# Chapter 2 Site Selection and Design

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# 2 Site Selection and Design

## 2.1 Executive Summary

2.1.1 This chapter outlines the process undertaken in selecting the Proposed Development site as a suitable location for a wind energy development, provides a description of the site and surrounding area, and describes the design evolution process undertaken by the Applicant prior to arriving at the final Proposed Development design.

## 2.2 Introduction

2.2.1 The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (the 'EIA Regulations') require the consideration of alternatives and an indication of the reasons for selecting the site, except were limited by constraints of commercial confidentiality. Paragraph 5(2)(d) of the EIA Regulations requires that an EIA Report includes *"a description of the reasonable alternatives studied by the developer, which are relevant to the development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment"*.

2.2.2 Part 2 of Schedule 4 of the EIA Regulations similarly notes the following requirement: *"A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects"*.

2.2.3 This chapter provides information on how the Proposed Development site was identified by the Applicant as a suitable location for a wind energy development, as well as the design iteration process undertaken to arrive at the final development layout and design.

2.2.4 The iterative design process provides an opportunity to consider a range of environmental impacts and integrate technical and environmental considerations into the iterative design of the Proposed Development, allowing potential environmental effects to be considered, avoided and minimised. Environmental impacts are therefore considered within the Proposed Development design layout from the earliest stage.

2.2.5 The final design of the Proposed Development represented in this EIA Report was arrived at following iterative consideration of many alternative design configurations, including positioning of turbines, turbine scale, layout and design of tracks and ancillary infrastructure. This chapter describes the design iteration process from which the Proposed Development design was selected.

2.2.6 The final design for the Proposed Development is described in **Chapter 3: Project Description** and is shown on **Figure 1.3**.

## 2.3 Site Location, Site Selection and Consideration of Alternatives

### Site Location

2.3.1 The Proposed Development is located approximately 4 km south of Gorebridge and 9.5 km south-east of Penicuik, within the northern edge of the Moorfoot Hills in the Midlothian Council area (refer to Figure 1.1).

2.3.2 Further characteristics of the Proposed Development site are as described in **Chapter 3**.

### Site Selection

2.3.3 The Applicant utilises a sophisticated Geographic Information System (GIS) model for site selection 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.

2.3.4 The Applicant's use of the GIS model enables objective and consistent treatment of the whole country to assist with site selection.

2.3.5 The GIS model is based upon a combination of generalised and graded suitability layers covering environmental, economic, and technical aspects, known as 'key layers'. All key layers are assessed using a 0% – 100% suitability scale, represented by a 0 – 1 score, where 0 represents unsuitable and 1 represents 100% suitability.

2.3.6 The key layers included in the GIS model are as follows:

- wind speed;
- proximity to housing;
- natural and built heritage constraints; and
- slope constraint.

2.3.7 In addition, for each site, a visual sweep of the following 'informative layers' is carried out:

- national and local planning policy / development plans / spatial frameworks (as discussed in Chapter 5: Statutory and Policy Framework);
- Ministry of Defence (MoD) tactical training areas;
- international, national and local designated sites;
- electromagnetic links and utilities;
- proximity to other wind farm sites (pre-planning, consented and operational); and
- other information gleaned from maps or knowledge of the area such as masts, undesignated parks, tourist attractions, etc.).

2.3.8 These informative layers are included in the GIS model for information, but not scored and combined into the results.

2.3.9 The Applicant undertook an analysis of its GIS model for the Proposed Development site, which scored medium to excellent preferability on all inputs. The combination of the scored layers resulted in an overall good score for the site.

## Consideration of Alternatives

2.3.10 Paragraph 5(2)(d) of the EIA Regulations requires that the EIA Report includes a description of reasonable alternatives studied by the developer, which are relevant to the development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment.

2.3.11 As noted in Planning Advice Note (PAN) 1/2013, *"Whilst the Directive and the Regulations do not expressly require the applicant to study alternatives, those alternatives which are in any case considered as part of the project planning and design process must be assessed, and an outline of the main alternatives studied by the applicant included in the EIA Report. The EIA Report must also give an indication of the main*

*reasons for the choice made, taking into account the environmental effects".*

2.3.12 The Applicant has considered a number of alternative turbine layouts for the Proposed Development, as outlined in Section 2.5 below. The finalised layout is the 27th iteration of the Proposed Development since it was acquired by the Applicant as a development opportunity.

