Contents

3.0 Site Selection and Design Evolution

3.1 Introduction

This Chapter outlines the process undertaken in selecting the Site as a potential location for a wind farm, provides a description of the Site and surrounding area, and discusses the design evolution process.

The principles of the EIA process state that Site selection and project design should be an iterative constraint-led process, and this procedure has been followed. This has ensured that any potential impacts have been avoided or minimised as far as possible.

This Chapter draws on issues considered in more detail in the relevant technical Chapters (Chapters 6 to 15). This Chapter does not pre-empt the conclusions of the later Chapters, but rather explains how potential environmental effects have informed the wind farm design.

The final layout design is described in **Chapter 2: Proposed Development Description** and is shown on **Figure 2.1**.

3.2 Site Description

The Site is located within Aultmore Forest, approximately 6km to the north of the settlement of Keith, Moray. The entire Site is located within the Moray Council administrative boundary and is managed by Forestry and Land Scotland (FLS), on behalf of Scottish Ministers, and is shown in **Figure 1.2**.

The Site consists predominantly of commercial forestry and comprises one large parcel of land, with turbines proposed to be located in the eastern and western sections. The central part of the Site is separated by a small strip of non-forested land. The three highest hills found across the Site are Millstone Hill (301m above ordnance datum (AOD)) in the west, Addie Hill (272m AOD) in the centre of the Site and Old Fir Hill (262m AOD) to the east.

The area surrounding the Site consists primarily of pastoral and arable farmland, interspersed with small groups of residential properties and farms. The closest residential property in the surrounding area is within 50m of the Site boundary.

There are no statutory landscape, ecological, ornithological or archaeological designations within the Site.

3.3 Historic and Current Site Uses

3.3.1 Current Land Use

The Site is predominately covered by commercial forestry but has some relatively small areas of bog/heath and a limited number of areas defined as ancient woodland (long established of plantation origin) but which have been incorporated into the commercial forestry. The forestry is of varying ages and will be felled at the appropriate time in accordance with the FLS land management plan.

3.3.2 Planning History

Planning permission (07/02375/EIA) for the 13 turbine Aultmore Wind Farm was granted in 2014, and a section 42 application to vary conditions 1, 18 and 24 of this permission was subsequently approved by TMC in February 2017 which brought with it a new permission (16/01657/APP). A further section 42 application to vary a condition of that permission was subsequently granted in August 2021. This brought with it a new planning permission (21/00484/APP) with a three-year timescale for the commencement of development (i.e. by August 2024).

The consented Aultmore Wind Farm consists of 13 wind turbines with a blade tip height of 90/110m, and includes provision for access tracks, borrow pits, substation/control building and temporary construction compounds.

3.4 Surrounding Area

3.4.1 Statutory Designations

There are no statutory or non-statutory ecological designations within the Site. Nearby statutory designations are shown on **Figure 3.1a** and include:

- River Spey Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC);
- Moray Firth Special Protection Area (SPA);
- Mill Wood SSSI;
- Shiel Wood Pastures SSSI;
- Reidside Moss SSSI and SAC;
- Moss of Crombie SSSI; and
- Cullen to Stake Ness Coast SSSI.

Non-statutory designations are shown on **Figure 3.1b**.

There are no landscape designations within the Site. Nearby landscape designations are shown in **Figure 3.1c** and include:

- Portgordon to Cullen Coast Special Landscape Area (SLA);
- Lower Spey and Gordon Castle SLA;
- The Spey Valley SLA; and
- Deveron Valley SLA.

The Cairngorms National Park (CNP) (including Wild Land and National Scenic Area designations) is located approximately 35km to the south-west of the Site.

There are no archaeological or cultural heritage designations within the Site; although there are a number of archaeological records (Canmore and HER) within the Site. A number of listed buildings and conservation areas are found within 2km of the Site boundary as shown on **Figure 3.1d**, and Gordon Castle Garden and Designed Landscape is located approximately 4km to the northwest of the Site.

3.5 Site Selection

The Site contains a consented but not yet built wind farm within the applicant's control. The consented site was originally chosen for a wind farm for the following reasons at the time[1]:

- Favourable wind resource.
- Landowner cooperation.
- Located within a Moray Council Preferred Area for wind farm development.
- Minimal adverse ecological impact due to existing site quality.
- Developing an altered commercial forestry site as opposed to valued moorland.

