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1 Introduction

- 1.1.1 This Design and Access Statement has been prepared by RES Limited (RES) (the Applicant) in support of an application for consent to construct and operate a wind farm comprising up to five turbines with a total installed capacity associated infrastructure of between 20 MW and 50 MW at a site located approximately 4.5 km west of the town of Thurso, in the Highlands. The Applicant is applying to the Highland Council.
- 1.1.2 This Design and Access Statement has been prepared in accordance with Regulation 13(1) of the Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013. The Statement should be read in conjunction with the Cairnmore Hill Wind Farm Environmental Impact Assessment Report (EIA Report), which also contains information on the design strategy, predicted landscape and visual effects, access related effects and any figures referred to in this document.

1.2 The Purpose of the Design and Access Statement

1.2.1 The purpose of this Statement is to provide information on the principles and approach that have guided the design process and to demonstrate observance of equal opportunity requirements for access. This Design and Access Statement demonstrates how the site and its surroundings have been fully appraised to ensure that the final design solution is the most suitable for the site. The report describes the starting point for the proposed wind farm design, and subsequent iterations to the layout that were made in response to the environmental and technical issues that were identified during the environmental impact assessment process and in response to the scoping and consultation process. Details are also provided on the access arrangements.

1.1 Development description

- 1.2.2 The Proposed Development is shown on Figure 1 (EIA-Report Volume 3a: Figure 2.1) and comprises:
 - 5 three-bladed horizontal axis wind turbines of up to 138.5 m tip-height;
 - turbine foundations;
 - hardstanding areas at each turbine location for use by cranes erecting and maintaining the turbine;
 - access tracks;



- a wind farm substation compound containing a control and substation buildings with battery energy storage ;
- an on-site electrical and control network of underground (buried) cables;
- a connection from the substation to the local grid network (not part of the wind farm planning application;
- a temporary construction compound;
- a temporary enabling works compound;
- communications mast;
- drainage works including a SuDs system;
- associated ancillary works;
- habitat management; and
- engineering operations.

2 Design and Access

2.1 Site Location

- 2.1.1 The proposed wind farm **site ('**Proposed Development**') covers an area of** approximately 3.58 km² and is located immediately south of the A836 and approximately 4.5 km west of the town of Thurso (Figure 2) (EIA Report Volume 3a: Figure 1.1). The site is gently undulating with the high points located at Hill of Forss. The site can be categorised as open moorland used for the purposes of grazing.
- 2.1.2 The nearest residential properties are located to the south-east of the site, among a cluster of properties around the hamlet known as Janetstown and immediately north of the site running along the A836. Properties located within the site boundary are within the control of the Applicant.
- 2.2 Key Considerations

Planning Policy Context



- 2.2.1 The Scottish Planning Policy (SPP)¹ requires planning authorities to define a spatial framework identifying those areas that are likely to be most appropriate for onshore wind farms. The spatial frameworks must be based on the following criteria:
 - Group 1: Areas where wind farms will not be acceptable:
 - National Parks and National Scenic Areas.
 - Group 2: Areas of significant protection:
 - Recognising the need for significant protection, in these areas wind farms may be appropriate in some circumstances. Further consideration will be required to demonstrate that any significant effects on the qualities of these areas can be substantially overcome by siting, design or other mitigation; and
 - Group 2 areas include World Heritage Sites; Natura 2000 and Ramsar sites; Sites of Special Scientific Interest; National Nature Reserves; Sites identified in the Inventory of Gardens and Designed Landscapes; Sites identified in the Inventory of Historic Battlefields; areas of wild land as shown on the 2014 SNH map of wild land areas; carbon rich soils, deep peat and priority peatland habitat; and an area not exceeding 2 km around cities, towns and villages identified on the local development plan.
 - Group 3: Areas with potential for wind farm development:
 - Beyond groups 1 and 2, wind farms are likely to be acceptable, subject to detailed consideration against identified policy criteria.
- 2.2.2 The site does not lie within any 'Group 1' areas, or within any national and international designations for ecology, ornithology, cultural heritage or wild land (Group 2 areas). All of the wind farm infrastructure is located within Group 3 as presented on Figure 1 (EIA Report Volume 3a: Figure 2.1). The site boundary does extend into a Group 2 area in the southeastern area of the site boundary.