2.3.13 The main alternatives including design, turbine specification, location, size and scale have been considered for the Proposed Development. The following section explores these options and explains how the final design of the Proposed Development has evolved.

2.3.14 As for other sites entirely, the Applicant uses a range of criteria to select sites for the development of renewable energy projects. As part of the growth plans for the development of renewable energy projects, the Applicant is continually assessing potential onshore wind farm sites. This involves a desk-based assessment utilising secondary data and GIS to identify constraints at a particular site. Sites that are not deemed suitable at one given time (i.e. 'the alternatives') may at a later date be re-assessed in respect of technical and environmental constraints and opportunities, as well as up to date planning policy. Hence, for commercial reasons and in accordance with PAN 1/2013, it is not possible to disclose the names or positions of the alternative sites.

## 2.4 Key Issues and Constraints

2.4.1 Once the site was identified, 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;
- recreational and tourist routes;

- proximity of residential properties;
- aviation and defence constraints; and
- presence of utilities.

2.4.2 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 5 to 14**).

2.4.3 The identification of key issues and constraints during the iterative process has allowed for issues to be addressed and the careful placement of infrastructure for the Proposed Development within the site. This allowed the Applicant and EIA team to facilitate effective mitigation, with potentially significant impacts avoided or minimised as far as reasonably practicable through the design process.

2.4.4 **Table 2.1** sets out the potential constraints that were analysed during the evolving design process, summarises mitigation measures that have been 'designed-in' and notes where there are potential issues remaining for each technical topic.

## Table 2.1 – 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:<br>• potential impacts on landscape character as a result of the scale of the turbines in the landscape;<br>• potential impacts on the designated landscapes, namely the Gladhouse Reservoir and Moorfoots Scarp Special Landscape Area (SLA);<br>• potential impacts on visual amenity, particularly residential visual amenity, including from properties within the immediate vicinity of the site and from wider communities and settlements;<br>• potential impacts on the night time environment arising from the lighting of wind turbines; and<br>• potential for cumulative effects to be caused by the Proposed Development in conjunction with other wind farm sites. | The final layout of the Proposed Development has adopted the following design measures in order to accommodate key landscape and visual sensitivities:<br>• establishment of a preferred developable area within the site to minimise the spread of turbines in front of the Moorfoot escarpment;<br>• wind turbine maximum tip heights have been set at 180 m in order to minimise impacts on designated landscapes;<br>• reduction in the number of turbines associated with the Proposed Development (19 down to 18);<br>• increase of the buffer zone of a property to the east and subsequent movement of affected turbines to reduce potential for residential visual amenity impacts; and<br>• agreement with the Civil Aviation Authority (CAA) on a reduced lighting scheme.<br><br>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 and cumulative environment. | The landscape and visual impacts of the Proposed Development are addressed further in **Chapter 6: Landscape and Visual Impact Assessment.**<br><br>Further details on the reduced aviation lighting scheme can be found in **Chapter 14: Aviation, Radar and Other Assessments.** |
| Archaeology and Cultural Heritage | The following key archaeological and cultural heritage sensitivities were identified in the vicinity of the site:<br>• potential effects on the settings of designated heritage assets in the wider landscape, namely Jeffries Corse Cairn (SM3527) and Dundreich Cairn (SM27777);<br>• cumulative effects on the settings of designated heritage assets in the wider landscape; and<br>• potential effects on known non-designated assets within the site boundary, notably SLR35 (sheepfold) and SLR42 (enclosure). | The final layout of the Proposed Development has adopted the following design measures:<br>• careful design and positioning of the proposed infrastructure away from all known heritage features to avoid direct impacts on known heritage assets;<br>• in respect to SLR35, SLR42 and other unknown assets appropriate mitigation will be undertaken during construction, including the fencing off of SLR35 and a targeted watching brief on SLR42; and<br>• careful design and positioning of turbines, including the reduction of final turbine number in sensitivity of wider heritage landscape. | The archaeological and cultural heritage impacts of the Proposed Development are addressed further in **Chapter 7: Archaeology and Cultural Heritage**.<br><br>A Written Scheme of Investigation (WSI) will be documented and agreed with the East Lothian Archaeology Officer (on behalf of Midlothian Council) prior to commencement of site works, which will be monitored by an Archaeological Clerk of Works (ACoW). |
| *Ecology* | The following key ecological sensitivities were identified in the vicinity of the site:<br>• potential effects on sensitive habitats through habitat loss, fragmentation and degradation, including peat forming habitats;<br>• potential effects on protected species e.g. mammals, bats, etc.;<br>• cumulative effects as arising from the addition of the Proposed Development in combination with other relevant projects; and<br>• potential effects on statutory sites within 5 km 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:<br>• avoidance of areas of deeper peat (>1 m), blanket bog and wet/dry modified bog, and potential high Groundwater Dependent Terrestrial Ecosystems (GWDTEs) for the location of turbines and other infrastructure as far as practically possible - this has reduced habitat loss of more sensitive, higher quality habitats;<br>• avoidance of watercourses – these have been buffered by 50 m where possible, apart from locations where access tracks unavoidably need to cross watercourses to minimise effects on associated habitats and species;<br>• where possible a minimum 30 m buffer for any infrastructure or construction activity (100 m for pile driving and blasting works) around the entrance to any badger sett; and<br>• establishing a 50 m buffer from turbine blade tips to edge habitats, across the site to safeguard bats.<br><br>Mitigation during construction will be followed through the appointment of an Ecological Clerk of Works (ECoW) who will monitor the implementation of the Construction Environmental Management Plan (CEMP) (**Technical Appendix 3.1**). | The ecological effects of the Proposed Development are addressed further in **Chapter 8: Ecology**. An outline Biodiversity Enhancement and Management Plan is presented in **Technical Appendix 8.6.** |

