CONTENTS

INTRODUCTION

3.1 This Chapter describes the proposed development which is subject to this EIA. It sets out the way in which the proposed development would be constructed including a description of the Energy Park layout, its proposed scale and the associated infrastructure. It also outlines the anticipated construction activities connected with the proposed development, and a description of the operational elements of the Energy Park.

3.2 The layout for the proposed development is shown on **Figure 3.1**. Information on construction methods are provided in **Technical Appendix 3.1: Outline Construction and Environmental Management Plan (CEMP)**. The outline CEMP is itself a part of the description of the proposed development and illustrates the construction measures which are inherent in the project development and design and which are therefore considered present at the outset of the environmental assessment.

PROPOSED DEVELOPMENT

Scheme Overview

3.3 The main site is centred on NGR NC 87999, 59788 and covers an area of approximately 416.71ha. The characteristics of the site are described in **Chapter 2: Site Description and Design Evolution**. Two smaller areas along the A836, which are included to facilitate access of abnormal loads to the main site, are also included within the application (see **Figures 3.2a and 3.2b**). These two abnormal loads turning area options are located at NGR NC 85250, 65287 (Western Turning Area, **Figure 3.2a**) and NGR NC 87786, 64983 (Eastern Turning Area, **Figure 3.2b**) and are approximately 1.06ha and 1.60ha respectively.

3.4 The proposed development would comprise of 11 three-bladed horizontal axis turbines up to 149.9m tip height with a combined rated output in the region of 52.8MW and would also include approximately 20MW of battery storage. The proposed development would include associated infrastructure including turbine foundations, crane hardstandings, new access tracks, underground cabling, a substation compound including a control building, up to two borrow pits and a temporary construction compound **(Figure 3.1).**

3.5 In total, approximately 15.29ha of land would be permanently lost as a result of the proposed development. This permanent loss represents approximately 3.65% of the area of the site. Temporary infrastructure consisting of a construction compound equates to around 0.73ha or approximately 0.17% of the total site area.

3.6 The proposed development includes the felling of approximately 3.58ha of native woodland which would be replanted. This felling is to facilitate the siting of wind turbines (Turbines 1 and 2) and associated access track. It is proposed that the requirement for compensatory planting be included as a condition attached to any consent, should it be granted.

3.7 The proposed development also includes the felling of approximately 87.75ha of conifer forest (net area of 70.75ha bearing trees) which would not be replanted. This felling is not to facilitate the siting of infrastructure but rather to allow for peatland habitat improvements as part of the

proposed development. Furthermore, the felling of this area of conifer forest is considered to be beneficial for the adjacent Special Protection Area (SPA), removing the forest 'edge effect' and associated negative effects on species such as Golden Plover. The quality of the trees in this area is considered to be poor (due to the relatively infertile soils for forestry growth, on which it was established). This area would be used to create an area of improved habitat and more information is provided in **Technical Appendix 8.5: Outline Habitat Management Plan**.

3.8 The proposed development has been designed with an operational life of up to 30 years at the end of which it would be decommissioned, or an application may be submitted to repower the site.

3.9 As noted in **Chapter 2**, the proposed development has been designed to reflect the topographical, environmental, visual and technical factors which exist across the site.

3.10 Each Chapter of the EIA Report takes an appropriate and topic specific approach to assessment of the proposed development. The EIA Report provides a worst-case assessment for each discipline and presents enough information for consultees and the decision makers to comment on and determine the application. Each technical Chapter has set out the degree to which the proposed development has been assessed in order to provide a clear and robust assessment that allows for the necessary flexibility in relation to turbine procurement, post-consent. **Chapter 5: Environmental Impact Assessment**, provides further detail on the approach to assessment.

3.11 The key component parts of the proposed development include the following:

- 11 wind turbines including internal transformers, with blade tip heights of 149.9m;
- 11 turbine foundations (approximately 25m diameter) and associated crane hardstandings (approximately 35m x 35m and 1m in depth, with an area for additional crane pads that is 85m x 5m);
- approximately 2.03km of upgraded access tracks, and approximately 5.48km of new access tracks with a typical running width of 5m (wider at bends and junctions) and associated drainage. 446.95m of the new track is anticipated to be floating track where consistent peat depths of 1-1.5m or greater are identified along with shallow topography (below 5%);
- approximately 7.5km of underground cabling along access tracks to connect the turbine locations, and the onsite electrical substation;
- one onsite substation which would accommodate 33kV Switchgear to collect electricity from different parts of the site. The substation compound, which will incorporate approximately 20MW of battery storage, would have an area of 75m x 100m and would include a control and metering building (approximately 14m x 23 m and 7m high);
- up to two borrow pit search areas (covering approximately 32,000m^2);
- a temporary construction compound (125m x 50m);
- clearance of 87.75ha of conifer forest (net area of 70.75ha bearing trees); and

- clearance of 3.58ha of native woodland.

