

 **Fred. Olsen Renewables**



Natural Power acting as lead consultants
on behalf of Fred. Olsen Renewables.

Crystal Rig Wind Farm (Phase IV)

Volume 2: Non-Technical Summary

May 2018

1166961 C

Fred. Olsen Renewables Ltd

Document history

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Issue

Issue	Date	Revision Details
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C	31/05/2018	First issue
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1. Introduction

1.1.1. An application for consent to develop Crystal Rig Wind Farm (Phase IV) (the Proposed Development) has been made to Scottish Ministers under Section 36 of the Electricity Act 1989. This Non-Technical Summary (NTS) has been produced in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Amendment Regulations 2017, (hereafter referred to as the EIA Regulations). It accompanies an Environmental Impact Assessment Report (EIAR) which presents the results of the Environmental Impact Assessment (EIA) undertaken to establish the potential effects that the Proposed Development may create. As per Regulation 5(2)(e) of the EIA Regulations, this NTS provides a non-technical summary of the following:

(a) a description of the development comprising information on the site, design, size and other relevant features of the development;

(b) a description of the likely significant effects of the development on the environment;

(c) a description of the features of the development and any measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;

(d) 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;

1.2. Applicant

1.2.1. The Applicant for this project is Crystal Rig IV Limited, a company set up for the project by Fred. Olsen Renewables Ltd. (FORL). FORL has been developing and operating wind farms since the mid 1990's and is fully committed to the Scottish and UK renewable energy generation market, with an operational portfolio generating capacity of 529.7 MW in Scotland across five sites. FORL developed, constructed and currently operates all of the current phases of Crystal Rig Wind Farm.

1.3. Project Development Consultants

1.3.1. The project has been designed and assessed by the Applicant in association with its lead consultants, Natural Power Consultants Limited (Natural Power). Natural Power has been appointed to coordinate and produce the EIAR and associated documentation.

1.3.2. Natural Power has been leading, undertaking and reviewing EIA and producing EIAR (formerly referred to as Environmental Statements) for the renewable energy industry since 1995. Natural Power's lifecycle experience and its 360° technical resources ranging from ecologists, hydrologists, planning consultants, design and geotechnical engineers, project managers, construction managers, technical analysts, asset managers, turbine technicians and others provide wide ranging capability in EIA topics.

1.3.3. Testimony to Natural Power's experience and ongoing commitment to competency and continual improvement, its Planning and Environment department is accredited by the Institute of Environmental Management and Assessment and EIAs prepared by Natural Power display the IEMA quality mark. In addition, Natural Power also operates in formally accredited health and safety (IOSAS 18001), environmental (14001) and quality (9001) management systems.

1.3.4. Other consultants involved in the EIA have provided professional input for Noise, Cultural Heritage, Forestry and photography for the LVIA:

- Hayes McKenzie
- CFA Archaeology Ltd.
- DGA Forestry LLP
- Tom Finnie Photography

1.4. EIAR

1.4.1. The EIAR has been prepared in accordance with the EIA Regulations and is structured as follows:

Table 1.1: EIAR Structure

Volume 1	Section 1: Introductory Chapters	Chapter 1: Introduction
		Chapter 2: Legal and Policy Context
		Chapter 3: Approach to EIA
		Chapter 4: Site Selection and Design Evolution
		Chapter 5: Project Description
	Section 2: Biological Environment	Chapter 6: Ecology Assessment
		Chapter 7: Ornithology Assessment
	Section 3: Physical Environment	Chapter 8: Landscape and Visual Impact Assessment (LVIA)
		Chapter 9: Hydrology, Geology and Hydrogeological Assessment
		Chapter 10: Cultural Heritage Assessment
		Chapter 11: Forestry Assessment
	Section 4: Population and Human Health	Chapter 12: Noise and Vibration
		Chapter 13: Traffic and Transport Assessment
		Chapter 14: Other Considerations Including Aviation, Existing Infrastructure and Shadow Flicker
	Section 5: Summary of Assessment	Chapter 15: Socio Economics
	Section 5: Summary of Assessment	Chapter 16: Synergistic Effects and Summary of Mitigation and Residual Effects
Volume 2	Non-Technical Summary	
Volume 3 (a),(b) & (c)	Figures	
Volume 4	Technical Appendices	

1.4.2. The EIAR is also supplemented by an accompanying Planning, Design and Access Statement and a Pre-Application Consultation (PAC) report.

1.4.3. Hard copies of the full EIAR can be requested from Natural Power, The Green House, Forrest Estate, St John's Town of Dalry, DG7 3XS. Telephone: +44 (0) 1644 430 008.

- EIAR in printed form (Volumes 1-4): £1493
- EIAR in PDF file format on CD or USB stick: £10

2. The Proposed Development

- 2.1.1. The Proposed Development is located in the Lammermuir Hills, immediately to the south of the existing Crystal Rig Wind Farms. All of the proposed wind turbines are situated within the Scottish Borders Council jurisdiction and access to the Proposed Development will make use of the existing access through the north, which is in East Lothian Council's area. The Proposed Development is located on ground that is currently used for rough grazing and in commercial forestry. It is centred on grid co-ordinates: 367100, 667900.
- 2.1.2. The Applicant is seeking consent for a period of 35 years for:
- Eleven wind turbines including foundations;
 - External transformers;
 - Crane pads;
 - Site tracks;
 - Underground electricity cables;
 - Up to six borrow pits;
 - Forestry Felling;
 - Signage;
 - Temporary construction and storage compounds; and
 - Ancillary development.
- 2.1.3. The Proposed Development is illustrated in Diagram 2.1 below and presented in full in Figure 1.2. It comprises of 11 turbines with the following tip heights:
- Four at up to 149.9 m to tip height
 - Three at up to 174.5 m to tip height;
 - Four at up to 200 m to tip height.
- 2.1.4. The Proposed Development will make use of the substation and control building (housing switchgear and metering) that is already being used at the operational Crystal Rig Wind Farms. The Applicant already has an agreement with National Grid for utilising available grid capacity in the local transmission network with connection to the existing 400 kV substation onsite. There will be no need for a new anemometry mast and as far as possible the Proposed Development will utilise existing tracks, building out new tracks from these to minimise environmental impacts. The existing control building at Friardykes has planning permission separate from the Crystal Rig Wind Farms (SBC ref: 08/00330/FUL) and therefore is not time limited.
- 2.1.5. The use of existing infrastructure such as access tracks, anemometry masts, and the metering building / 400 kV Substation for the purpose of the Proposed Development will be extended to coincide with the intended life of the Proposed Development at which point it can be decommissioned and the site restored in accordance with requirements at that time. Likewise, areas of land next to the public road (between the A1 junction at Innerwick and the entrance to Crystal Rig Wind Farms) which are under the Applicant's control may require temporary works to facilitate transport of the Proposed Development's turbines and reinstated thereafter in a similar manner to related works on the other Crystal Rig Wind Farms. Any areas required are included in the application boundary and the details of any works can be agreed with the roads authority and/or planning authority as required pre-construction through similarly worded conditions attached to consents of the now operational Crystal Rig Wind Farms.