| Issue | Environmental Constraint / Potential Effect | Mitigation by Design | Issues Remaining |
|---|---|---|---|
| Ornithology | The following key ornithological sensitivities were identified in the vicinity of the site:<br>• short-term reduction in breeding or wintering bird populations due to construction disturbance (affecting breeding or foraging behaviour and potentially resulting in a reduction in productivity or survival);<br>• long-term reduction in breeding or wintering bird populations due to the loss/fragmentation of habitat critical for nesting or foraging;<br>• long-term reduction in breeding or wintering bird populations due to collision mortality;<br>• cumulative effects with other projects or activities that are constructed during the same period, and/or with projects or activities which pose either a potential collision risk or loss of habitat by displacement; and<br>• potential effects on the eight statutory sites within 20 km of the Proposed Development designated for their ornithological interests | The Proposed Development has been designed in sensitivity to ornithological habitats, including Gladhouse Reservoir SPA, Ramsar site and SSSI, and Moorfoot Hills SSSI and would not result in any adverse effect on their qualifying interests.<br><br>No significant ornithological effects are expected as a result of the Proposed Development. Nonetheless, best practice measures would be followed throughout the Proposed Development's lifetime to ensure compliance with nature conservation legislation and with biodiversity objectives of National Planning Framework 4 (NPF4).<br><br>As above, mitigation during construction will be followed through the appointment of an ECoW who will monitor the implementation of the CEMP. The ECoW will also monitor the implementation of the Breeding Bird Protection Plan (**Technical Appendix 9.6**) and Biodiversity Enhancement and Management Plan (**Technical Appendix 8.6**), which will ensure that the Proposed Development delivers a net gain to the local bird populations. | The effects on ornithology are addressed further in **Chapter 9: Ornithology**. An outline Biodiversity Enhancement and Management Plan is presented in **Technical Appendix 8.6** and a Breeding Bird Protection Plan is presented in **Technical Appendix 9.6.**<br><br>A Shadow Habitats Regulation Assessment has been prepared in support of the application and is presented in **Technical Appendix 9.7.** |
| Peat and Soils | The following key peat and soil sensitivities were identified in the vicinity of the site:<br>• potential effects of excavated peaty soils;<br>• potential effects of sliding of peatlands; and<br>• potential effects on peatland habitats through habitat loss, fragmentation and degradation. | Most of the site is located outwith areas designated as priority peatland. Where peat is present, the Proposed Development has been designed to avoid such areas, reducing the habitat loss of more sensitive higher quality habitats such as blanket bog wherever possible.<br><br>The Proposed Development has been designed to avoid any areas of ground which may be subject to peat slide risk. The ground condition factors that were considered in the design of the Proposed Development were:<br>• identification of areas of peat to minimise incursion, protect from physical damage, minimise excavation and transportation of peat, reduce potential for peat instability and minimise potential soil carbon loss;<br>• identification of slope angles greater than 4˚- to minimise soil loss and potential instability; and<br>• 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. | The potential for impacts on peat and soils is addressed further in **Chapter 10: Geology, Hydrology and Hydrogeology** and accompanying **Technical Appendices 10.2 Peat Management Plan** and **10.1 Peat Landslide Hazard Risk Assessment.** |
| Hydrology | The following key hydrological sensitivities were identified in the vicinity of the site:<br>• potential effects on designated sites due to potential changes in surface and/or groundwater quality and quantity;<br>• potential effects on the catchments due to changes in surface and/or groundwater quality and quantity;<br>• potential localised increase in flood risk due to watercourse crossings;<br>• potential effects on GWDTEs through changes to site hydrogeology;<br>• potential effects on Public or Private Water Supply (PWS) abstractions due to potential changes in surface and/or groundwater quality and quantity; and | The Proposed Development has been designed to reduce the potential for hydrological impacts by avoiding sensitive ecological hydrological interest features including:<br>• all on-site watercourses have been buffered by 50 m where possible, apart from locations where access tracks unavoidably need to cross watercourses;<br>• avoidance of private water supply catchments where possible – site-specific field investigations have been undertaken that involved visiting local properties, enquiring about their water use and source, and mapping water abstraction locations to inform design;<br>• avoidance of high dependency GWDTEs - areas with potential to be GWDTEs were examined. Areas of high potential for GWDTEs have been avoided by site infrastructure across the site as far as practically possible; and<br>• minimising the number of watercourse crossings through the layout design process, with the locations of watercourse crossings selected to avoid damage. | The potential for hydrology and hydrogeology effects resulting from the Proposed Development are addressed in **Chapter 10**.<br><br>An outline Pollution Prevention Plan is included in the outline Construction Environment Management Plan (**Technical Appendix 3.1**) |