[1] Taken from Chapter 3 of the Aultmore Wind Farm Environmental Statement submitted under application reference 07/02375/EIA.

- Significant opportunities for habitat and wildlife enhancement.

Following the successful consenting of the 2007 application in 2014, a condition was put in place requiring the applicant to agree aviation and radar mitigation with the MOD to mitigate any potential impacts on the MOD radar at Lossiemouth.

However, since then significant changes in both turbine technology and the UK electricity market have taken place. Further, it is considered that the turbine layout for the consented scheme underutilises the Site's potential for clean energy generation. Studies completed by Vattenfall identified the potential to redesign the Site using up-to-date turbine technology and a wider footprint to increase its contribution to government climate targets and policy, including its 2018 declaration of a Climate Emergency.

This combination of factors provides the rationale for the redesign and optimisation of the Aultmore Site - reconfiguring it using up-to-date turbine technology thereby increasing its clean energy productivity and enhancing its commercial viability in the foreseeable electricity market.

3.5.1 Design Principles and GIS

When considering the potential for the Site to be redesigned to accommodate larger, modern wind turbines, a GIS model has been developed by SLR and the applicant for the Site which seeks to mirror planning, environmental, technical and commercial constraints. The GIS model is updated regularly when new data becomes available or when other factors change. Where available and appropriate, the GIS model incorporates published advice from statutory consultees.

Key issues and constraints for consideration in the design process were established through a combination of desk-based research, extensive field survey and consultation (through the EIA scoping process). The design process considered the following key issues and constraints:

- landscape designations and visual amenity;
- archaeological and cultural heritage assets;
- sensitive fauna;
- sensitive habitats;
- watercourses, private water supplies and sensitive surface water features;
- topography and ground conditions;
- public road accessibility and feasibility of delivering large turbine components;
- recreational and tourist routes;
- proximity of residential properties;
- grid connection availability;
- aviation and defence constraints; and
- presence of utilities.

Information in respect of the survey work to identify various key issues and constraints and how they have contributed to the layout design has been investigated in greater detail in the technical chapters of this EIA Report (Chapters 6 to 15).

The key issues and constraints gleaned from the assessments within the technical chapters has allowed for the careful placement of the proposed development within the Site. This allowed the applicant to facilitate effective mitigation, with potentially significant effects avoided or minimised as far as reasonably practicable through the design process. A summary of the potential effects addressed through the design process and the issues remaining following the selection of the final design is provided in **Table 3.1.**

Table 3.1 – Summary of Mitigation by Design.