Source: Natural Power

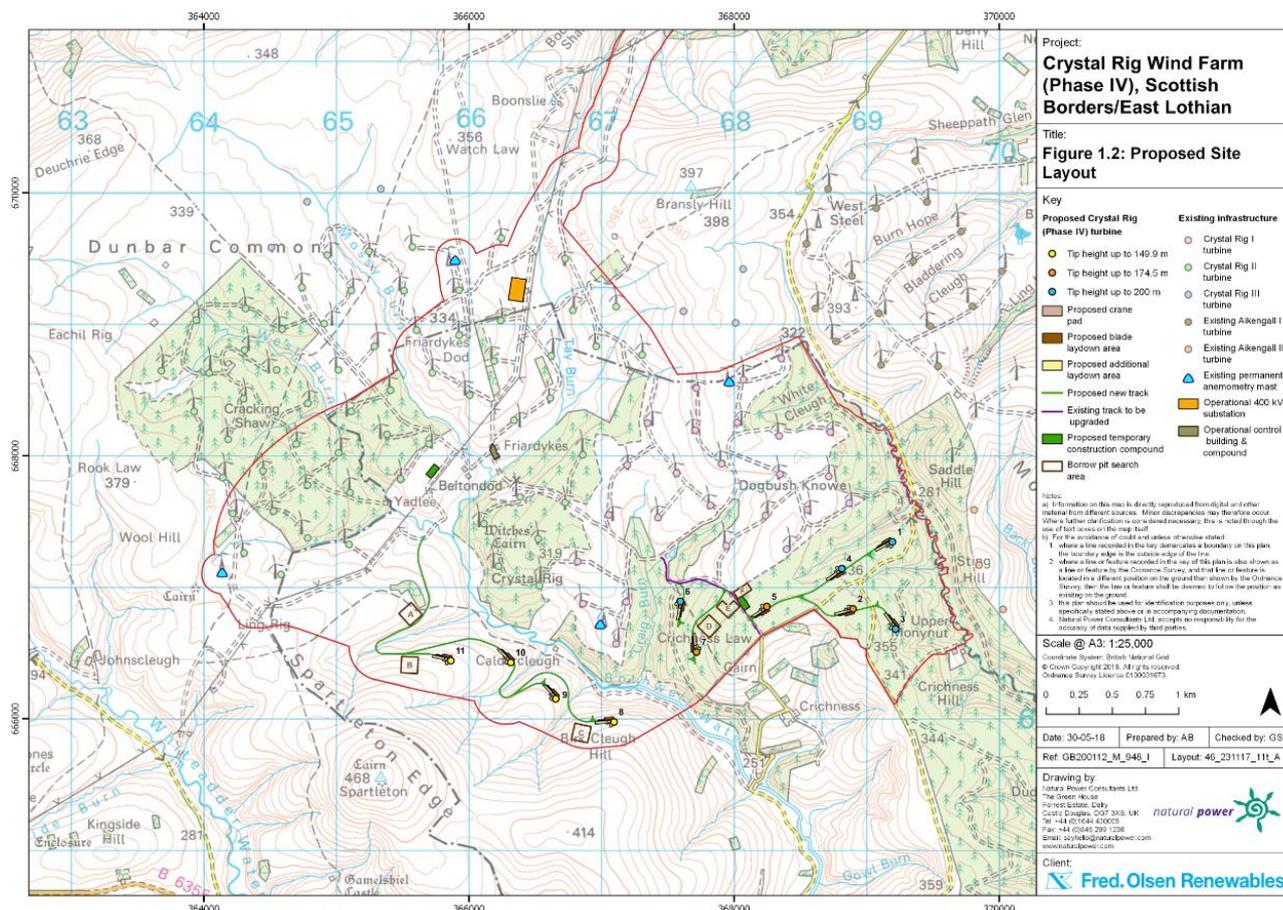


Diagram 2.1: Proposed Site Layout (not to scale)

2.1.6. Details of the proposed wind turbine details including their positions are provided in Table 1.4 below:

Table 2.1: Turbine details and co-ordinates

Turbine ID	Easting	Northing	Approximate Rotor Diameter	Maximum Tip Height
1	369193	667345	130	200
2	368896	666836	130	174.5
3	369216	666683	130	200
4	368812	667141	130	200
5	368246	666853	130	174.5
6	367594	666893	130	200
7	367715	666508	130	174.5
8	367093	665976	114	149.9
9	366654	666152	114	149.9
10	366315	666428	114	149.9
11	365863	666442	114	149.9

Source: Natural Power

2.1.7. The information provided in this section of the NTS satisfies the requirement of Regulation 5(2)(a) of the EIA Regulations. A more detailed description of the Proposed Development is provided in Chapter 5 of the EIAR.

3. Reasonable Alternatives

3.1.1. This section of the NTS presents the reasonable alternatives to the design of the Proposed Development as required by Regulation 5(2)(d) of the EIA Regulations.