| Issue | Environmental Constraint / Potential Effect | Mitigation by Design | Issues Remaining |
|---|---|---|---|
| | • potential effects on Gladhouse Reservoir Drinking Water Protected Area (DWPA). | The Proposed Development incorporates good practice drainage design during construction and operation adopting a sustainable drainage system (SuDS) 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:<br>• potential for peat slide risk;<br>• potential for deep cut / fill slopes around infrastructure; and<br>• 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 impacts by avoiding:<br>• areas of the site where the topography is greater than 12% slope gradient for wind turbine and adjacent crane hardstand positioning;<br>• positioning the crane hardstand downslope of the proposed wind turbine location where other site constraints allow it; and<br>• 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. | 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 | Potential impacts of the Proposed Development relating to traffic and transport are most likely to occur during the construction period and are likely to include:<br>• An increase in traffic flows in the surrounding area; and<br>• A direct effect on local road users and local residents. | The Proposed Development has been designed to reduce the potential for transport impacts, including the creation of a new junction off the B7007.<br><br>The construction traffic would result in a temporary increase in traffic flows on the road network surrounding the Proposed Development. A series of mitigation measures and management plans have been proposed to help mitigate and offset the impacts of both the construction and operational phase traffic flows, including increased signage, adoption of a voluntary speed limit and an agreement of normal site working hours.<br><br>Site entrance roads will be well maintained and monitored during the operational life of the Proposed Development. Regular maintenance will be undertaken to keep the site access track drainage systems fully operation and to ensure there are no run-off issues onto the public road network. | The traffic and transport effects of the Proposed Development are addressed further in **Chapter 11: Traffic** and Transport and **Technical Appendix 11.1: Transport Assessment.**<br><br>It is proposed that a Construction Traffic Management Plan (CTMP) and Traffic Management Plan are prepared post consent in consultation with Midlothian Council to further mitigate any effects caused by the Proposed Development. |
| Noise | Potential effects at nearby noise sensitive receptors due to operational and construction noise with potential for cumulative impact. | The Proposed Development has been designed to reduce the potential for operational noise effects by locating wind turbines at least 1.2 km from residential properties or 1 km from financially involved properties.<br><br>Mitigation during construction will be followed through the adherence to a Noise Management Plan. Normal working hours for the construction of the Proposed Development will be 07:00 – 19:00 Monday to Friday and 07:00 – 13:00 on Saturdays in order to limit potential noise impacts. | The noise effects of the Proposed Development are addressed further in **Chapter 12: Acoustic Assessment**.<br><br>An outline Noise Management plan including best practice means and specific mitigation actions to be adopted during construction is included in the outline Construction Environment Management Plan (**Technical Appendix 3.1**). |
| Aviation | The following key aviation sensitivities were identified for the Proposed Development:<br>• potential for impacts on aviation operations at Edinburgh Airport;<br>• potential for impacts on military aviation assets, including Air Defence and Air Traffic Control radars, and obstruction impacts on Low Flying Areas (including LFA 14); and<br>• potential for impacts on the operational functionality of the Eskdalemuir Seismological Recording Station. | No significant aviation impacts are expected from the Proposed Development, including on both civil and military operations.<br><br>The Proposed Development is located on the outer edge of the 50 km consultation range of the Eskdalemuir Seismological Recording Station. The Proposed Development has been designed to locate as many turbines as possible (seven out of eighteen) outwith the Eskdalemuir safeguarding zone as practically feasible. It is expected that this impact can be mitigated once the MOD and Scottish Government has agreed on the updated technical 'noise budget' and allocation policy.<br><br>To ensure aviation safety, a reduced visible aviation lighting scheme has been agreed with the CAA, and a scheme of infrared lighting will be agreed with the MOD. | The aviation effects of the Proposed Development are addressed further in **Chapter 14: Other Assessments**. |