Issue	Environmental Constraint / Potential Effect	Mitigation by Design	Issues Remaining
Landscape and Visual	The following key landscape and visual sensitivities were identified in the vicinity of the Site: • potential effects on local landscape character including LCT 9 Low Forested Hills, LCT 8 Upland Farmland and LCT 3 Rolling Coastal Farmland. • potential effects on local landscape character and regional and local landscape designations including Portgordon to Cullen Coast SLA, Lower Spey and Gordon Castle SLA, The Spey Valley SLA and the Deveron Valley SLAs (in both Moray and Aberdeenshire). • potential effects on visual receptor groups including local roads, residents and Core Path KT01 / Fishwives Road, as well as on larger settlements such as Keith, Buckie and Cullen, and the A98 to the north and the A95/A96 to the south. • potential visibility from nearby dwellings, settlements and transport routes as noted above; • changes in the experience of recreational users on the Site. • potential effects on the night time environment arising from the lighting of wind turbines. • potential cumulative effects in combination with the consented Lurg Hill Wind Farm and the smaller, operational turbines close to the Site. • potential effects on the night time environment in combination with nearby wind farms.	The final layout of the proposed development has adopted the following design measures: • the proposed development has been designed to be read harmoniously in the context of the nearby operational and consented wind farms. • wind turbine tip heights have been carefully considered in terms of carefully considered in the context of maximising generation capacity whilst minimising impacts from a landscape perspective. • wind turbines on the western cluster of the Site have been sited to take account of nearby residential receptors, and views from Letterfourie House. • wind turbines set back over 1,150m from the closest third party existing residential properties; • agreement of a reduced aviation lighting scheme with the CAA, which removes the requirement for tower lighting, and requires only T01, T02, T03, T05, T06, T08, T13, T15 and T16 to be lit with medium intensity 2000 candela steady red light (with a second back up light). The 2000 candela lights can be dimmed to 10% of peak intensity when the lowest visibility as measured at suitable points around the wind farm by visibility measuring devices exceeds 5km. Intermediate level 32 candela lights will not be required on the turbine towers. Throughout the design evolution of the proposed development, a key driver has been the consideration of potential landscape and visual effects on receptors including how the proposed development would relate to the existing landscape character as well as existing wind farms in the landscape. The landscape and visual effects potentially caused by the proposed development have been considered extensively from key receptors during the layout design of the proposed development.	The landscape and visual effects of the proposed development are addressed further in **Chapter 6: Landscape and Visual Impact Assessment**, and in **Technical Appendix 14.1.**
Archaeology and Cultural Heritage	The following key archaeological and cultural heritage sensitivities were identified in the vicinity of the Site: • potential direct effects on cultural heritage assets within the Site boundary. • potential effects on the settings of designated heritage assets in the wider landscape. • cumulative effects on the settings of designated heritage assets in the wider landscape.	Non-designated heritage assets were identified within the Site, which mainly relate to features found during previous surveys and some historical records for old wells, quarries and old houses present before the forest was planted. These assets have been avoided through design where possible. Letterfourie House was identified as a sensitive receptor by HES, and the western cluster of turbines redesigned to reduce impact on the receptor.	The archaeological and cultural heritage effects of the proposed development are addressed further in **Chapter 7: Archaeology and Cultural Heritage.**
	There are no scheduled assets within the Site, however a number of HER have been noted and avoided where possible.	HER records have been avoided where possible.	
Ecology	The following key ecological sensitivities were identified in the vicinity of the Site: • potential effects on sensitive habitats through habitat loss, fragmentation and degradation, including peat forming habitats. • potential effects on protected species e.g. mammals, fish, etc.; • cumulative effects as arising from the addition of the proposed development in combination with other relevant projects; and • potential effects on statutory sites within 5km designated for ecological interests	The proposed development has been designed to reduce the potential for ecological effects by avoiding more sensitive ecological interest features including: • avoidance of areas of deeper peat - this has reduced the habitat loss of more sensitive higher quality habitats such as blanket bog; • avoidance of areas of sensitive habitat – these areas have been buffered by 30m and turbines and infrastructure relocated to avoid any impact on these areas. • avoidance of watercourses – these have been buffered by 50m, apart from locations where access tracks unavoidably need to cross watercourses. • avoidance of any potential areas of GWDTEs and sensitive habitats; and • Avoidance of badger setts – all setts found during the baseline surveys have been avoided by a minimum 100m buffer.	The ecological effects of the proposed development are addressed further in **Chapter 8: Ecology and Biodiversity**.
Ornithology	The following key ornithological sensitivities were identified in the vicinity of the Site:	The proposed development has been designed to avoid more sensitive ornithological habitats.	The ornithological effects of the proposed development are addressed further in **Chapter 9: Ornithology.**