3.1.2. As an area already accommodating a successful wind farm, this suggested a viable place to develop further. The selection process investigated different designs and aimed to result in layout that maximises the efficiency of the Proposed Development whilst limiting the potential environmental impacts. The Proposed Development Area has also been assessed by checking it against a number of strategic constraints. Figure 1.1 of the EIAR, illustrates the regional context of the Proposed Development Area, presented below in Diagram 3.1.

3.1.3. Surveys for landscape and visual, ecology, ornithology, hydrology and noise impacts were all undertaken to complement the Applicant's existing knowledge of the site.

Source: Natural Power

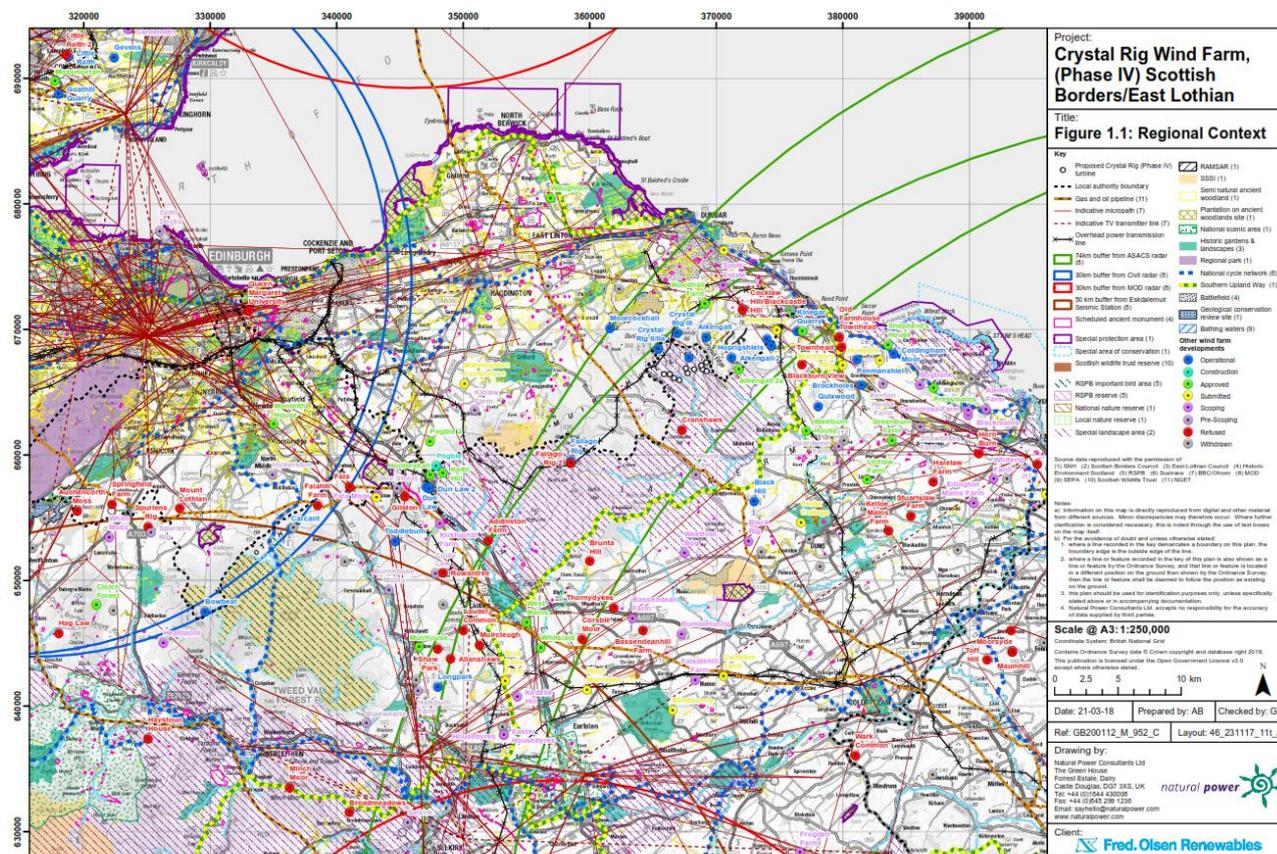


Diagram 3.1: Regional Context (not to scale)

3.2. Planning Policy

3.2.1. Draft supplementary guidance for renewable energy dated 2016 and issued by Scottish Borders Council in 2017 includes a map which reflects Scottish Planning Policy indicating that the Proposed Development is located in an “Area with Potential for Wind Farm Development”.

3.3. Wind Resource

- 3.3.1. Wind speed measurements using anemometer masts have been ongoing at the existing Crystal Rig Wind Farms. With the high wind speeds and productivity of the existing Crystal Rig Wind Farms, the Applicant is confident that the Proposed Development can generate renewable electricity at this site on an economically viable basis.

3.4. Grid Connection

- 3.4.1. A high voltage overhead electricity line passes through the existing Crystal Rig Wind Farms for which a grid connection is in operation at the existing Crystal Rig substation. The Applicant has an agreement with the National Grid for generating more electricity at this connection. Therefore, there is the potential for the Proposed Development to utilise the existing infrastructure at the Crystal Rig Wind Farm, thereby reducing the associated environmental impacts. A grid connection can be a key limiting factor to development and the ability to use existing infrastructure and availability to the Applicant favours additional development at Crystal Rig.

3.5. Design Alternatives

- 3.5.1. The Proposed Development has been in the design process for several years and the layout has changed significantly over this time; see Figure 4.1 of the EIAR, also illustrated in Diagram 3.2. These changes have been influenced by several factors including market mechanisms, landownership, stakeholder feedback, planning policy and potential environmental effects.