| Issue | Environmental Constraint / Potential Effect | Mitigation by Design | Issues Remaining |
|---|---|---|---|
| Shadow Flicker | Potential effects of shadow flicker on residential receptors. | **Chapter 14** of the EIA Report includes a shadow flicker assessment of the Proposed Development to assess any potential impacts. The assessment indicates that the most affected property could experience approximately 101 hours per year of shadow flicker. This is a financially involved property and represents a 'worst case' scenario as set out in the assessment. Any reports of shadow flicker will be investigated, and mitigation can be implemented at operational phase if required. Mitigation may include shutting down turbines during times when wind and climactic conditions are such that shadow flicker could occur; or planting trees or hedgerows between affected dwellings and the responsible turbines. | The shadow flicker effects resulting from the Proposed Development are addressed further in **Chapter 14**. |
| Utilities | Potential effects on existing utilities within or in the immediate vicinity of the site, including the Penicuik to Boon National Grid gas pipeline, which intersects the site in a westerly to north-easterly direction. | A buffer of 163 m (1.5 * hub height + 5 m) has been applied between the gas main and the nearest turbines. Track crossings over the gas main have been minimised as far as possible.<br><br>An underground cable runs along the B7007 and across the proposed site entrance. This is a Scottish Power Distribution (SPD) cable associated with Carcant Wind Farm. Appropriate mitigation and any necessary consents required for the access works will be agreed with SPD. | Utility crossings have been minimised as far as practically possible. Where utility crossings are required, appropriate utility protection will be designed in consultation with relevant providers. |

## 2.5 Design Process

2.5.1 The principles of the EIA process require that site selection and layout design be iterative and constraint-led, to ensure that potential environmental impacts as a result of the Proposed Development are avoided or minimised, as far as reasonably possible.

2.5.2 This section will review the principles of the layout design and alternatives options for the Proposed Development.