3.12 Typical details for the proposed turbines, transformers, foundations, access tracks, crane hardstandings, electrical and battery infrastructure, borrow pits and construction compound are shown on **Figures 3.4** to **3.12.**

Forestry

3.13 Two areas of conifer forest are located within the site. A larger area of conifer forest is located in the north of the site and a smaller located at the south west of the site. Further to this there are several blocks of native forestry plantation located across the site. A report on these forest areas has been prepared by Denis Torley of Bidwells and is provided in **Technical Appendix 3.2: Forestry**.

3.14 The proposed development includes the felling of an area of 87.75ha of the northern most commercial conifer forest area (net area of 70.75ha bearing trees). The proposed development includes the restoration of this area to peatland habitat, as part of the Habitat Management Plan (HMP).

3.15 The proposed development also includes the felling of an area of 3.58ha of native woodland in order to facilitate the location of two wind turbines (Turbines 1 and 2) and associated access track.

3.16 EIA Report **Technical Appendix 3.2** states that the northern conifer plantation on site can be considered to be a poor quality commercial forest with estimated yield classes varying from 6 to 14, with the majority of the Sitka spruce crop recording an average yield class of 10, reflecting the relatively infertile soils for forestry growth. The crop quality is variable both within and between stands, reflecting variations in the underlying fertility and height of water table across the site. In many areas of the crop the intention of the mixture, to produce a final crop of Sitka spruce, has been unsuccessful, with full canopy closure not being achieved and the Lodgepole pine failing to be suppressed.

3.17 With regards to the 3.58ha of felled native woodland to accommodate Turbines 1 and 2 and associated access track, it is proposed that the requirement for compensatory planting be included as a condition attached to any consent, should it be granted.

3.18 **Technical Appendix 3.2** discusses tree clearance methodologies.

Access to the Site

3.19 The proposed abnormal load route required to transport turbine components to the site is shown on **Figure 12.3** and is based on an assessment from the Port of Scrabster via the A836, along the Kirkton Farm road, to the site. The site would be accessed from the A836 via the existing Kirkton farm road, which will be upgraded in line with required track specification. The existing track which leaves the public road (Kirkton Farm road) near the Old Kirkton Burial Ground and continues into the main Kirkton Energy Park site will be upgraded and new tracks established throughout the site in order to ensure access to all proposed turbines (**Figure 3.1**).

3.20 For abnormal loads coming from the east (Port of Scrabster) to access the Kirkton Farm road, it will be necessary for the vehicles to continue on the A836 past the Kirkton Farm road entrance, turn, and approach from the north / west. As a result of this, two potential turning areas (only one would

be developed) have been designed and are included as part of the application (**Figure 3.2a** and **Figure 3.2b**). These two turning area options have been designed to accommodate vehicles up to 58.5m in length, carrying blades up to 67m long.

3.21 The proposed abnormal load route was assessed and verified for up to 66.6m blades, identifying where permanent or temporary road upgrades would be required (**Figure 12.3** and **Technical Appendix 12.1: Blade Transport Vehicle Swept Path Analyses**). Any road improvements would be undertaken within this envelope.

3.22 All other HGV and construction traffic would also use the entrance off the A836, down the Kirkton Farm road.

3.23 Full detail of the assessment of the effects on the road network is provided in **Chapter 12: Site Access, Traffic and Transport.**

Grid Connection

3.24 The grid connection point for the proposed development is subject to confirmation by the network operator. The anticipated connection point to the electrical grid system is the 132kV Scottish and Southern Energy (SSE), Connagill substation, at Strath Halladale approximately 1.6km east of the site.

3.25 The precise route of the grid connection cabling has not yet been determined and its effects are not identifiable/assessable because it has yet to be designed and an application has not yet been made. However, given the location of the proposed substation compound, the location of the anticipated connection point at Connagill substation, and the route of existing overhead lines in the vicinity, a potential grid connection route is shown in **Figure 3.3**. The potential grid connection route shown follows a similar route to the existing Strathy North Wind Farm overhead line.

3.26 The grid connection is likely to require separate consent under Section 37 of the Electricity Act 1989. The grid connection application would be made by Scottish and Southern Energy Electricity Networks (SSEN) who are responsible for the Transmission Grid in the area of the proposed development and who would own assets beyond the site substation.

Operational Life

3.27 It is anticipated that the proposed development would have an operational life of 30 years. At the end of this period, the proposed development would be decommissioned or an application may be submitted to repower the site. Details of infrastructure removal and restoration are provided in summary in **Table 3-4.**

EMBEDDED MITIGATION

3.28 A key benefit of the EIA process is the opportunity it gives to integrate environmental considerations into the careful, iterative design of a project. Embedded mitigation proposals are those mitigation measures which are inherent to the proposed development and are integral to and should be included in consideration of the application.