Source: Natural Power

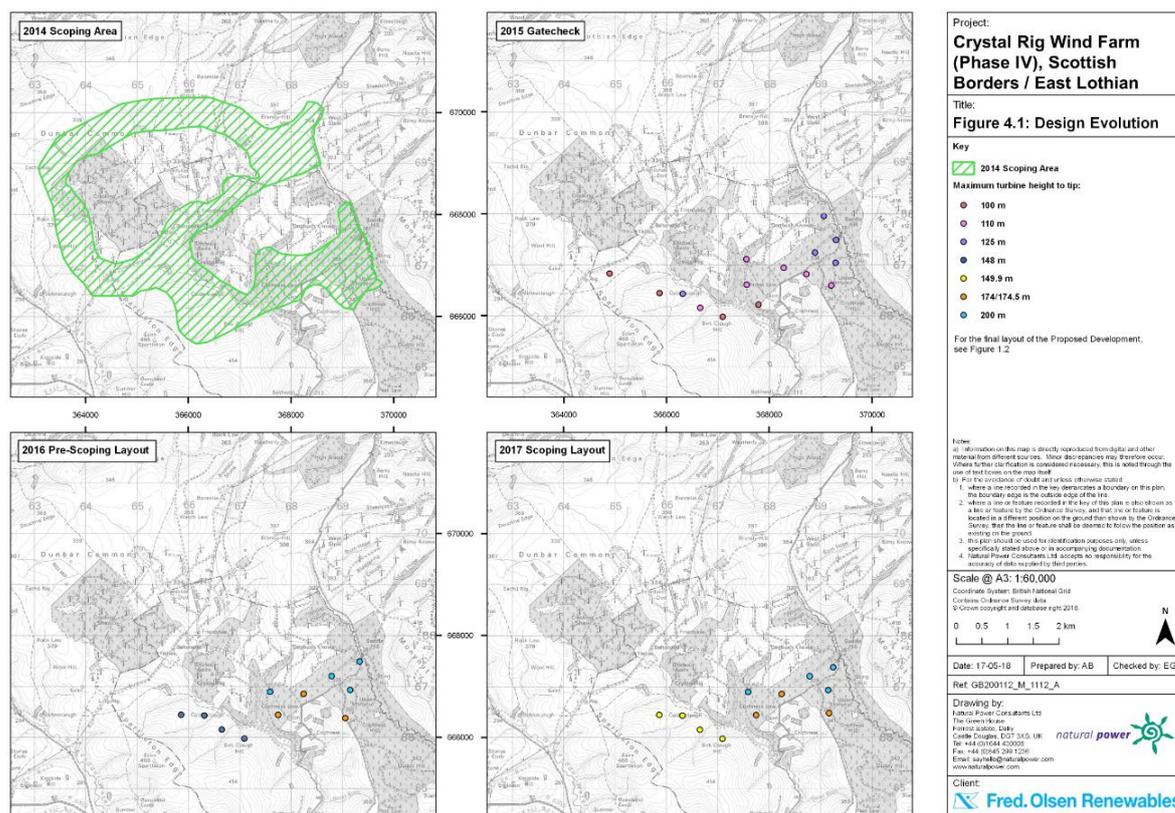


Diagram 3.2: Changes to Site Layout (not to scale)

Scoping (2014)

- 3.5.2. In August 2014 the Applicant presented to consultees, stakeholders and the public a layout of 26 wind turbines at up to 135 m in maximum height to blade tip to help clarify key issues and confirm

methods for survey and assessment. As can be seen from the Scoping Area in Figure 4.1, turbines were proposed to occupy areas to the northern, western and southern extents of the existing Crystal Rig Wind Farms.

Gatecheck (2015)

- 3.5.3. Following on from consultee responses to the Scoping Report and liaison with East Lothian Council (ECL) and Scottish Borders Council (SBC), the project was reduced in size to 15 wind turbines.
- 3.5.4. This Gatecheck layout was considered by the Applicant to address the consultee's advice and fit with planning policies and guidance. However, before the application was ready for submission, there was a significant change in the electricity market with the removal of UK Government financial support for onshore wind. This significantly adversely affected the economic viability of this layout. A new layout design was required to maximise use of the wind on the site if the project was to be progressed.

Pre-Scoping (2016)

- 3.5.5. Under the new electricity market conditions, fresh wind energy assessments were undertaken and financial modelling updated to establish what wind turbine locations and sizes would support a viable wind farm development at the site. As turbine efficiency increases with turbine height, larger more productive turbines that maximise energy yields needed to be considered, resulting in proposed maximum heights of up to 200 m to tip. Because of the site constraints already established through the design process including consideration of potential landscape and visual effects upon the Lammermuir Edge for example, the most appropriate area to accommodate the larger turbines is situated to the southern edge of the existing Crystal Rig Wind Farms, which is different to the Scoping (2014) layout.
- 3.5.6. With the turbines now proposed at heights above 150 m, visible aviation obstruction lighting is a requirement of the Civil Aviation Authority (CAA) which was an additional consideration for the project. This layout, consisting of 11 turbines was developed through 2016 and presented to consultees, including ECU, SBC, SNH, Scottish Environment Protection Agency (SEPA), at a pre-scoping meeting in 2017.

Scoping (2017)

- 3.5.7. There were no serious concerns raised by consultees at the pre-scoping meeting that might have otherwise indicated the Proposed Development could not be supported. Some refinements were made to this layout including relocating a turbine further east from a residential dwelling in to the forested area, which resulted in the eleven turbine layout presented in the Scoping Report 2017. That report replaced the one issued in 2014 and new scoping opinions were received from several consultees. The full Scoping Opinion issued by the ECU is available to view online¹.

Proposed Development

- 3.5.8. Following receipt of the Scoping Opinion, a Design Day was held which incorporated a round table analysis of the site layout with the Applicant and Natural Power's specialists in planning, LVIA, hydrology, construction, ecology and ornithology. In consideration of consultee's scoping opinions a

¹ Available online: <http://www.energyconsents.scot/ApplicationDetails.aspx?T=8> , case reference ECU00000476 (last accessed 13/03/2018)

further refinement was made to the layout in carefully balancing the site constraints with viability of the project.