¹ The Scottish Government (2014) Scottish Planning Policy, The Scottish Government, Edinburgh, June 2014 - URL: http://www.gov.scot/Publications/2014/06/5823/6 , accessed 11/03/22



- This Group 2 area relates to separation for community amenity in terms of consideration of visual impact. This is defined as an area not exceeding 2 km around cities, towns and villages identified on the local development plan with an identified settlement envelope and edge. As aforementioned, no infrastructure proposed as part of the development is located within this Group 2 area. However, the Applicant has undertaken a Residential Visual Amenity Assessment to assess impacts on the visual amenity of individual properties within 2 km of the Proposed Developments turbines (EIA Report Volume 4: Technical Appendix 5.2).
- 2.2.3 At a local level, the key policy is provided within the following documents:
 - The statutory development plan for the site comprises the Highland-wide Local Development Plan (the HwLDP) (adopted April 2012)²;
 - Onshore Wind Energy Supplementary Guidance (adopted November 2016)3;
 - The Caithness and Sutherland Local Development Plan (adopted August 2018)⁴; and
 - The Highland Council (August 2016) Onshore Wind Energy Supplementary Guidance Caithness and Sutherland Area Spatial Framework⁵.
- 2.2.4 Whilst there are a number of policies within the LDP relevant to the Proposed Development, it is the section of the Onshore Wind Energy Supplementary Guidance - Caithness and Sutherland area that is of most relevance to the design process. The spatial framework for wind energy development shows that the site is wholly in Group 3 area (areas where wind farms are likely to be acceptable (Figure 3) (EIA Report Volume 3a: Figure 3.1)).

Relevant Guidance

2.2.5 In addition to policy guidance in respect of spatial plans and locating of **development, Scottish Natural Heritage's current guidance on si**ting and

⁵ The Highland Council (August 2016) Onshore Wind Energy Supplementary Guidance - Caithness and Sutherland Area Spatial Framework, available at

² Highland-wide Local Development Plan (2012), URL: accessed 06/09/19

³ Onshore Wind Energy Supplementary Guidance (November 2016), URL:

⁽https://www.highland.gov.uk/downloads/file/18793/onshore_wind_energy_supplementary_guidance_november_2016, accessed 06/09/19

⁴ Caithness and Sutherland Local Development Plan (August 2018), URL:

⁽https://www.highland.gov.uk/downloads/file/19712/casplan_adopted), accessed 06/09/19



designing of wind farms⁶ (hereafter referred to as the Guidance) was referenced consulted, with particular regard to the matters pertaining to:

- the location of the Proposed Development relative to landscape character as discussed in Paragraphs 3.3 to 3.6 of the Guidance and in paragraphs 3.37 to 3.39, and more specifically the experience of coastal landscapes, as described in paragraphs 3.50 to 3.53 in the Guidance;
- the location of the Proposed Development relative to sensitive landscape and visual receptors, as discussed in paragraphs 3.7 to 3.16 of the Guidance;
- the layout of the Proposed Development, including ancillary elements (Ref. Paragraphs 3.22 of the Guidance);
- specific design considerations in respect of landform, landscape scale, landuse (paragraphs 3.34 and 3.35 of the Guidance);
- visual focus and focal points, as discussed in paragraphs 3.40 and 3.41 if the Guidance; and
- approaches to designing in landscapes with multiple wind farms, as discussed in paragraphs 4.1 to 4.12 of the Guidance.

Environmental Considerations

- 2.2.6 In addition to the policy considerations 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 issues:
 - landscape character and visual amenity within a 40 km study area;
 - cultural heritage, including mapping all known assets within the site, and assets of national importance within a 10 km study area to assess the potential for visibility and setting effects;
 - sensitive fauna, with the mapping of the presence of European protected species;
 - sensitive habitats, particularly peat forming habitats (supported by peat probing surveys) and habitats dependent on groundwater;
 - ornithology, including surveys for bird flight activity and breeding bird activity on the site;
 - cumulative operational noise levels and exposure at nearby properties; and
 - hydrology and hydrogeology, including identifying all sensitive surface water features.