3.29 Throughout the design evolution, 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 is assessed.

3.30 During the construction of the proposed development, effects can be further taken into account by the adoption of good practice, supported by robust project management and an Environmental Clerk of Works (ECoW), as set out in the outline CEMP (**Technical Appendix 3.1**), and by the application of the Pollution Prevention Guidelines (PPGs) and replacement Guidance for Pollution Prevention (GPPs).

3.31 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**. Such environmental measures are also included in the outline CEMP (**Technical Appendix 3.1**).

Design Principles

3.32 A number of design principles and environmental measures have been implemented and incorporated into the proposed development as standard practice described in **Chapter 2: Site Description and Design Evolution**.

3.33 One of the key approaches to the design has been a desire to maximise the potential energy yield of the site, whilst respecting environmental (including landscape and visual) constraints. Further details are set out in **Chapter 2** and the **Design and Access Statement** (DAS) submitted in support of the application.

Micrositing

3.34 During the construction process there may be a requirement to microsite elements of the proposed development infrastructure. This is an important measure which allows for further minimisation of environmental effects, under the supervision of the Environmental Clerk of Works (ECoW), where elements of the development can be moved to avoid areas of deep peat or other constraints, as more detailed information about site conditions are procured. It is proposed that a 25m micrositing tolerance of turbines and all other infrastructure would be applied to the proposed development (so long as infrastructure moves no closer to any identified watercourse). Within this distance any changes from the consented locations would be subject to approval of the ECoW as required and in consideration of other known constraints. It is anticipated that the agreed micrositing distance may form a planning condition accompanying consent for the proposed development. The assessment of the proposed development has assumed a 25m horizontal micrositing allowance.

CONSENT PRIOR TO COMMENCEMENT OF CONSTRUCTION

3.35 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 of this EIA Report.

CONSTRUCTION PHASE

Construction Timetable

3.36 It is anticipated that construction of the proposed would commence in late 2025 and would last approximately 18 months. Construction would include the principal activities listed within the indicative construction programme as provided in **Table 3-1**. The majority of forest felling (to facilitate habitat improvements) would be carried out post construction of the proposed development.

Table 3-1: Indicative Construction Programme

Construction Activity	Months																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Access Road Improvements and Reinstatement																		
Site establishment and restoration																		
Construction of Haul Road & Site Access to Borrow Pits																		
Construction of access tracks, crane pad and building compounds																		
Felling required to facilitate infrastructure																		
Turbine Foundation Construction																		
Substation/storage - civil and electrical works																		
Cable Laying and Sand for Cable Bedding																		
Crane delivery																		
Turbine Delivery and Erection																		

Cumulative Wind Farm Construction

3.37 Within the vicinity of the proposed development (approximately 10km) there are several wind farm projects recently consented or at various stages of the planning process. These are as follows:

- Strathy South Wind Farm – Consent granted;
- Strathy Wood Wind Farm – Consent granted;
- Limekiln Wind Farm S36 Variation – Consent granted; and
- Armadale Wind Farm – Application submitted; and
- Melvich Wind Energy Hub – Scoping stage.

3.38 If these proposed developments are granted planning permission then, subject to various factors such as discharge of conditions and agreement of grid connection, there is a possibility that some of these projects could be undergoing construction at approximately the same time as the proposed development. It is acknowledged that this would have a potentially detrimental effect on traffic and that coordination between developers and contractors would be required to mitigate these effects. Mitigation measures for this eventuality would be contained within the Traffic Management Plan, expected to be agreed, via condition, with THC and Transport Scotland prior to the commencement of construction.

Construction Employment

3.39 The number of people employed during the construction period would vary depending on the stage of construction and the activities ongoing on site. Staff numbers would start relatively low as site enabling works progress. Numbers would ramp up quickly as tracks reach turbine locations and foundations start to get built out. It is anticipated that the peak workforce requirement would be up to 30 construction staff, at a point where the civils and electrical works are overlapping with turbine erection teams. Staff numbers would then drop as civils teams demobilise and turbine erection and testing is completed.

Construction Hours

3.40 The construction working hours for the proposed development would be 07:00 to 19:00 Monday to Friday and 07:00 to 16:00 on Saturdays. It should be noted that out of necessity some activities, for example abnormal load deliveries, concrete deliveries during foundation pours and also the lifting of the turbine components, may occur outside the specified hours stated. These activities would not be undertaken without prior approval from THC. The principal contractor would keep local residents informed of the proposed working schedule, where appropriate, including the times and duration of any abnormally noisy activity that may cause concern, all under the terms of a traffic management plan as set out in **Chapter 12: Site Access, Traffic and Transport**.