- 3.5.9. The main changes included moving the eastern most turbines to ensure associated turbine infrastructure including crane pads and laydown areas could be developed outwith 50 m of identified watercourses. These changes resulted in the track layout having to be revised and as a result the Applicant managed to remove the need for a watercourse crossing in this area. Consultees had requested Borrow Pits (BP) to be displayed on the site layout and so following desk top studies, potential BP search areas were also included. The turbines and BP have been located in areas where potential effects upon GWDTE are avoided and/or limited.
- 3.5.10. The minor public road which lies north-south in between Crystal Rig and Aikengall Wind Farms was also considered in the design process. Thought had been given to making use of the public road for the Proposed Development rather than creating new access tracks. However, from both a Health & Safety and asset management perspectives, using the public road was not a practical option.
- 3.5.11. All the turbines have been sited at the southern edge of the existing Crystal Rig Wind Farms with the locations carefully selected to limit visibility of the new turbines from key view points within the wider area. The proposed layout comprises:
- Four turbines at up to 200 m to tip.
 - Three turbines at up to 174.5 m to tip.
 - Four turbines at up to 149.9 m to tip.
- 3.5.12. This layout was taken forward to public consultation where it was presented at a public exhibition. Full details of the public consultation are provided in the PAC Report. The potential effect upon breeding raptors in the area was raised by an attendee, an issue which had also been flagged in his response to the scoping report (2017). Additional ornithology assessments have been undertaken for this and are detailed in chapter 7 of the EIAR. The results indicated that design of the layout did not need to change and chapter 7 includes the proposed mitigation.

3.6. Summary

- 3.6.1. The Proposed Development has been located in a suitable area for wind farm development following a site selection process. The rigorous design evolution has taken place over several years through many changes which have reacted to new developments, policies, market mechanisms and consultee responses. Through balancing the various site constraints with the scale of development required to be economically viable, the Applicant believes that the proposed development provides optimum use of the site with respect to the potential renewable electricity generating capacity balanced against the potential environmental and other effects.
- 3.6.2. This section of the NTS has addressed the requirement of Regulation 5(2)(d) of the EIA Regulations in considering reasonable alternatives.

4. Potential Effects and Mitigation

- 4.1.1. This section of the NTS presents the potential significant effects of the Proposed Development and the measures taken or put forward to reduce the potential significant effects identified (mitigation). In doing so, it addresses Regulation 5(2)(b) and 5(2)(c) of the EIA Regulations.

4.2. Access

- 4.2.1. There is an existing access route available both on public and private roads that has been upgraded for the existing Crystal Rig Wind Farms and is currently used for operational access. The ability to use this existing infrastructure minimises disruption and environmental impact.
- 4.2.2. Access routes to site have been used for previous phases of development at Crystal Rig. Final details will be confirmed following purchase of wind turbines by the Applicant and agreed with the planning authority before construction starts through production of a Traffic Management Plan (TMP) similar to that used for other phases of the Crystal Rig Wind Farm.
- 4.2.3. Other details covered in the TMP would include process for informing the public of the large component deliveries, their escorts and any temporary modifications required on the route. A route survey report and road condition surveys would be undertaken. The assessment of potential effects upon traffic and transport is provided in Chapter 13 of the EIAR. It concludes that without mitigation, potential effects during construction and operation are Negligible/Low – Moderate (**not significant** in EIA terms) and following mitigation measures, the effects are further reduced to no more than Low/Moderate.

4.3. Landscape and Visual Impact

- 4.3.1. Landscape and visual considerations were taken on board at an early stage of the project as these were understood to be key to project progression. Early consultation with Scottish Natural Heritage (SNH), East Lothian Council and Scottish Borders Council ensured that their thoughts on the potential for further development were taken into due consideration. Likewise discussions and experience through the application process of Crystal Rig Wind Farm (Phase III) were also taken into account.
- 4.3.2. Consideration was also given to other wind farm sites in the area and cumulative considerations. Ensuring the Proposed Development reads in harmony with the existing developments in the area (in particular the existing Crystal Rig Wind Farms and Aikengall Wind Farm developments) is fundamental to considering the potential landscape and visual impacts. Further consideration to design from a landscape and visual perspective and the Landscape and Visual Impact Assessment (LVIA) itself is presented in Chapter 8 of this EIAR.
- 4.3.3. Chapter 8 considers the Proposed Development's residual effects from the operational phase following the mitigation measures which have been incorporated during the design of the proposed layout. Snapshots of the visualisations produced to illustrate the Proposed Development are provided below in Diagram 4.1, Diagram 4.2 and Diagram 4.3 below. The full visualisations which should be referred to for assessment purposes are provided in Volumes 3 (b) & 3 (c) of the EIAR.

Table 4.1: Potentially Significant Landscape and Visual Effects

Impact upon:	Potential Significant Effect
Landscape Character	Localised significant effects on 3 of the 14 landscape character types.
Landscape Designations	Lammermuir Hills SLA – landscape resource and 2 special qualities. Lammermuir Hills AGLV – 1 special quality Lammermuir Moorland Draft SLA – 1 special quality Whiteadder Draft SLA – 1 special quality
Selected Viewpoints (VP)	From 20 VP with 5 scenarios assessed for each VP, there has been one potentially significant effect identified across each set of assessments for 12

Impact upon:	Potential Significant Effect
Residential Receptors	VP. These VP are within 12 km of the Proposed Development and the mitigating factors indicate the effects are acceptable.
Sequential Routes	Potentially significant visual effects predicted upon 2 properties which are within 1 km of the Proposed Development (these properties are financially involved with the Proposed Development).
Sequential Routes	Potentially significant effects predicted for the PRoW BB96 at day and night and upon the PRoW BB97 & BB98 at night.