⁶ Scottish Natural Heritage (2017) Siting and Designing Wind Farms in the Landscape - Guidance (Version 3a) (available at 11/Siting%20and%20designing%20windfarms%20in%20the%20landscape%20-



Technical Considerations

2.2.7 The optimal layout of a wind farm is influenced by a range of technical criteria. These technical criteria will vary depending on the type and size of turbine. Generally, turbines are arranged at a set distance apart to minimise the effect of wake turbulence, this being a larger distance downwind of the prevailing wind direction than across it. This set distance varies from site to site and between turbine models (on the manufacturer's recommendation). These spacing criteria, in conjunction with the specific environmental considerations, determined the number of turbines that could be located within this site.

2.3 Design Evolution and Alternative Layouts

- 2.3.1 There have been five principal iterations, which have been developed at different stages in the project design process shown in Figure 4 (EIA Report Volume 3a: Figure 3.2):
 - Option A: Hill of Forss Layout;
 - Option B: Scoping Layout;
 - Option C: Design Freeze Layout;
 - Option D: Design Freeze Layout (Amendment);
 - Option E: 2021 Design Chill Layout; and
 - Option F: 2022 Design Freeze Layout.

Option A: Hill of Forss Layout (July 2013)

- 2.3.2 The Hill of Forss Layout resulted in 5 turbines at a maximum tip height of 110 m. An initial baseline landscape and visual appraisal and analysis in respect of design priorities provided a number of locational and design priorities, including:
 - Preferential location of the proposed Development outwith areas classified as Group 1 or Group 2 on landscape and visual grounds in the 2016 spatial framework for onshore wind energy.
 - Location of the proposed development outwith areas subject to landscape designations or classifications, and which is set back from settlements and principal concentrations of receptors.
 - Positioning of the proposed development in a landscape that is relatively settled and subject to existing wind farm developments and other large-scale structures, as opposed to one that has a higher degree of naturalness and consequently a higher sensitivity.
 - Selection of a location within a landscape of sufficient scale and simplicity to provide for the accommodation of the turbines.



- Location of the proposed development away from distinctive landscape features, the scale and form of which could be compromised.
- Positioning of turbines inland, away from key views of key landmark features and views including the distinctive cliffs and bays of the northern coastline of Caithness, and the land mass of Orkney.
- Positioning of the proposed development to ensure sufficient separation from other nearby wind farm sites to ensure that the proposed development is seen as distinct and separate.
- Preferential use of existing tracks on site to minimise effects associated with this aspect of the proposed development.
- Minimisation of the amount of site infrastructure and ancillary elements, and their careful positioning and design, to ensure that such elements are screened from the majority of external receptor locations.
- Careful siting and design of ancillary elements such as the proposed substation and control room along with potential associated energy storage facility to minimise visibility from external receptor locations, especially the A836 corridor.
- Creation of a simple, balanced, coherent array that minimises 'stacking' of turbines in views from key neighbouring receptor locations.
- The site is located within a low priority zone for military low flying exercises.

Option B: Scoping Layout (July 2016)

- 2.3.3 The Scoping Layout resulted in a major design iteration to both the proposed turbine layout and maximum tip height (EIA Report Volume 3a: Figure 3.2). These changes were introduced in order as a result of an enlargement of the proposed developable area of the site. The layout increased from 5 turbines to 10 turbines and the tip height increased from 110 m to 125 m.
- 2.3.4 The key landscape and visual priorities in developing this option were as follows:
 - Setting of turbines back from the most visibly prominent slopes of the Hill of Forss, and within the flatter part of the site where turbines would have a more consistent elevation;
 - Increasing the distance between the proposed developments turbines and the A836 corridor; and
 - Maintenance of a maximum distance from individual dwellings and Janetstown properties to avoid overbearing or overwhelming visual effects.