Construction Environmental Management Plan

3.41 An outline CEMP is provided as **Technical Appendix 3.1**. In acknowledgement that the CEMP is a live document that would evolve throughout the construction phase of the proposed development, only the principles of the CEMP are outlined at this stage. It is anticipated that submission and approval of a more detailed CEMP, following site investigation works and further detailed design, would be the subject of a condition should consent for the proposed development be forthcoming.

Site Preparation and Establishment

3.42 Site preparation works would include the following key tasks, some of which would be undertaken concurrently:

- set up of welfare facilities;
- formation of the construction compound area;
- felling of woodland (only the area of woodland required for the siting of Turbine 1 and 2 and associated access track);
- establishment of borrow pits; and
- establishment of internal tracks or upgrading of existing tracks.

Temporary Construction Compound

3.43 A temporary construction compound would be required for the duration of the construction phase. The temporary construction compound location is shown on **Figure 3.1.**

3.44 The temporary construction compound would have a footprint of 125m x 50m (6,250m^2) and would be likely to 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.

3.45 **Figure 3.12** illustrates a typical construction compound although the layout may differ depending on site topography and contractor requirements. Crane hardstanding areas, along with the construction compound, would be used for laydown during construction.

3.46 The buildings (e.g. welfare facilities, storage areas, offices and fuelling point) that form part of the temporary construction compound would be removed at the end of the construction phase.

Tree Clearance

3.47 The proposed development would require 87.75ha of conifer forest to be cleared (net area of 70.75ha bearing trees). This is principally to facilitate wider habitat restoration objectives. The proposed development would also require the felling of an area of 3.58ha of native woodland in order to accommodate wind turbines and associated infrastructure.

3.48 As detailed in Section 3.16, the trees on site are generally of poor quality. **Technical Appendix 3.2**

outlines the proposed method for the removal of conifer crops in the plantation is by a combination of shortwood harvesting where timber products are recoverable, and whole tree extraction for smaller crops at the west of the site. These poorer crops would be chipped on site for produce for the regional biomass market. Harvesting operations would take place post construction and outwith the bird breeding season.

Borrow Pits

3.49 Two borrow pit search areas have been identified onsite, to provide a total of approximately 130,000m³ of material to construct the proposed development. Quarrying both of these borrow pits would provide a greater volume of rock than would be needed for the construction of the proposed development, but would allow for the current uncertainty of the quality of the rock at these locations. It is the aim of the applicant to source as much of the rock as possible from onsite, as this would minimise the need to transport large quantities of aggregate. The current preference would be for borrow pit 1 (**Figure 3.11a**) to be used first, then borrow pit 2 (**Figure 3.11b**) if additional rock required.

3.50 For purposes of the EIA, both borrow pits have been assessed.

Access Tracks

3.51 Approximately 7.52km of onsite access tracks would be required to provide access to the wind turbines, substation, and construction compound **(Figure 3.1).** Where possible the location of the access tracks follows existing farm tracks. A total of approximately 5.48km of new track would be created and approximately 2.03km of existing track would be used.

3.52 Tracks would be unpaved and constructed of a graded local stone with a typical running width of 5m (wider on bends and at junctions). The tracks would be up to 7m wide including potential ditches and banks. Three construction traffic passing places would be required, in addition to passing opportunities and crane hardstandings. Additionally, five turning heads would be constructed. It is proposed that the majority of the stone required for construction of the tracks and hardstanding areas could be won from the identified borrow pits.

3.53 **Figure 3.6** provides a typical illustration of the design of an onsite track, the design of tracks would take account of recognised good practice guidance as noted in **Technical Appendix 3.1: Outline CEMP.**

3.54 Site visits have confirmed the presence of peat, of variable condition and depth across the site area, with deeper peat present on low lying and shallow slope areas, as well as in the plantation forestry at the north of the site. Where possible the turbines and tracks have been positioned to avoid areas of deepest peat. Where this has not been possible, floating tracks would be constructed. It is anticipated that approximately 446.95m of floating track would be required where peat has been consistently identified onsite in depths from 1m to 1.5m or greater along with shallow topography in the area (below 5%). In areas where the peat is shallow, i.e. rockhead is less than 1m below the surface, then the track formation would be by cut and fill or by a cut operation where there is a slope. Where the peat layer is more than 1m in depth and where there is a side slope the peat would be removed to an appropriate horizon.