### Design Principles

2.5.3 As part of the iterative approach adopted by the Applicant, a number of design principles have been incorporated into the Proposed Development as standard practice, including the following:

- consideration of the underlying landscape and its scale;
- consideration of operational, consented and proposed wind turbines neighbouring the site;
- consideration of the size and scale of the Proposed Development appropriate to the location and proximity to residential properties;
- sensitive siting of the proposed infrastructure incorporating appropriate buffer distances from environmental and archaeological receptors to avoid or reduce effects;
- maximising the re-use of existing tracks as much as possible to access proposed wind turbine locations;
- optimising the alignment of new access tracks and hardstands taking due consideration to the topography of the site, to minimise cut and fill, minimise the impact on sensitive peatland habitats and reduce landscape and visual effects;
- adoption of floating access tracks to minimise disturbance of peat where appropriate;
- minimising watercourse crossings and encroachment on watercourse buffers;
- consideration to inclusion of borrow pit search areas to minimise the volume of the stone required to be imported to the site;
- using the latest wind turbine technology, consisting of more efficient and larger turbines where these can be reasonably accommodated within the landscape, as supported by the Onshore Wind Policy Statement (OWPS) (Scottish Government 2022); and

- maximising the potential energy yield of the site through the employment of co-located technology in optimal locations (wind and battery storage).

## Design Evolution

2.5.4 The layout of the Proposed Development has been an iterative process which started in September 2022, each time taking into consideration information gathered through site assessments or comments from consultees, as well as the professional judgement of technical experts.

2.5.5 Since the submission of the EIA Scoping Report and the receipt of the EIA Scoping Opinion the Applicant has undertaken design iterations to maximise the capacity of the Proposed Development while minimising the environmental impacts.

### *Turbine Layouts*

2.5.6 The main iterations of the turbine layout have been separated into four key stages and are described below within **Table 2.2** and shown on **Figure 2.1**. These iterations have taken into consideration the on-site environmental and engineering constraints to reduce the impacts on the wider landscape and avoid watercourses and sensitive habitats.

**Table 2.2 Design Iterations**

| Design Iteration | No. Turbines | Date | Description |
|---|---|---|---|
| Scoping Layout | 19 | January 2023 | The Proposed Development presented in the Scoping Report comprised the largest extent of land and greatest number of turbines expected to be submitted for consent. Advice taken in relation to landscape and visual impact identified 180 m tip heights as the most likely acceptable maximum for the site. The location of turbines was determined by initial onsite constraints identified though desk studies and survey work to date.<br><br>The Scoping Layout therefore represented what is likely to provide the most energy output and be the 'worst case' regarding potential adverse environmental effects. |
| Optimised Layout | 19 | March 2023 | Following the completion of further onsite surveys, a turbine required to be moved from an area of |

| Design Iteration | No. Turbines | Date | Description |
|---|---|---|---|
| | | | blanket bog (T7 on the Scoping Layout). The Applicant uses a sophisticated optimisation tool to iteratively reposition turbines across the site as new constraints are identified, with the aim to maximise capture of wind energy and associated generation of electricity.<br><br>The result of the above exercise was the Optimised Layout shown in **Figure 2.1**. |
| Design Chill Layout | 18 | June 2023 | Following feedback through the EIA Scoping process and public exhibitions, Pegasus Group carried out a further landscape and visual analysis. In particular, further considerations of impact on residential receptors resulted in a recommendation to increase the buffer zone to the nearest property to the east. This also helped to give the Proposed Development a more compact appearance in views from the north in front of the Moorfoot escarpment. It was also agreed that a turbine should be removed due to visual impact on the B7007 road (T13 on the Optimised Layout). It could not be relocated without removal of another turbine.<br><br>Following this, the turbine locations were optimised for energy yield and the 18 turbine layout was progressed as the 'design chill'. |
| Design Freeze Layout | 18 | August 2023 | Following the 'design chill', secondary onsite surveys were carried out to fully define site constraints against the proposed turbine and infrastructure layouts. Upon review, minor movements were proposed to three turbines in order to position them further away from watercourses or steeper gradients. Given the minimal changes between "Design Chill" and "Design Freeze" no further changes were proposed for landscape and visual considerations.<br><br>The turbines were renumbered to reflect their reduced number and the application site boundary was refined. This layout is considered 'design freeze' and is the layout assessed in this EIA Report. |

### *Site Access and Site Tracks*

2.5.7 The proposed access to the site has been carefully considered throughout the design process. The Proposed Development is to be accessed from the B7007 via a newly provided access junction, entering the site from the east.