Option C: Design Freeze Layout (March 2019)



- 2.3.5 Reductions in turbine numbers to 8 machines, with corresponding reductions in necessary infrastructure.
- 2.3.6 Due to change in the market conditions for onshore wind farms, a larger turbine typology was proposed with the tip height increasing from 125 m to 138.5 m. This change resulted in the need to submit another Proposal of Application Notice and further consultation on the proposed design was held in April 2019.
- 2.3.7 The reduced number of turbines provided benefits in respect of reduce infrastructure requirements, development footprint and a narrowing of the horizontal extent of the proposed development, with consequent benefits in respect of the visual amenity of the A836 and Janetstown properties.
- 2.3.8 The changes to the layout resulted in reduced operational noise levels at properties to the southwest of the proposed development. These properties lie between the proposed development and the existing Baillie wind farm such that reductions in operational noise levels from the proposed development lead to reductions in the cumulative operational noise levels at these locations. The changes to the layout also reduce the change in cumulative noise exposure due to the introduction of the proposed development by limiting the range of wind directions from which all properties that are downwind of turbines belong to the proposed development.
- 2.3.9 With further site investigatory data available by March 2019, the Principal Designer identified an opportunity to utilise and win stone within the site and thereby reducing the need for delivery of construction material to be used in establishment of the proposed development. As the borrow pits were in the south of the site, the most realistic method of construction was to propose to build an enabling compound and build from the south of the site towards T5 and complete the access tracks to the site opening where proposed AlLs were to exit the road network and onto site.

Option D: Design Freeze Layout (Amendment) (October 2019)

- 2.3.10 From the period of the consultation held in April 2019 and October 2019 there was a requirement to make an amendment to the red line boundary which resulted in an overall reduction in the overall area of the proposed development. The layout remains at 8 turbines with a tip height of 138.5 m.
- 2.3.11 The amendment to the red line boundary also led to the removal of a borrow pit and secondary access to the south.
- 2.3.12 The hardstanding at T6 was relocated to avoid direct impacts on watercourse directly east of this turbine.



- 2.3.13 This layout incorporates bat disturbance buffers from the buildings located at 'Hopefield' and 'Blackheath'. These buildings were identified as having bat roost potential, the layout maintains a minimum 200 m, plus candidate turbine rotor radius, buffer from the buildings, in line with relevant guidance.
- 2.3.14 In response to consultation feedback, public access and heritage enhancement measures have been incorporated including the installation of noticeboards/information boards and signage, restoration of existing historic sheepfold, use of dry-stone walling and seating, and car parking close to site entrance⁷.

Option E: 2021 Design Chill Layout

- 2.3.15 Reductions in turbine numbers to 5 machines, with corresponding reductions in necessary infrastructure. This -re-design has led to a design that incorporates all the turbines on a single row whilst the tip height of the turbines remains at 138.5 m.
- 2.3.16 The reduced number of turbines provided benefits in respect of lesser infrastructure requirements, development footprint, increasing the offset from all residential properties, increase the offset from the Broch at Thing's VA and Scrabster Mains.
- 2.3.17 The substation and control buildings have been relocated from the Hill of Forss plateau to further south west down the Hill of Forss plateau, which will reduce the visual impact of these structures.
- 2.3.18 The changes to the layout resulted in reduced operational noise levels at properties to the southwest of the proposed development. These properties lie between the proposed development and the existing Baillie wind farm such that reductions in operational noise levels from the proposed development lead to reductions in the cumulative operational noise levels at these locations. The changes to the layout also reduce the change in cumulative noise exposure due to the introduction of the proposed development by limiting the range of wind directions from which all properties that are downwind of turbines belong to the proposed development.

Option F: 2022 Design Freeze Layout

⁷ It is proposed that these measures are conditioned, and a final design approved by THC following further consultation with the local community and THC.



2.3.19 T3 was moved approximately 60m southeast from its position at Design Chill to help improve the Residential Visual Amenity (RVA) for properties located to the north of the Proposed Development.