3.55 Floating road construction is described in the Outline CEMP (**Technical Appendix 3.1**). Details of the

proposed construction are provided on **Figure 3.6**. The construction comprises the laying of a geosynthetic (geotextile mat or geogrid reinforcement) across the soils prior to constructing the road. Where required, risk from run-off would be mitigated by directing drainage to settlement ponds. Erosion processes on the roadside embankments and cuttings would be mitigated by ensuring that gradients are below stability thresholds, which would also enable effective regeneration of vegetation. Sediment traps would be required in the early years following construction until natural regeneration is established.

3.56 The tracks would be left in place following construction to provide access for maintenance, repairs and eventual decommissioning of the proposed development. At the end of the construction period the edges of all new tracks would be restored using materials stripped from excavations.

3.57 There are six existing watercourse crossings (including fords) as part of the current farm track which is included as part of the proposed development. The six existing watercourse crossings would be upgraded as part of the proposed development.

3.58 A further five new watercourse crossings would be required as part of the proposed development.

3.59 Details of the watercourse crossings within the site are provided in **Table 3-2** and shown on **Figure 10.1**. **Chapter 10** of the EIA Report describes in more detail the identified watercourse crossings.

Table 3-1: Onsite Watercourse Crossing

Watercourse Crossing	Easting	Northing	New/Existing
WX01	288753	961422	Existing
WX02	288723	961384	Existing
WX03	288662	961252	Existing
WX04	288603	961123	Existing
WX05	288466	960965	Existing
WX06	288051	960870	New
WX07	288456	960869	New
WX08	288186	960599	New
WX09	288485	960718	Existing
WX10	287891	958992	New
WX11	287902	958832	New

3.60 The proposed development would include a walking route to link the proposed access tracks with the existing Core Path at the Upper Bighouse Estate. It is anticipated that this walking route would also alter the route of the Core Path slightly, at its southern end, so as to avoid the operational timber yard/biomass plant. This would increase the opportunities for walking and biking in the local area, as well as improving safety for users of the Core Path.

Abnormal Loads Turning Areas (A836)

3.61 For abnormal loads coming from the east (port of Scrabster) to access the Kirkton Farm road, it will be necessary for the vehicles to continue on the A836 past the Kirkton Farm road entrance, turn, and approach from the north / west. As a result of this, two potential turning areas (only one would be developed) have been designed and are included as part of the application.

3.62 These two abnormal loads turning area options are located at NGR NC 85250, 65287 and NGR NC 87786, 64983 (**Figure 3.2a and Figure 3.2b**) and are approximately 1.06ha and 1.60ha respectively.

3.63 Both abnormal load turning areas have had peat probing undertaken and also been subject to an NVC / Phase 1 habitat walkover. These concluded that both sites had very limited peat depths and no priority habitat.

3.64 Both abnormal load turning areas have had a Road Safety Risk Assessment and a stage 1-2 Road Safety Audit undertaken. These are provided in **Technical Appendix 3.3: Turning Areas Safety Audit**.

3.65 The abnormal loads turning area would likely be comprised of a compacted stone layer between 350mm-800mm in thickness with a 100mm layer of smaller stones for the surface. Access to the turning area would be gated in order to prevent unauthorised use.

3.66 The proposed turning area at Melvich presents an opportunity to provide a direct benefit to the local community. Melvich Community SCIO are progressing a project to replace the old Melvich Village Hall (now demolished) with a new community hub building however availability of car parking spaces has been flagged as a significant issue in the early stages of their feasibility study (RIBA Stage 1). The proposed turning circle could act as overspill car parking for the proposed new Melvich Community Hub, which is planned to be located directly opposite on the western side of the A836, and as a result remove a potential planning issue for the new community asset. This turning area would have the potential to be a long term addition to the NC500, such as through the hosting of Electric Vehicle charging facilities, and could also be used for the location of a multi-use games area (MUGA), which the Melvich Community SCIO have expressed an interest in developing. The applicant has been in discussions with Melvich Community SCIO in this regard and the two organisations have agreed to continue to liaise as their respective plans and applications develop.

Lighting

3.67 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 site boundary), to minimise impact on local properties and any other

environmental considerations.

Materials Sourcing and Waste Management

3.68 For construction, the proposed development would require a range of materials (e.g. stone for access tracks, the temporary site compound and the substation compounds). Excavated material from the turbine bases and access tracks would be used onsite for restoration/reinstatement.

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

3.70 Concrete would be batched onsite at the construction compound for which water would be required. There may be potential to use water mains on the A836, or alternatively a location for a borehole would be required to be found onsite.

3.71 Water would also be required for welfare facilities and to dampen track during dry weather, although this would be minimal, and an abstraction license is not anticipated to be required for the activity.