Issue	Environmental Constraint / Potential Effect	Mitigation by Design	Issues Remaining
	• habitat loss or damage (permanent and temporary) due to construction of wind farm infrastructure; • inadvertent destruction of nests during construction; • disturbance to birds during construction due to vehicular traffic, operating plant and the presence of construction workers; • disturbance to birds due to the operation of the wind turbines, vehicular traffic and the presence of people during operation; • barrier effect due to the operation of the wind turbines; • mortality of birds caused by collisions with turbine blades and other infrastructure; • cumulative effects from the proposed development along with all other operational, consented and submitted plans or projects within an appropriate zone of influence and against the relevant NHZ population estimates, following NatureScot guidance.		In addition, an Outline Biodiversity Enhancement and Restoration Plan (OBERP) Management Plan is available in **Technical Appendix 8.6: OBERP**
Peat and Soils	The following key sensitivities with relation to peat and soils were identified: • Potential impacts on excavated peaty soils. • Potential impacts of sliding of peatlands. • Potential effects on peatland habitats through habitat loss, fragmentation and degradation.	The proposed development has been designed to avoid areas of deeper peat reducing the habitat loss of more sensitive higher quality habitats such as blanket bog wherever possible. Where access tracks cannot avoid areas of deeper peat the use of floating access track construction has been adopted to minimise impact. The proposed development has been designed to avoid any areas of ground which may be subject to peat slide risk where possible. The ground condition factors that were considered in the design of the proposed development were: identification of peat depths in excess of 1.0m – to minimise incursion, protect from physical damage, minimise excavation and transportation of peat, reduce potential for peat instability and minimise potential soil carbon loss; identification of slope angles greater than 4 ° - to minimise soil loss and potential instability; and avoidance of areas where initial peat stability concern was identified where possible – to avoid areas with possible instability issues and associated indirect effects on surface water. Proposals for peatland restoration have been included in the outline Habitat Enhancement and Management Plan, seeking to restore areas of degraded peatland habitats.	The potential effects on peat and soils due to the proposed development are addressed further in **Chapter 10: Hydrology, Hydrogeology, Geology and Soil**s and **Technical Appendix 10.1: Peat Slide Risk Assessment** and **Technical Appendix 10.2: Peat Management Plan.**
Hydrology	The following key hydrological sensitivities were identified in the vicinity of the Site: • potential effects on designated sites due to potential changes in surface and/or groundwater quality and quantity; • potential effects on the catchments due to changes in surface and/or groundwater quality and quantity; • potential localised increase in flood risk due to watercourse crossings; • potential effects on GWDTE through changes to Site hydrogeology; • potential effects on Public or Private Water Supply (PWS) abstractions due to potential changes in surface and/or groundwater quality and quantity; and • potential for peat slide risk.	The proposed development has been designed to reduce the potential for hydrological effects by avoiding more sensitive ecological interest features including: • avoidance of watercourses – these have been buffered by 50m, apart from locations where access tracks unavoidably need to cross watercourses; • minimising the number of watercourse crossings through the layout design process, with the locations of watercourse crossings selected to avoid damage; • avoidance of private water supply catchments – these have been buffered by at least 250m to the nearest wind turbine locations. • avoidance of high dependency GWDTES - areas with potential to be Groundwater Dependent Terrestrial Ecosystems (GWDTEs) were also examined. They were found to be limited in extent across the Site and mainly confined to the areas of open land within the forest and adjacent to watercourses. Areas of high potential for GWDTEs have been avoided by Site infrastructure across the Site. • The proposed development incorporates good practice drainage design during construction and operation adopting a sustainable drainage system (SuDS)	The hydrology and hydrogeology effects of the proposed development are addressed further in **Chapter 10: Geology, Hydrology and Hydrogeology.** A Pollution Prevention Plan would form part of the Construction Environment Management Plan.

Issue	Environmental Constraint / Potential Effect	Mitigation by Design	Issues Remaining
		approach to control the rate, volume and quality of runoff from the proposed development.	
Topography	The following key topographical sensitivities were identified in the vicinity of the Site: • consideration of steep slopes for siting of infrastructure and turbines. • potential for peat slide risk; • potential for deep cut / fill slopes around infrastructure; and • potential for safety risks to personnel during construction and operation of the proposed development.	The proposed development has been designed to reduce the potential for topographical effects by avoiding: • areas of the Site where the topography is greater than 12% slope gradient for wind turbine and adjacent crane hardstand positioning; • positioning the crane hardstand downslope of the proposed wind turbine location where other Site constraints allow it; • positioning the access track, adjacent to the crane hardstand at wind turbine locations, downhill to the crane hardstand when aligning parallel to the contours where other Site constraints allow it; • aligning access tracks perpendicularly to slope gradients greater than 14%; • areas where slope stability was identified as an area of high peat slide risk have been avoided at all turbine locations and crane pad locations.	The Peat Slide Risk Assessment in **Technical Appendix 10.1** undertakes a thorough review of risk at each of the infrastructure locations and provides additional mitigation where required.
Traffic and Transport	The following key transport sensitivities were identified in the vicinity of the Site: • Severance; • Driver Delay; • Pedestrian Delay and Amenity; • Fear and Intimidation; and • Accidents and Safety.	The proposed development has been designed to reduce the potential for transport effects by avoiding positioning wind turbines within the public roads buffer of 220m (tip height + 10%). Options for using the U72L minor road at Mains of Oxhill were explored and discounted due to the restricted sight lines of the existing road junction, and extensive modifications that would also be required for the delivery of abnormal loads along the U72L. A new access point has been proposed along with B9016, where suitable visibility splays are found.	The traffic and transport effects of the proposed development are addressed further in **Chapter 11: Traffic and Transport.** It is proposed that a detailed Construction Traffic Management Plan (CTMP) and Access Management Plan are prepared post-consent to further mitigate any effects of the proposed development.
Noise	Potential effects at nearby properties due to operational and construction noise with potential for cumulative impact.	The proposed development has been designed to reduce the potential for noise effects by avoiding locating wind turbines within 1,150m of residential properties.	The noise effects of the proposed development are addressed further in **Chapter 12: Noise and Vibration.**
Shadow Flicker	Potential effects of shadow flicker on residential receptors.	Turbines have been located over 1,150m from the nearest residential receptors.	The shadow flicker effects of the proposed development are addressed further in **Chapter 15: Other Issues including Shadow Flicker and Telecommunications**
Utilities	Potential effects on existing utilities within the Site.	The proposed development has been designed taking into account the location of the following existing utilities: • SPEN 11kV OHL – An overhead line runs alongside the existing forestry track leading to the communications tower on Tor Sliasg. No turbines are located within 700m of this power line. • Existing Water Pipelines – a number of water pipelines are found on the Site, typically feeding PWS. The existing forestry tracks cross these pipelines, and no additional crossings are required.	Utility crossings have been minimised as far as practicable. Where utility crossings are required appropriate utility protection will be designed.