2.4 Preferred Option

2.4.1 The preferred option which has been taken forward for assessment in the EIA Report is Option F which is presented in EIA Report Volume 2: Chapter 2: Proposed Development and presented in Figure 1 (EIA Report Volume 3a: Figure 2.1).

2.5 Wind Turbines

- 2.5.1 The most suitable turbine model for a particular location can change with time and therefore a final choice of machine for the Proposed Development has not yet been made. The most suitable machine would be chosen before construction. A candidate turbine has therefore been assumed for the purposes of the EIA-Report (4.3 MW^a nominal capacity and with an overall height to blade tip of up to 138.5 m).
- 2.5.2 Most of the dominant wind turbine manufacturers are now producing turbines that are classed as suitable for the wind regimes typical of Scotland and many are also producing turbines that match the 138.5 m tip height specification that is suggested for the Proposed Development. Exact tower and blade dimensions vary marginally between manufacturers, but suitable turbines are produced by Senvion, Nordex, GE and Vestas amongst others. The colour and finish of the wind turbine, blades, nacelles and towers would be agreed with the Highland Council (THC) in advance of construction though the mechanism of a planning condition.
- 2.5.3 Each turbine would have a transformer and switchgear. For the Proposed Development, it is proposed that the transformer and switchgear would be contained within the nacelle or tower base.

2.6 Infrastructure Design

2.6.1 Site infrastructure would comprise access tracks with passing places, crane hardstandings at turbines, turning spurs, substation and control building with battery energy storage, temporary construction compounds with parking, temporary enabling works compound and a turbine laydown area.

 $^{^{\}rm 8}$ It is expected that should consent be granted that a 4.3 MW candidate turbine could be available resulting in a total indicative capacity of 21.5 MW



2.7 Substation and Control Building with Battery Energy Storage

2.7.1 It was considered that the substation and control building with battery energy storage would be best accommodated within the undulating topography of the main site where they could be substantially shielded from views from individual residential properties and from prominent transport routes.

2.8 Design Solution

- 2.8.1 The Proposed Development would fit within the existing pattern of development for onshore wind farms in the areas and has been designed to optimise a number of factors including technological, engineering and environmental, and subsequently the preferred option is being taken forward shown in Figure 1 (EIA Report Volume 3a: Figure 2.1).
- 2.8.2 The design aim has been to achieve reduced landscape and visual impacts whilst achieving an appropriate landscape fit and avoiding areas constrained by other environmental considerations such as ornithology, ecology, hydrology and archaeology.
- 2.8.3 The final design solution provides the following:
 - a reduction in the number of turbines from 10 to 5;
 - proposed turbine dimensions which are in keeping with current industry standards;
 - siting the Proposed Development out with areas subject to landscape designations or classifications;
 - siting the Proposed Development within an area of search as defined within The Highland Council's Spatial Framework for Onshore Wind Farms (August 2016); and
 - minimisation of track, utilisation of existing access track and layout of infrastructure to reduce impact as far as practicable on the areas of deepest peat and Ground Water Dependent Terrestrial Ecosystem (GWDTE) within the site.

2.9 Public Access

2.9.1 There is a Core Path (The Highland Council Reference: CA13.07) which runs through the site. The path enters the eastern edge of the Proposed

