for the proposed Development, the opportunity to propose a new walking route up to a viewpoint location at the summit of Cnoc nan Caorach at the northern edge of the Site was discussed and agreed with the landowner, Forestry and Land Scotland, and raised in a meeting with the Kintyre Way SCIO in January 2021.

107. The proposed walking route would form an extension to the Corranbuie Walking Trail, a circular route from Tarbert that is also part of the Kintyre Way. The area where the potential walking route is proposed includes areas of scattered commercial coniferous trees and areas of bare ground and exposed bedrock adjacent to a timber haulage road.

108. The proposed new walking route would be in the form of a unmetalled footpath suitable for pedestrian use only. Its appearance would be consistent with the Corranbuie Walking Trail adjacent to it and the Kintyre Way within the Site. Materials for the footpath construction would be sourced from the proposed Development construction and/or from the Site itself. The exact route of the footpath would be confirmed prior to its construction, taking account of topographical features such as steep slopes and environmental constraints. If areas of poor drainage are identified, alternative construction methods (e.g. a narrow wooden walkway or wooden footbridge, or re-routeing to avoid the poorly drained area) would be considered. It would form of a circular route to the south and, when combined with the existing Corranbuie Walking Trail, would form a figure of 8 shape in plan.

From the most southerly part of the proposed walking route, the viewpoint on the new path at the summit of Cnoc nan Caorach would have good views to the north to Tarbert and to the south to the proposed Development. The viewpoint location is currently on an exposed area of bedrock. The viewpoint is anticipated to take the form of two all-weather interpretation boards: one showing key features of the view north across Tarbert, with a second showing key features of the view south towards the proposed Development.

3.8.2 Walking Bothy

109. SPR has entered discussions with the Kintyre Way SCIO, custodians of the Kintyre Way, on the provision of a new walking bothy for recreational users of the Kintyre Way within the Site and has identified and discussed a location with the SCIO.

110. The new walking bothy is proposed at a location close to the southern extent of the Site, adjacent to the Kintyre Way. The location under discussion is at approximately NR 8920 6130. The location is currently an artificially flat area of grassland and has previously been the location of a picnic bench (no longer present). It is located approximately 4.2 km away from Skipness and 10.5 km away from Tarbert along the Kintyre Way.

111. The bothy would consist of a basic single room, single-storey building finished with local materials and in the vernacular architectural style of the local area.

3.8.3 Stone seating along the Kintyre Way

112. Stone seating within the Site will be installed at the end of the construction phase, if appropriate locations can be agreed with the landowner and Kintyre Way SCIO. These will take the form of undressed small boulders of varying size won through the construction phase of proposed Development and will be located in areas along or near the Kintyre Way. Their purpose will be to help recreational users of the Site and the Kintyre Way to rest and recuperate. The locations will be selected so that they do not interfere with the operational activities of the proposed Development, wheelchair or reduced mobility access along the Kintyre Way, and/or the forestry management activities being undertaken by the landowner.

3.9 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 22/10/19]

Forestry Commission Scotland. The Scottish Government's Policy on Control of Woodland Removal. https://forestry.gov.scot/publications/285-the-scottish-government-s-policy-on-control-of-woodland-removal/viewdocument [Accessed 11/06/2021]

The Electricity Act 1989.

The Air Navigation Order 2016.

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