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3.5.2 Do Nothing Approach Do Nothing Approach

The "do nothing" scenario is a hypothetical alternative conventionally considered in the EIA Report as a basis for comparing the development proposal under consideration. This scenario is considered to represent the current baseline situation as described in the individual chapters of this EIA Report.

In the absence of the proposed development, it is anticipated that the Site would continue to be managed as a commercial forestry, along with the telecommunications tower. This land use would continue on the Site whether or not the proposed development proceeds.

3.6 Technology, Size and Scale

The proposed development comprises up to 16 three-bladed horizontal axis turbines, up to 200m tip height, with a combined rated output estimated to be in the region of 105.4 Megawatt (MW) and an energy storage facility with an estimated capacity in the region of 50MW.

3.6.1 Wind turbines

Onshore wind continues to be one of the lowest cost new renewable energy generation types and the Site has been predominantly selected for its potential to generate energy from wind turbines. Larger turbines will be needed if onshore wind development is to continue making contribution to both the UK and Scottish Government's renewable energy targets, particularly the recent announcement commitment to net zero CO2 emissions by 2045 (Scottish Government, 2019).

The necessity for taller turbines is also recognised in the Vision Statement of the Scottish Government Onshore Wind Policy Statement (OWPS, 2022), which states that: "*Onshore wind is one of the cheapest and quickest forms of new electricity generation. Onshore wind remains vital to meeting this increasing demand, providing fast deployment whilst minimising costs to the consumer. This will be achieved by deploying the most productive modern turbines that are taller than older models, by repowering existing sites where possible, and by maximising the use of our exceptional natural wind resource where environmental effects are acceptable. These will sit in Scotland's evolving landscape among reforested hills, restored peatland, and thriving and sustainable ecosystems*". Section 3.6 of the OWPS also states that *"Meeting the ambition of a minimum installed capacity of 20 GW of onshore wind in Scotland by 2030 will require taller and more efficient turbines. This will change the landscape"*.

Section 3.4 of the OWPS, with regards to forested sites and wind farms states that *"Taller turbines have a higher installed capacity which results in the need for fewer turbines per site. This, alongside the ongoing commitment to compensatory planting, will allow the Scottish Government commitments to both onshore wind development and re-forestation to continue to complement one another"*.

It was considered that taller turbines of 150m and above would likely provide the optimum scale of development, subject to assessment of landscape impacts. Compared to smaller wind turbines the amount of concrete per MW produced would be less, and similarly the length of new access track (km) required per MW produced would also be significantly less. Taller wind turbines would also reduce any forestry felling by increasing the rotor clearance above the tree canopy and thereby reducing the impacts upon existing forestry operations. Taller turbines also produce more electricity as wind speed and thus energy yield increases with height above ground level. Bigger rotors also capture the wind more efficiently and produce more electricity per turbine.

The supply of smaller wind turbines across Europe is already reducing, due to lack of demand as manufacturers are recognising the world market is shifting to larger machines with development work focussing on larger turbines to secure higher yields. Overall, whilst it was considered that taller wind turbines were the most appropriate and would better contribute to the Scottish Government's climate change targets, the assessment of landscape impacts would bear the final limiting factor on the selected height of wind turbines.