Wind Turbine Layout

3.72 The proposed development is for 11, three-bladed, horizontal axis wind turbines. The proposed turbine locations are shown on **Figure 3.1** and the coordinates for each are provided in **Table 3-3.**

Table 3-2: Turbine Coordinates and Specifications

Turbine No.	Easting	Northing	Hub Height (m)	Tip Height (m)	Rotor Diameter (m)	AOD (m)
T1	288041	960971	83.4m	149.9m	133m	93.02m
T2	287925	960642	83.4m	149.9m	133m	97.07m
T3	287835	960291	83.4m	149.9m	133m	109.13m
T4	287802	960002	83.4m	149.9m	133m	116.10m
T5	287822	959704	83.4m	149.9m	133m	112.29m
T6	287828	959426	83.4m	149.9m	133m	102.03m
T7	287881	959083	83.4m	149.9m	133m	96.45m
T8	287915	958740	83.4m	149.9m	133m	99.72m
T9	287934	958463	83.4m	149.9m	133m	102.79m

Turbine No.	Easting	Northing	Hub Height (m)	Tip Height (m)	Rotor Diameter (m)	AOD (m)
T10	287934	958170	83.4m	149.9m	133m	108.02m
T11	287934	957909	83.4m	149.9m	133m	103.82m

Wind Turbines and Transformers

3.73 The exact model of the wind turbines to be installed at a proposed development would be selected through a competitive procurement process and would be dependent upon technology available at that time. This EIA Report has considered the use of an indicative turbine type shown on **Figure 3.4.**

3.74 It is anticipated that the turbines would be rated at approximately 4.8MW, depending upon the dimensions of the selected turbines. A realistic minimum capacity for the proposed development would be in the region of 52.8MW based on current turbine availability.

3.75 The 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 e.g. a gear box. The turbines would be semi-matt pale grey (in line with RAL 7038) or a finish agreed with THC.

3.76 For the purposes of the assessment, it is assumed that each turbine would be served by an electrical transformer that would be located internally.

Foundations and Crane Hardstandings

3.77 Turbine foundations would be designed to accommodate the final choice of turbines and to suit site specific ground conditions. The final design specification for each foundation would depend on the findings of detailed ground investigation of the land on which each turbine would be located. An illustration of a typical turbine foundation is provided on **Figure 3.5**.

3.78 The turbines would have gravity foundations laid using reinforced concrete and would have a diameter of approximately 25m.

3.79 Depth of the excavation would depend on the need to reach suitable ground. Excavations would be on average approximately 3.0m deep.

3.80 The sides would be graded back, from the foundation to approximately 30m diameter and battered to ensure that they remain stable during construction.

3.81 The turbines would be erected using mobile cranes brought on to the site for the construction phase. A crane hardstanding would be built adjacent to each wind turbine and is likely to have a footprint of approximately 35m x 35m and 1m in depth (with an area for additional crane pads that is 85m x 5m). The actual crane pad design and layout would be determined by the turbine supplier according to their preferred erection method. An indicative design, considered to be the worst-case in terms of size, has been considered for the purposes of this assessment and is provided on **Figure 3.7.** The crane hardstanding would also be utilised as laydown area. These areas would remain in

suite for the duration of the operational phase of the proposed development.

3.82 Soils that are excavated during construction would be set aside for backfilling the batter areas around the turbine bases and hardstandings and use of small bankings either side of access tracks. Further details of soil storage are contained in **Technical Appendix 10.2: Peat Management Plan.**

Onsite Substation Compound and Electrical Cabling

3.83 The proposed development would be connected to the electricity network via an onsite substation control building measuring approximately 14m x 23m and 7m high and located within the substation compound (approximately 75m x 100m) at NGR NC 88717 61157. The compound would include an area for car parking and High Voltage (HV) equipment, such as transformers and circuit breakers as well as a control building. This indicative onsite substation compound is shown on **Figure 3.9**.

3.84 The main control building would be single storey, built on a pre-cast concrete base and would measure approximately 14m x 23m and 7m high (pitched roof which would be 7m high at its tallest point). It is proposed that the buildings would have a rendered finish; the final external finishes would be agreed with THC. A typical control building elevation is shown on **Figure 3.10**.

3.85 It is proposed that battery storage (approximately 20MW) and other electrical equipment would be located within the substation compound. The batteries would store excess power generated by the proposed development and provide grid support services. The battery containers would be of steel construction, similar in appearance to shipping containers. The batteries would comprise a number of units typically measuring approximately 17m (l) x 8m (w) x 4m (h) with ancillary equipment such as inverters.

3.86 Underground power cables would run along the side of the access tracks in trenches from each of the turbines to the substation. Indicative cable trench arrangements are provided on **Figure 3.8.**

Site Restoration Post Construction

3.87 Soils would be used for reinstatement works associated with access tracks, cable trenches, turbine foundations, crane hardstandings, borrow pits and the temporary construction area. The upper vegetated turfs would be used to dress infrastructure edges and to reinstate the surface of restoration areas. It is anticipated that most of the soil resources within areas directly affected by construction activities would be able to be stored and reinstated as close as possible to where they were excavated in accordance with best practice; so that the site would be restored with minimal movement of material from its original location. It is not anticipated that any excavated material would leave the site.