Source: EIAR Chapter 8: LVIA

- 4.3.4. Chapter 8 of the LVIA should be referred to for full detailed assessment of each receptor. It concludes that in general, there are no significant additional cumulative effects identified as a result of the addition of the Proposed Development to a baseline landscape comprising other consented or submitted wind farm developments, which comprise the cumulative landscape and visual impact assessment baselines. The potential significant effects identified in Table 4.1 are restricted to isolated landscape and visual effects upon limited receptors within close proximity of the Proposed Development which are commonly associated with wind farms.
- 4.3.5. The location of the Proposed Development, immediately to the south of the operational Crystal Rig/Aikengall operational turbine cluster provides a strong connection between the Proposed Development and the operational turbines and maintains separation from other operational clusters of development. The Proposed Development therefore complies with Scottish Borders Update of Wind Energy Landscape Capacity and Cumulative Impact Study (2016) which states that *'The Lammermuir Plateau has been subject to extensive windfarm development and much of its underlying capacity is occupied. There is capacity for limited additional development of larger turbines provided this is associated with existing windfarms. Extensions should maintain significant separation between the established wind energy clusters, taking advantage of areas with topographical containment and lower intervisibility to avoid increasing the overall prominence of existing windfarms beyond the LCA.'*
- 4.3.6. Furthermore, the Proposed Development meets the objectives of the guidance as it:
- retains separation and prevents visual coalescence between identified clusters and other Areas of Significant Cumulative Development;
 - is not widely visible from the A1 or East Coast Mainline Railway Corridor as shown in ZTV Figure 8.1;
 - provides a 'rounding off' of the Crystal Rig/Aikengall operational developments without causing overdevelopment of this upland landscape;
 - fits with the current turbine development pattern;
 - minimises visibility to sensitive receptors in surrounding areas; including to the north the more visually prominent areas of the northern escarpment of the Lammermuirs visible from population centres of Edinburgh and the Lothians and to the south from the Southern Upland Way.

Source: EIA Figure 8.17m (i) Viewpoint 13



Diagram 4.1: Baseline Photo (not to scale)

Source: EIA Figure 8.17m (vi) Viewpoint 13



Diagram 4.2: Photomontage with the Proposed Development (not to scale)

Source: EIA Figure 8.17m (vii) Viewpoint 13

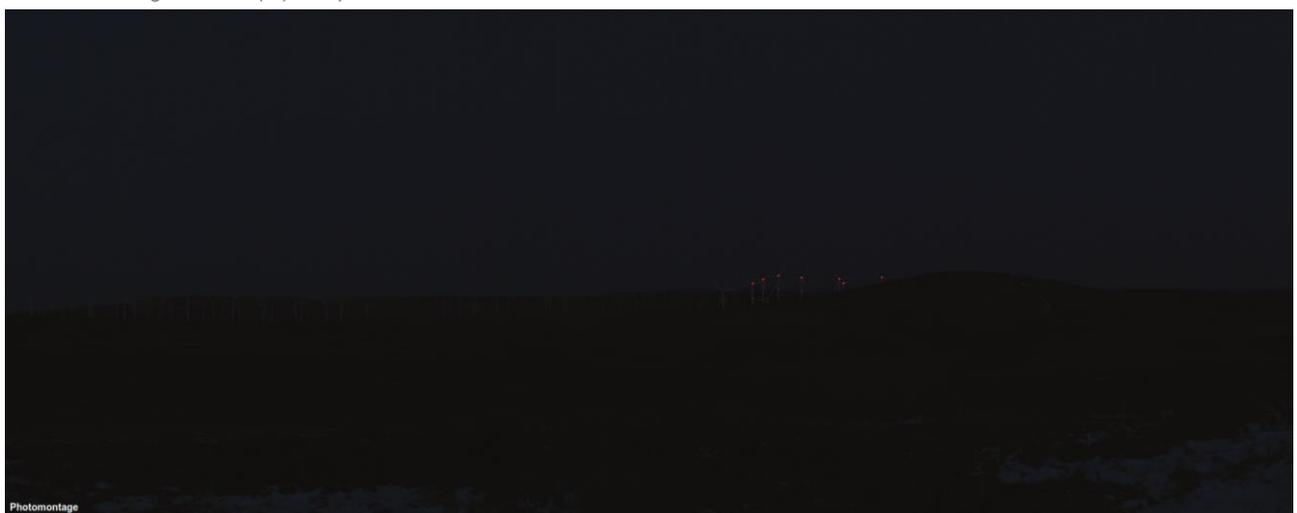


Diagram 4.3: Photomontage with the Proposed Development in low light (not to scale)

4.4. Ecology and Ornithology

- 4.4.1. The Proposed Development is not located within any ecological or ornithological designation. Rammer Cleugh and Woodhall Dean are the nearest Sites of Special Scientific Interest (SSSI). The nearest Special Protection Area (SPA) and RAMSAR site is the Firth of Forth. These areas were marked as constraints and identified as sensitive areas to avoid. Existing ecology and ornithology data (from previous developments) was reviewed and informed the site selection for the Proposed Development. Assessments of the relevant potential effects upon ecology and ornithology are presented in Chapters 6 and 7 of the EIAR respectively. The potential significant effects and mitigation are summarised in Table 4.2 and Table 4.3.

Table 4.2: Potential Significant Effects upon Ecology

Receptor	Mitigation	Residual Effect
Northern brown argus (butterfly) 	Identification and protection by the Ecological Clerk of Work (ECoW) during construction of any patches of rock rose that may support populations of northern brown argus. Enforcing a speed limit of 15 mph for any vehicle going on site, in order to reduce the risk of collision with protected species.	Negligible and Not Significant
Bilberry bumblebee 	The ECoW will keep a watching brief for any bilberry bumble bee nests in areas that are likely to be impacted by construction/ tracked across by vehicles and will advise on appropriate mitigation (e.g. exclusion zones). Enforcing a speed limit of 15 mph for any vehicle going on site, in order to reduce the risk of collision with protected species.	Negligible and Not Significant
Hoverfly 	Enforcing a speed limit of 15 mph for any vehicle going on site, in order to reduce the risk of collision with protected species. Continued run-off management and erosion control. Check of maintenance vehicles for oil leaks to avoid risk of pollution incident.	Negligible and Not Significant

Source: EIAR Chapter 6

Table 4.3: Potential Significant Effects upon Ornithology

Receptor	Mitigation	Residual Effect
Osprey 	Species Protection Plan proposed. Good practice during felling activities. The erection of an artificial nest platform.	Low and Not significant

Source: EIAR Chapter 7

4.5. Hydrology, Hydrogeology & Geology

- 4.5.1. The River Tweed is the nearest Special Area of Conservation (SAC). As part of the hydrology assessment all mapped watercourses were marked as areas to try and avoid. A distance of 50 m from such watercourses was applied to the proposed turbines and their associated infrastructure to protect watercourses from disturbance and potential effects on water quality during construction and operation. From previous developments, the amount of peat on-site was understood to be minimal and this was confirmed after further peat survey work. Ground Water Dependant Terrestrial Ecosystems (GWDTE) have been identified and avoided where possible. An assessment of hydrological elements is provided in Chapter 9 of the EIAR.