The final selection of the turbine tip height of up to 200m was considered to represent the best balance of tall turbines and design in the landscape. These considerations and the final selection of turbine height are described in Section 3.7 Design Evolution of this Chapter.

3.6.2 Energy storage

There is a national requirement to balance the peaks and troughs associated with electricity supply and demand to avoid strains on transmission and distribution networks and to keep the electricity system stable. An energy storage facility is therefore proposed as part of the proposed development to support the flexible operation of the national grid and decarbonisation of electricity supply.

The energy storage facility would store electrical energy through the use of batteries, contained alongside inverters (to convert the direct current (DC) from the batteries to alternating current (AC), suitable for exporting to the grid), within a self-contained building adjacent to the onsite control building to allow easy connection to the grid and minimise energy losses.

3.7 Design Evolution

This section of the EIA Report addresses the evolution of the design process undertaken by Vattenfall and the EIA team for the design of the proposed development.

FLS has been regularly updated by Vattenfall throughout the design process, and has been consulted at each stage of the project. This was done through regular meetings and updates with the FLS Forest Liaison Officer. FLS also approved materials used in the Scoping exercise and public consultation.

3.7.1 Design evolution approach

The layout and design of the proposed development has followed an iterative environmental constraints-led design process, aimed at minimising environmental impacts but at the same time meeting the commercial requirements of Vattenfall. An iterative design approach works in tandem with the EIA process, whereby the design process adopts incremental changes in layout and design resulting from a continually evolving understanding of environmental constraints. This iterative approach allows potential environmental constraints, as they are identified, to be avoided or minimised through alterations in design. This approach is referred to within this EIA Report as mitigation 'embedded' into the proposed development or simply 'embedded measures' or 'embedded mitigation'. Relevant embedded measures are explained within each technical Chapter of this EIA Report.

As part of the iterative approach adopted by Vattenfall, a number of design principles and environmental measures have been implemented and incorporated into the proposed development as standard practice, including the following:

- consideration of the form of the underlying landscape and its scale;
- sensitive siting of the proposed infrastructure incorporating appropriate buffer distances from environmental receptors to avoid or reduce effects on the environment;
- considering the size and scale of the proposed development appropriate to the location and proximity to residential receptors;
- consideration of the Site's topographical constraints and their effect on engineering design and practicality in order to ensure that the design is buildable;
- re-using existing forestry tracks and borrow pits as much as possible to access proposed turbine locations;
- design of new tracks to minimise cut and fill, reducing landscape and visual effects as well as costs;

- inclusion and design of borrow pits to minimise the amount of the material required to be imported to the Site; and
- potential for up to 100m micrositing of turbines and infrastructure during construction to ensure the best possible location is chosen based on detailed Site investigations.

Throughout the design evolution of the proposed development, a key driver has been the consideration of potential landscape and visual effects on receptors including how the proposed development would relate to the existing landscape character as well as existing windfarms in the landscape. In particular, care has been taken to evaluate the scale and number of proposed turbines cumulatively with existing windfarms in the area, in particular with the cluster of operational, smaller turbines directly to the south and west of the Site, as well as the consented Lurg Hill Windfarm to the west.

The landscape and visual effects potentially caused by the proposed development have been considered extensively from key receptors during the design of the proposed development.

SNH's Siting and Designing Windfarms in the Landscape (Version 3a, 2017) states that:

"In a wind farm, turbines can be arranged in many different layouts. The layout should relate to the specific characteristics of the landscape - this means that the most suitable layout for every development will be different. For a small wind farm, this might comprise a single row of wind turbines along a ridge; while, for a larger development, a grid of wind turbines is often taken as the starting point, with the turbines spaced at minimum technical separation distances."

The substation and energy storage area also follow a similar physical requirement for positioning on flat land and avoiding sensitive habitats areas, deep peat and steep slopes. A number of construction and maintenance compounds are also required with similar design requirements, but taking account of practical considerations such as the requirement to be located near to the entrance and the development of the first wind turbine on entering the Site, as well as providing storage and welfare facilities across the Site.

The onsite access tracks have been designed to use existing forest 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. All access tracks require to be designed to avoid excessive gradients to aid the safe usage of the tracks and delivery of large turbine components in particular.