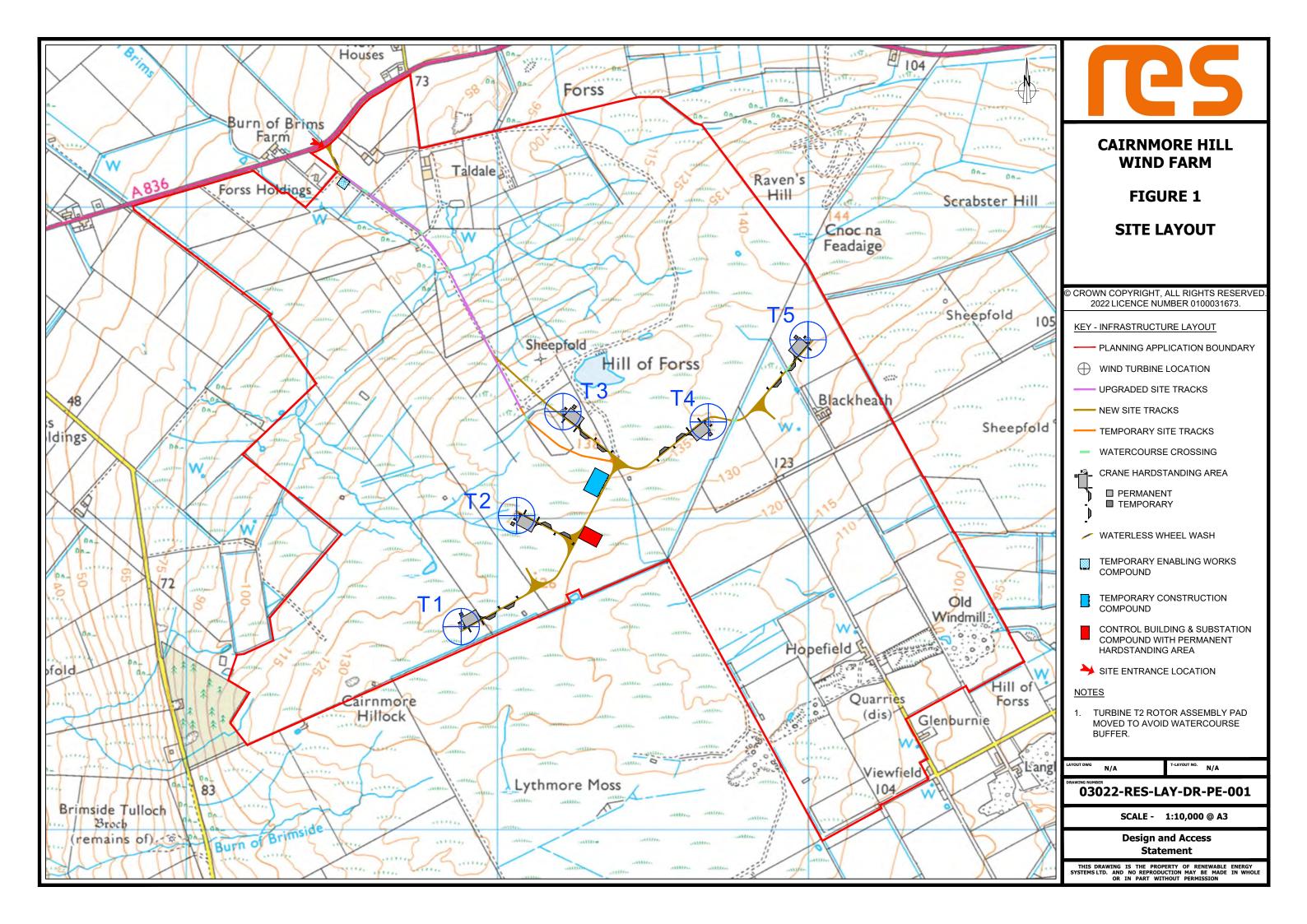


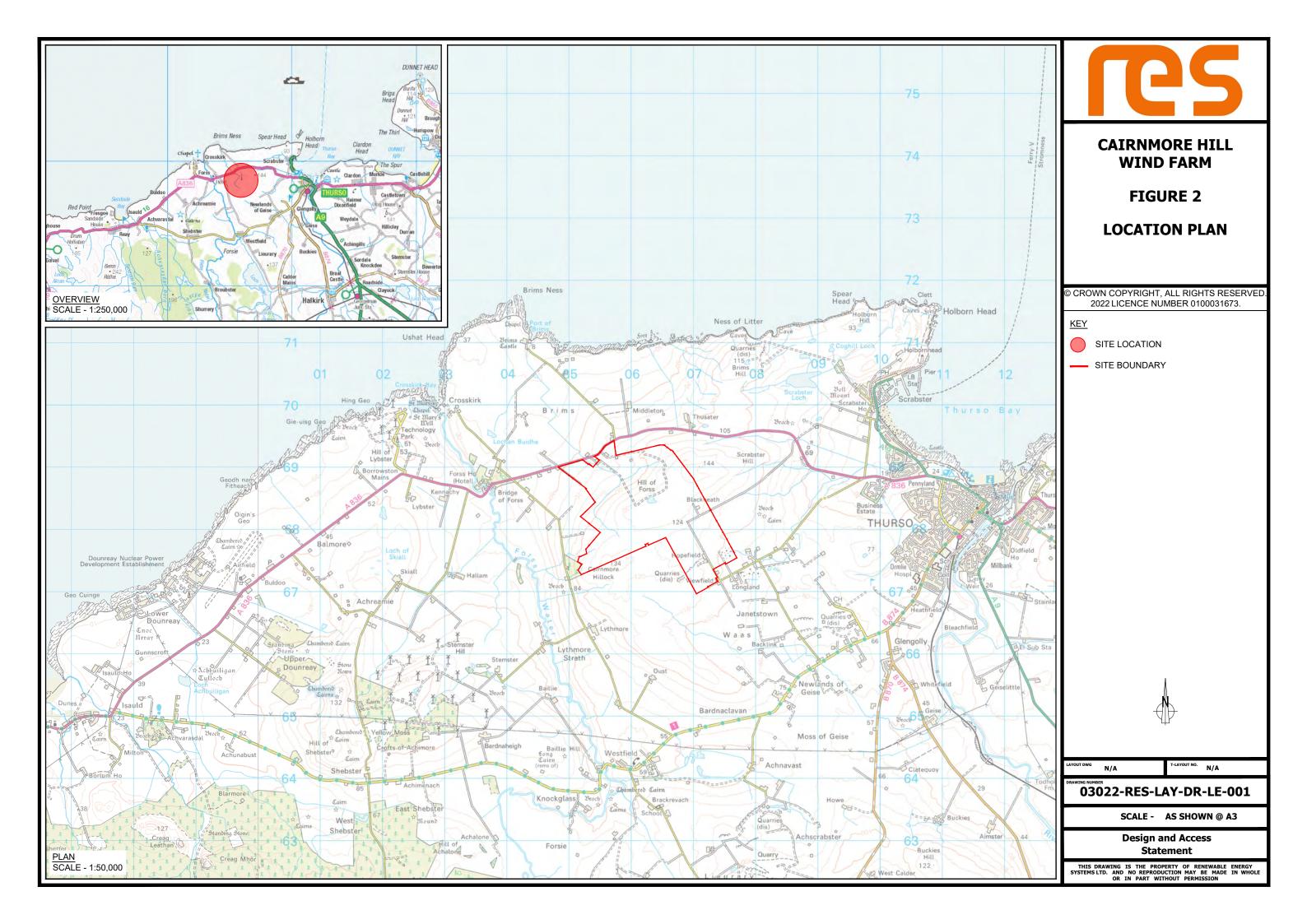
Development's site boundary and finishing at the property known as 'Hopefield' (EIA Report Volume 3a: Figure 5.1.3).