Table 4.4: Potential Significant Effects upon Hydrology

Receptor	Mitigation	Residual Effect
Pollution incidents	Preparation of a site specific Construction Environment Management Plan (CEMP) prior to construction, similar to that produced for Crystal Rig Wind Farm (Phase III). Hydrological elements of the CEMP can include, but not limited to the following:	Not significant
Erosion and sedimentation		
Changes to water resources i.e. private water supplies		
Modification of surface water and groundwater flows		
Modification of natural drainage patterns	<ul style="list-style-type: none"> • A Drainage Management Plan • Watercourse crossing assessment 	
Impediments to flow and flood risk	<ul style="list-style-type: none"> • Private water supply management plan (including emergency pollution response plan) • Water quality monitoring programme 	
Compaction of soils		

Source: EIAR Chapter 9

4.6. Cultural Heritage

- 4.6.1. Desktop studies revealed there are no Listed Buildings onsite. There is one Scheduled Ancient Monument (SAM), Yadlee Stone Circle, onsite (Figure 4.4 provides a photograph of one of the larger stones from this SAM).
- 4.6.2. This SAM is adjacent to the existing Crystal Rig Wind Farms and the design process was careful to avoid direct effects and limit potentially significant indirect effects on this asset. A snapshot of a photomontage from Volume 3 is provided below to illustrate the SAM in the context of the Proposed Development, see Diagram 4.5. It shows the existing Crystal Rig Wind Farm (Phase II) turbines on the left and the Proposed Development's turbines to the right.

Source: Natural Power



Figure 4.4: Photograph of a stone from Yadlee Stone Circle

Source: EIA Figure 10.4 (e)



Diagram 4.5: Photomontage from Yadlee Stone Circle (not to scale)

- 4.6.3. A full assessment of cultural heritage is provided in Chapter 10 of the EIA. It concludes that there will be **no significant** effects upon cultural heritage. It also recommends a programme of mitigation works to further reduce potential effects. These would be proposed in a Written Scheme of Investigation and agreed with SBC to offset any potential loss of low sensitivity cultural heritage features within the Proposed Development Area.

4.7. Forestry

- 4.7.1. Part of the Proposed Development Area is within commercial forestry which is planned to be felled as part of its ongoing management separate from the Proposed Development. The total Forestry Study Area extends to 929.2 ha and is comprised of privately owned and managed woodlands. The species composition of the forest would change as a result of the Proposed Development's forestry proposals. In particular:
- There would be a change in the pattern of timber harvesting with 59.9 ha being advanced compared with the baseline;
 - There will be a decrease in the stocked area of conifer woodland of 27.9 ha, balanced by a small increase in the area of broadleaf woodland; and
 - As a result, there would be a net loss of woodland area of 26.7 ha.
- 4.7.2. In order to comply with the Scottish Government's Control of Woodland Removal Policy, compensatory planting or equivalent compensation to be agreed with Forestry Commission Scotland, would be required. The Applicant is committed to providing appropriate compensation to replace the loss of woodland area in terms of the relevant policy requirements as applicable at the time. Forestry is not regarded as an EIA receptor but other chapters of the EIA do take account of the forestry impact.

4.8. Noise

- 4.8.1. Locations of dwellings were noted for future noise modelling and assessment and compared to previous noise modelling reports of the existing Crystal Rig Wind Farms. The dwellings closest to the Proposed Development are financially interested. An assessment of the potential noise effects is provided in Chapter 12 of the EIA.
- 4.8.2. Noise from on-site construction activities are expected to be significantly below the 65 dB L_{Aeq} criterion, and it can therefore be concluded that noise impact from on-site construction activities will be **not significant**.

- 4.8.3. Predicted operational noise levels from the Proposed Development at all residential properties surrounding the site are either below 25 dB L_{A90} , or cumulative noise levels are below either the financially involved noise limits or the relevant derived noise limits from Crystal Rig Wind Farm (Phase II) planning conditions. As such operational noise levels are determined to be **not significant**.

4.9. Aviation

- 4.9.1. The potential effects upon aviation are assessed in Chapter 14 of the EIAR. As noted in paragraph 3.5.6 of this NTS, the CAA requires any structure equal to and taller than 150 m in height to be fitted with visible aviation warning lighting. This will result in seven of the eleven proposed turbines having such lighting and the current CAA requirement is as follows:
- One medium Intensity (2000 candela) omni-directional visible red light on the nacelle of the turbine; a second 2000 candela red light serving as an alternate should be provided in case of failure of the operating light. The lights should be installed to assure that the output of either light is not blocked by the other.
 - At least three (to provide 360° coverage) low-intensity (32 candela) visible red lights at an intermediate level of half the rotor diameter below the nacelle.
- 4.9.2. Diagram 4.3 provides an illustration of how the Proposed Development may appear in low light conditions with such aviation warning lighting fitted.
- 4.9.3. Under the usual planning conditions expected upon consent, the Ministry of Defence (MoD) would be informed of the dates of commencement, completion, final turbine locations and heights. Consultation is ongoing with the MoD to confirm the above mitigation.
- 4.9.4. In summary, it is concluded in the EIAR that with this mitigation in place there are **no significant residual effects** from the Proposed Development upon aviation interests.

4.10. Microwave Fixed Links, Radio Communication Networks and other Infrastructure

- 4.10.1. The potential effects by the Proposed Development are assessed in Chapter 14 of the EIAR. It notes that desk based studies and consultation with owners of potential assets near the Proposed Development was undertaken.
- 4.10.2. With the information available to the Applicant, the Proposed Development does not directly affect this infrastructure and therefore there are **no significant effects** predicted.