Borrow pits would also be required as a source of aggregates to be used in the construction of the tracks, hardstandings and foundations. Borrow pit locations sought to minimise construction of additional access tracks and provide easy opportunities to source suitable materials for construction. The total number and size of borrow pits has been selected to meet the estimated volume of aggregates required to construct the tracks, hardstandings and foundations.

3.7.2 Design evolution steps

Vattenfall has been investigating the potential for a wind farm on this Site since the early 2000s and had a 13-turbine development consented in 2014. As described in Section 3.5 and Section 3.6, changes in turbine technology have led to the Site being re-examined given the advances in turbine technology and ongoing negotiations with the MOD with regards radar mitigation (which had delayed the construction of the consented scheme).

Vattenfall commissioned ecological and ornithological surveys of the Site, which commenced in 2021. Data from these studies plus additional desk based environmental studies fed into a 16 turbine, 200m blade tip layout that was presented in a Scoping Report submitted to the ECU in 2021.

The proposed layout and Site boundary were further refined during the EIA process as Site-based surveys were carried out and following consultation with consultees, in the form of responses to the direct scoping exercise, direct consultation with consultees and discussions with the local community. Information collected during this stage of the design firstly fed into a 'Design Chill' layout of 17 turbines at 200m. The Design Chill layout enabled the EIA and Vattenfall technical team

to undertake further studies and surveys and refine further the layouts including aspects such as borrow pit locations and access track alignments.

An interim 'Design Slush' layout in late 2022 took place to further refine the layout, based on additional environmental datasets and a renewed focus on refining the layout to minimise potential impacts on residential visual amenity. The potential of creating a new access track from the B9106 was also examined during this layout.

Following detailed review, a final 'Design Freeze' or 'application layout' has been developed which forms the basis of this application for consent. The proposed application boundary has been revised to include the area of land to the west for a new access track, which now forms part of the Site. The final design is based on a full understanding of the technical and environmental constraints. With this information, the final layout also comprises features to enhance the Site, including a Biodiversity Enhancement and Management Plan and enhanced access for recreation.

A summary of the evolving layouts and design, and the reasons for the changes and design decisions is presented in **Table 3.2. Figure 3.2** illustrates the three layouts and visually illustrates how the design and Site boundary have evolved through the design stages of the EIA process.

Table 3.2 – Summary of Mitigation by Design

	Turbine Numbers	Tip Height	Layout Capacity	Comments and Reasons for Design Amendments
Initial layout (2021 Scoping Report)	16	200m	96MW	Considered to be the maximum case scenario in terms of generation using technology available at the time, whilst meeting noise and other desktop constraints. This iteration was submitted as part of the scoping report.
1st iteration (2022 EIA Studies / Design Chill	17	180m / 200m	102MW + 20MW energy storage	'Design Chill' layout which was based on the emergence of environmental constraints from baseline studies and in response to feedback from consultees and the local community. Additional peat probing and ecology survey data was available. Areas of known deeper peat, GWDTE and sensitive habitats were avoided. In particular, two turbines were moved out of identified areas of deeper peat. The western layout was shifted westwards due to the presence of microwave links and a proposed mitigation solution. The eastern cluster was redesigned due to updated survey and wind data being available, which also created additional space for an additional turbine to be added. Two turbines were moved away from nearby receptors to mitigate impacts on these properties. Post Scoping consultation with HES was undertaken to try and mitigate their concerns with regards to the views from Letterfourie House. This resulted in the western cluster of turbines being tweaked to improve the layout and impact when viewed from this Listed Building. HES were content with the resulting views. Site infrastructure was developed including options for substation, battery storage, borrow pit and access track locations. Consideration was given to the potential for a new access track to be created from the B9016 from the west onto the Site. Turbines were numbered 1 – 17 for this layout.
2nd iteration	16	180m / 200m	96MW + 20MW energy storage	'Design Slush' layout which was based on the emergence of further environmental and technical constraints from additional survey work, along with