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

OPERATION AND MAINTENANCE PHASES

Duration

3.89 The proposed development would have an operational life of up to 30 years from the first commissioning (export to the electrical grid).

Electricity Generation

3.90 The turbines would start to generate electricity at wind speeds of around 3m/s (6.7mph). Electricity output would increase as the wind speeds increase up to a maximum of around 13m/s (29.1mph), when the wind turbines would reach their maximum capacity. The turbines would continue to operate at maximum capacity up to wind speeds of around 23m/s (51.4mph). Above when they would cut-out and automatically stop as a safety precaution. Above 23m/s the turbines would operate at a reduced output under a storm-control mode up to wind speeds of around 30m/s (67.1mph). Above 30m/s the turbines would cut-out and automatically stop as a safety precaution.

3.91 The proposed development would produce an average of approximately 184,280 Mega Watt hours (MWh) of electricity annually (based on a site derived capacity factor of 39.8%). This equates to the power consumed by approximately 49,167average UK households[1], which would be well above the current energy requirements of the 3,622 homes in North, West and Central Sutherland[2].

Maintenance

3.92 The proposed development would largely be controlled and managed remotely, however there would be technicians on site regularly and it would be maintained throughout its operational life via servicing at regular intervals. It is anticipated that there would be approximately four annual service visits per turbine by a service team of up to three people. Inspections of high-voltage equipment and general site safety are expected to be carried out monthly. Faults would be responded to as required, most likely by a team of two technicians.

3.93 This team would either likely be employed directly by the developer or by the turbine manufacturer. Management of the Energy Park would typically include turbine maintenance, health and safety inspections and annual civil maintenance of tracks, drainage and buildings. Turbine maintenance includes the following:

- annual civil maintenance of tracks and drainage;
- scheduled routine maintenance and servicing;
- unplanned maintenance or call outs;

[1] Calculated using the most recent statistics from the Department of Business, Energy and Industrial Strategy (BEIS) showing that annual UK average domestic household consumption in 2020 was 3,748kWh

[2] Statistics.Gov.Scot 2020

- HV and electrical maintenance; and
- blade inspections.

Access Tracks

3.94 The proposed development would include a walking route to link the proposed access tracks with the existing Core Path at the Upper Bighouse Estate. It is anticipated that this walking route would also alter the route of the Core Path slightly, at its southern end, so as to avoid the operational timber yard.

3.95 The alignment of this walking route, as well as details about materials and finishes would be agreed with THC.

Abnormal Loads Turning Areas (A836)

3.96 The abnormal load turning area that is selected (from the two options) and constructed would be maintained for use throughout the lifetime of the proposed development. This would allow abnormal loads e.g. turbine blades to be removed from or delivered to site, allowing the required flexibility for ongoing maintenance.

3.97 The abnormal load turning area would be gated to prevent unauthorised access, however should the eastern turning location, which is in Melvich itself, be selected and constructed, it is proposed that the turning area could be used for the benefit of the community (see paragraph 3.66). Limitations on community use would apply, primarily in the rare event that the turning area is required for allowing abnormal loads to enter or exit the proposed Energy Park site.

Habitat Management Plan

3.98 As part of the proposed development an area of approximately 87.75ha would be targeted for peatland restoration in order to compensate for habitat loss.

3.99 The peatland restoration would be undertaken by clearing conifer plantation forestry and ditch blocking to restore the original pre-forestry conditions, enabling the development of peatland habitats as part of a Habitat Management Plan (HMP). An outline HMP is provided in **Technical Appendix 8.5**.

Community Benefit and Shared Ownership

3.100 The proposed development is being brought forward with the opportunity for community shared ownership. The preferred model for shared ownership in the project is through revenue (profit) sharing. This would offer local communities the ability to invest in, and acquire up to a 10% share of the project. The local communities would see a return on investment through profits produced throughout the lifetime of the project. Discussions are in progress with the Farr North Community Trust and other representative local community groups in Sutherland. The community of interest and reasons for selection of the area for the shared ownership opportunity is illustrated in the **PAC Report**, accompanying the application. A memorandum of understanding (MoU) is being developed to set out the proposed terms for the shared ownership opportunity. Interested community groups

have been asked to sign the MoU as a precursor to a more detailed agreement with a grouping of interested communities. Local Energy Scotland has been providing independent advice and support to communities interested in the shared ownership opportunity. Further details of the consultation effort associated with and response from communities is provided in the **PAC Report** accompanying the application. Discussion relating to the shared ownership offering is also being provided in the Planning Statement.