4.11. Public Rights Of Way & Core Paths

- 4.11.1. The potential effects by the Proposed Development are assessed in Chapter 14 of the EIAR. There are a number of Public Rights of Way (PRoW) and Core Paths within Crystal Rig Wind Farms and in the vicinity of the Proposed Development Area. Exclusion zones were included at the design stage on either side of such paths to ensure that the presence of the turbines would not interfere directly with the use of these.
- 4.11.2. Of the paths in the area, there are two PRoW which may be affected: BB96 and BB97. The final design has ensured that the proposed turbines are at least tip height distance away from these Rights of Way thus avoiding any direct adverse effects during operation. A section of new access track which is required to reach proposed turbines no.8-11 will cross over Right of Way BB97. This access track would not prevent use of the Right of Way during the operational phase. There is a 15

miles per hour speed limit on the Crystal Rig Wind Farms which is in place for health and safety purposes. With suitable health and safety signage and operating procedures in place the potential for direct effects on these Rights of Way is considered to be **not significant**.

4.12. Public Water Supply

- 4.12.1. The potential effects by the Proposed Development are assessed in Chapter 14 of the EIAR. Scottish Water was consulted and it confirmed that there would be no impact on Scottish Water assets and the public water supply therefore **no effect**.

4.13. Shadow Flicker

- 4.13.1. The potential effects by the Proposed Development are assessed in Chapter 14 of the EIAR. Wind turbines are tall structures which can cast long shadows when the sun is low in the sky. Under certain conditions (e.g. clear skies, enough wind for the turbines to be rotating and a low angle of the sun in the sky), observers close to a wind farm could experience a phenomenon commonly known as "shadow flicker", where the rotating turbine blades pass between the sun and the observer creating an intermittent shadow. It is, however, part of the nature of long shadows that they pass any particular point relatively quickly and the effect, if present, lasts a short period of time, due to the movement of the sun across the sky. They are generally only observed in the period after dawn and before sunset as the sun is rising and setting.
- 4.13.2. Two identified properties which are within the range, albeit on the periphery, of where shadow flicker may occur, have been identified in the EIAR. Both properties are financially involved in the Proposed Development. Any mitigation can be secured through the agreements already established between the Applicant and these properties. The potential effects are therefore considered to be **not significant**.

4.14. Socio-economics and Tourism

- 4.14.1. Chapter 15 of the EIAR assesses the potential effects of the Proposed Development upon economic activity at both a local and national level including potential effects on the tourism sector.
- 4.14.2. There is likely to be moderate/minor effects on those tourist and recreational destinations identified within the local area, however there is also the potential to bring beneficial economic effects to the Economic Study Area (see paragraphs 15.5.13 and 15.6.21 of Chapter 15 of the EIAR) and contribute to addressing the measured levels of deprivation that has been experienced within the Economic Study Area. This overall position is in line with national, regional and local policies and strategies in the sense that the Proposed Development is expected to bring a small but overall beneficial level of sustainable economic growth to the Economic Study Area.

4.15. Synergistic Effects

- 4.15.1. An assessment of synergistic effects considers the combination of effects upon different topics together. This is provided in Chapter 16 of the EIAR. It ensures that the assessments provided in the EIAR for each topic are not considered in isolation.
- 4.15.2. During the construction and decommissioning phases, potential adverse synergistic effects are limited to the Proposed Development Area where there will be heavy plant operations, earth works, forestry operations and vehicle movements. These could result in potential synergistic effects upon physical and biological receptors including where there are overlaps between ecology, hydrology,

hydrogeology. These effects would be temporary in nature, will be managed through a CEMP, TMP and/or Decommissioning Plan and in isolation have been assessed in the EIAR as not significant. These potential effects can also be monitored by an ECoW or Planning Monitoring Officer if required through a planning condition in similar manner to Crystal Rig Wind Farm (Phase III). Given the limited number and extent of receptors, the limited effects predicted and their temporary nature, the synergistic effects during construction and decommissioning phases are considered **not significant**.

- 4.15.3. Potential synergistic effects during the operational phase relate primarily to overlaps between physical and human receptors and are limited to areas which are within or close to the Proposed Development Area where there may be a combination of potential visual, noise and shadow flicker effects. The EIAR predicts that there are no significant adverse effects in isolation for noise and shadow flicker but there may be potential significant adverse visual effects upon two properties and (users of) two PRow within 1 km of the Proposed Development. It is noted that the two properties within 1 km of the Proposed Development are financially involved with the Proposed Development. Potential visual effects upon the PRow are dependent upon the views of users as they pass the Proposed Development. Potential direct effects will be managed through siting, site management and signage. As neither will prevent use of these PRow in the long term, it is considered that the synergistic effects during operation are **not significant**.

4.16. Summary

- 4.16.1. This section of the NTS has presented the potential significant effects of the Proposed Development and the measures taken or put forward to reduce the potential significant effects identified (mitigation). In doing so, it has addressed Regulation 5(2)(b) and 5(2)(c) of the EIA Regulations.

5. Conclusions

- 5.1.1. This NTS has provided a high level summary of the Proposed Development which is assessed in greater detail throughout the EIAR. This NTS has presented the information required of the EIA Regulations and has attempted as much as possible to present the information in a manner that can be readily understood, as guided by Planning Circular 1/2017.
- 5.1.2. The Proposed Development has been located in a suitable area for wind farm development following a site selection process. It is located next to the existing Crystal Rig Wind Farms and can therefore make use of much of the existing infrastructure there.
- 5.1.3. The design stages have taken place over several years through many changes which have reacted to new developments, policies, market mechanisms and consultee responses. Through balancing the various site constraints with the scale of development required to be economically viable, the Applicant believes that the proposed development provides the best use of the site with respect to the potential renewable electricity generating capacity balanced against the potential environmental and other effects.
- 5.1.4. The EIAR presents the potential effects of the Proposed Development as well as potential synergistic effects which consider such effects in combination. Following the use of mitigation, potential significant effects are restricted to isolated landscape and visual effects upon limited receptors within close proximity of the Proposed Development. These effects are commonly associated with wind farms. Given the Proposed Development does meet the objectives of national policy and Scottish Borders Council guidance these effects are considered acceptable. Further consideration of these findings in policy terms is provided in the Planning, Design and Access Statement.

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