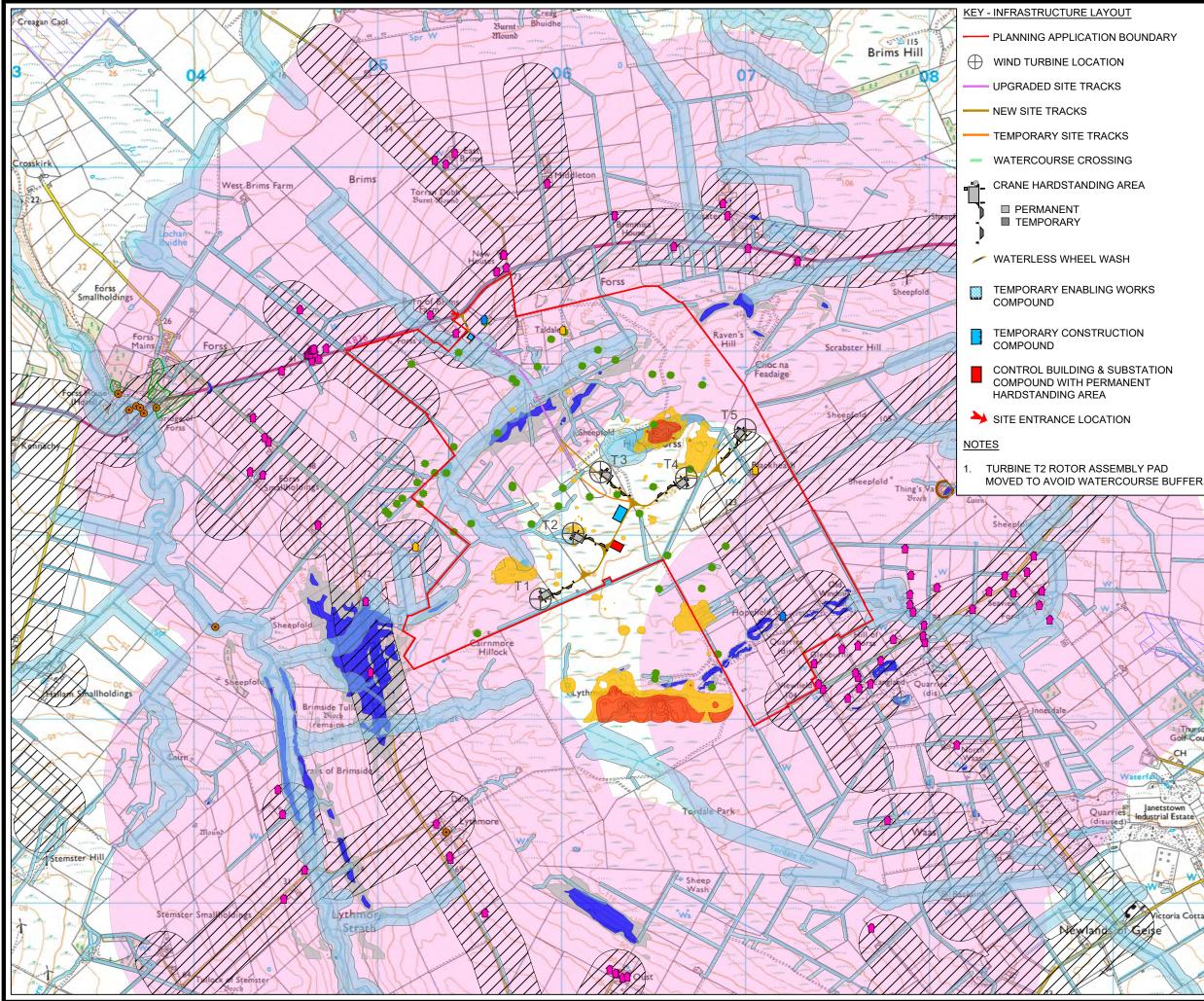
- 2.9.2 There would be no proposed closures or diversions of any of the Public Rights of Way.
- 2.9.3 The Applicant would adhere to the requirements of the Construction (Design and Management) Regulations 2015 to ensure the safety of staff and follow current best practice Health and Safety guidelines. Speed limits would also be put in place to regulate traffic flow on site. As detailed in the Outdoor Access Management Plan (EIA Report Volume 4: Technical Appendix 2.7) public access to the site throughout the construction phase would be managed by the appointed main contractor for health and safety reasons, in line with the requirements of the Construction (Design and Management) (CDM) Regulations, 2015. Appropriate signage will be implemented to communicate safe access to the site during the construction phase.
- 2.9.4 Following the completion of construction, there would be no reason, under normal circumstances, to restrict access to the site for public safety reasons however restrictions may occur during operation where operational maintenance or health and safety restrictions required this. Current access arrangements to the site would therefore not change substantially.

3 Conclusion

3.1.1 This design and access statement has presented the final design of the Proposed Development. It details how the design evolved through a series of iterations to ensure that the aims of the design strategy were achieved, and environmental and technical considerations were fully taken into account.







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