3.101 In addition to the shared ownership opportunity, should the proposed development gain consent, a Community Benefit Fund would be made available to the community of interest illustrated within the **PAC Report**. This is offered on the basis of a payment per MW of installed capacity at the Scottish Government recommended rate at the time of commissioning the proposed windfarm. At present the recommended rate is £5,000 per MW. It is estimated that, depending on the type of investment selected, the community benefit fund alone would accrue benefits to the local economy of approximately £7.92 million over the 30 year life of the Energy Park.

3.102 The applicant is also proposing to offer, as part of its Community Benefit package, a contribution towards electricity bills to residents that live in the Melvich and Strath Halladale area, over the 30 year life of the Energy Park. Part of this offer would enable residents and communities to increase the energy efficiency of their properties and reduce their carbon emissions, by offering a capitalised lump sum to enable this.

3.103 The Kirkton Energy Park is proposed to become part of the Octopus Fan Club initiative, whereby households in proximity to the Kirkton Energy Park will have the option to opt in to either the near neighbour scheme or The Octopus Energy Fan Club programme, whereby they would receive a discount of up to 50% on the unit price of the electricity they use while the Kirkton Energy Park turbines are generating. The precise area around Kirkton which will be encompassed by the Fan Club will be the subject of consultation with the local communities.

DECOMMISSIONING PHASE

3.104 At the end of its operational life, which would be defined by condition on the grant of any consent, the proposed development would be decommissioned unless an application is submitted to extend the operational period or to repower the site. The decommissioning period would be expected to take up to one year.

3.105 The ultimate decommissioning protocol would be agreed with THC and other appropriate regulatory authorities in line with best practice guidance and requirements of the time. This would be done through the preparation and agreement of a Decommissioning and Restoration Plan (DRP). Financial provision for the decommissioning would be provided. It is anticipated that the DRP would be the subject of a planning condition.

3.106 The final, detailed, DRP would reflect the relevant legislation, and best practice current at the time of decommissioning and restoration.

3.107 **Table 3-4** sets out the potential decommissioning requirements for each element of the proposed development. These would be outlined further in the outline DRP and then updated in the detailed DRP.

Table 3-4: Decommissioning Requirements for Infrastructure

Element	Decommissioning Requirement
Turbines	Turbines would be dismantled and removed from site. Turbine components would be dismantled onsite using standard engineering techniques similar to those used for the original installation. The re-use or recycling of components would be prioritised, this would include exploration of any viable second hand turbine market. Turbine oils or any other oils would be removed from the site and disposed of appropriately.
Turbine Foundations	Top soil material that has revegetated the foundations would be excavated first and temporarily stored for re-use following partial removal of foundations. The top 1m of the turbine foundation would be removed and disposed of appropriately. This is considered preferential to removing all infrastructure, due to the potentially lower environmental impacts associated with excavating, processing and removing concrete from the site. The excavated foundation would be reprofiled with soil and reseeded.
Crane Hardstandings	Top soil material that has revegetated the crane hardstandings would be excavated first and temporarily stored for reuse following partial removal of crane hardstandings. The top 1m of the crane hardstandings would be removed and disposed of appropriately. This is considered preferential to removing all infrastructure, due to the potentially lower environmental impacts associated with excavating, processing and removing aggregate from the site. The excavated hardstandings would be reprofiled with soil and reseeded. Recovered geogrids and geotextiles would be disposed of appropriately. All granular materials would be excavated and removed from the site, for re-use where practicable.
Access Tracks	Access tracks would be left in-situ, which would reduce potential environmental impacts associated with potential sediment migration into watercourses as a result of removing all tracks.
Watercourse Crossings	These would remain in-situ in association with the access tracks after decommissioning. This would reduce decommissioning activities in the vicinity of watercourses and thus potential for contamination as a result of run-off.
Underground Cabling	These are underground and therefore all cables would be made safe and left in-situ. This is considered preferential to extracting cables from the cable trenches due to the potentially greater environmental impacts associated with excavating, processing and removing the cable from the site.
Substation compound	All equipment from within the substation compound would be removed from site and either reused, recycled or disposed of appropriately. Oils or lubricants from the compound would be removed and disposed of appropriately. The control building, and related infrastructure, would then be demolished and all materials would be reused, recycled or disposed of appropriately.
Substation compound foundation	The top 1m of the compound foundations would be removed and disposed of appropriately. The excavated hardstandings would be reprofiled with soil and reseeded.

REFERENCES

The Electricity Act 1989.

The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

Scottish Environment Protection Agency, Natural Resources Wales, the Northern Ireland Environment Agency (2019). Guidance for Pollution Prevention - Works and maintenance in or near water: GPP 5.