2.5.8 An initial outline design of access tracks was developed prior to 'design chill'. This was based on turbine supplier recommendations for hardstanding size and specification and ensuring suitable track alignment to allow safe access and delivery of components. Proposed new tracks have been designed to take into account existing site topography, ground conditions including peat depth, and to minimise and appropriately locate water crossings. Full details of on site tracks, including the total length of new tracks and details and locations of watercourse crossings can be found in **Chapter 3** and are illustrated on **Figure 10.1.**

### *Borrow Pits*

2.5.9 Borrow pits are required as a source of rock to be used in the construction of the tracks, hardstandings and foundations. During design optimisation, the locations of infrastructure and track design was refined to minimise the volume of earthworks and cut and fill required to construct the Proposed Development. Potential locations for the borrow pits were identified based upon a review of geological mapping and site reconnaissance. The total number and size of borrow pit search areas was selected to meet the estimated volume of rock required to construct the tracks, crane hardstands and foundations.

2.5.10 If the Proposed Development is consented, further intrusive geotechnical investigation would be carried out to identify which of the two borrow pit locations would yield the required quality of rock for each aspect of the infrastructure.

### *Compounds*

2.5.11 The locations of the temporary construction compounds, substation and energy storage facility are shown in **Figure 1.3**. These have been considered through the iterative design process and have been sited to avoid areas of deep peat and watercourses with the aim of limiting the effects on sensitive habitats. Steep areas have been avoided to reduce the requirement for cut and fill. The construction compounds have also been located for practical purposes; to control traffic entering the site, to be

located close to turbines and to facilitate construction of the substation and energy storage facility.

*Micrositing*

2.5.12 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, agreement is sought for a 50 m micrositing allowance around all wind farm infrastructure. The technical assessments (presented in **Chapters 6 to 14**) have considered the potential for micrositing and it is considered that the proposed infrastructure could be microsited without resulting in potential new adverse effects. During construction, the need for any micrositing would be assessed and agreed with the onsite ECoW and ACoW.

## 2.6 Do-Nothing Scenario

2.6.1 The "do nothing" scenario is a hypothetical alternative conventionally considered in EIAs as a basis for comparing a development proposal under consideration with an otherwise undeveloped site, i.e. the baseline conditions of a site.

2.6.2 In the absence of the Proposed Development, it is anticipated that the site would continue to be managed for grazing livestock. This land use would continue on the site whether or not the Proposed Development proceeds. However, the do nothing scenario would mean that the local community would not benefit financially from the proposed windfarm and there would be no contribution to national net-zero targets. For these reasons, the do-nothing scenario is not considered to be the best option for the site.

## 2.7 Summary

2.7.1 The final Proposed Development layout has been informed by a robust design iteration process, taking into account potential environmental, landscape and visual impacts and their effects, physical constraints, safe and efficient operation of the development, and health and safety considerations. The information used to inform the design iteration process included baseline data (desk studies and field surveys), review of preliminary visualisations, ongoing impact assessments and consultation feedback.

2.7.2 The Proposed Development layout is considered to represent the most appropriate design, taking into account acceptable limits for potential environmental impacts and physical constraints, while maximising the renewable energy generating capability of the site.

2.7.3 The EIA Report is based on the final layout selected for the Proposed Development. The final layout comprises 18 turbines up to 180 m in height and associated access tracks, crane hardstandings, substation and energy storage facility, temporary construction compound, and borrow pit search areas. The final layout of the Proposed Development is described in detail in **Chapter 3** and shown on **Figure 1.3**.

## 2.8 References

Scottish Government (2017). The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017. Available at: http://www.legislation.gov.uk/ssi/2017/102/contents/made

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