	Turbine Numbers	Tip Height	Layout Capacity	Comments and Reasons for Design Amendments
(EIA studies / Design Slush				additional consultation with stakeholders. This iteration also started to focus on potential residential amenity impacts following the Site work by the landscape architects. Further investigations were undertaken with regards to the potential access options from the B9016. • Turbine 1 of the design chill layout was removed due to additional surveys identifying it lay within sensitive NVC habitat, as well it being prominent from the residential property at Drodlands. • Turbine 4 moved 140m southwest to accommodate the movement of other turbines. • Turbine 5 moved 175m northeast onto a flatter location to give further separation from Drodlands. • Turbine 6 was moved slightly eastwards to try and further reduce any impacts on Letterfourie House. • Turbines 7 and 8 were moved further away from nearby properties to further reduce the residential amenity impact. Turbine 9 was moved westwards out of an area of deeper peat. • Turbine 10 moved to the other side of the proposed access track to try and avoid impacts on an area of deeper peat. • Turbine 11 did not move. • Turbine 12 did not move. • Turbine 13 moved 180m northeast towards T14 to reduce the residential impact on Ryeriggs. • Turbine 14 did not move. • Turbine 15 did not move. • Turbine 16 moved 250m northeast to reduce residential impact on Ryeriggs • Turbine 17 moved 275m north into the space vacated by T16 to reduce impact on Ryeriggs and to try and minimise the spread of the wind farm cluster. The turbines were not renumbered at the conclusion of this process, remaining 2 – 17. Two potential substation locations were identified, to give flexibility for the grid connection location, dependent on the final grid offer.
3rd Iteration (EIA Studies / Design Freeze)	16	200m	105.6MW + battery energy storage.	'Design Freeze' layout which was based on the detailed examination of landscape views at key receptor locations and completed detailed studies, such as habitat surveys, peat depth investigations and surveys for groundwater dependent terrestrial ecosystems (GWDTE). The turbines were renumbered sequentially 1 -16 running west to east for the Design Freeze layout. Consultation with the main wind turbine manufacturers identified that it would add complication to procure two sizes of turbines for the same Site, and so 200m was adopted as the standard turbine size across the Site. A revised turbine model was adopted, which

	Turbine Numbers	Tip Height	Layout Capacity	Comments and Reasons for Design Amendments
				raised the power rating of each turbine to 6.6MW (from 6MW). Further detailed assessment work with regards residential visual amenity was undertaken, which resulted in turbines 4 and 5 (note renumbered from previous iterations) moving further north and east as follows: • Turbine 5 moved 100m east to provide additional space for T17 to move into whilst not having a detrimental impact on energy yield. • Turbine 4 moved 270m northwest to further reduce residential impact on Ryeriggs and Sunnybrae. • Site infrastructure (access tracks and borrow pits) and locations of the substation, construction and maintenance compound and energy storage location were also amended following detailed onsite investigations, engineering considerations and the amends to the turbine locations. The layout also confirmed the final location of the access route from the B9016.

3.8 Micrositing

In order to be able to address any localised environmental sensitivities, unexpected ground conditions or technical issues that are found during detailed intrusive Site investigations and construction, it is proposed that 100m micrositing around the turbine locations and all other infrastructure is allowed. The technical assessments (presented in Chapters 7 to 15) have considered the potential for micrositing.

During construction, the need for any micrositing would be assessed and agreed with the onsite Environmental Clerk of Works (ECoW).

3.9 Conclusion

The EIA process has been an iterative one, so that constraints identified throughout the EIA and design process could be avoided and potential impacts of the proposed development avoided or reduced.

In summary, the application design and layout represent a proposed development which achieves the following:

- maximises the renewable energy potential through the development of a mix of modern, renewable technologies;
- minimises the proximity to and visibility from residential properties as well as the settlements of Keith, Buckie and Fochabers.
- a layout that provides a reasonably balanced group of wind turbines when seen from key receptor locations in the surrounding landscape;

  consideration of the cumulative landscape and visual impacts arising from the proposed development in addition to the existing windfarms, as well as other nearby consented windfarms;
- in a location where there is already a consented wind farm;
- reduces the amount of felling and can be accommodated within the Forest Design Plan for the area;

- utilises existing forestry infrastructure as far as practicable;
- minimises and, where possible, avoids the loss of priority habitats and species, and creates opportunity for habitat enhancement which will be delivered by a Biodiversity Enhancement and Restoration Plan;
- protects watercourses from the potential impacts of constructing the Development;
- incorporates recreational enhancements (intended new circular walk/cycle path (subject to agreement with landowner) and improved signposting);
- avoids development on deep (over 0.5 m) peat where possible; and
- can be engineered and constructed safely.

The final layout of the proposed development is described in detail in **Chapter 2: Proposed Development Description** and shown on **Figure 2.1**. The potential effects of the resulting layout are addressed throughout Chapters 6 to 15 of the EIA Report.