
2.	The Environmental Impact Assessment Process	2-1
2.1	Environmental Impact Assessment	2-1
2.2	Assessment methodology	2-3
2.3	Defining significance of effects	2-4
2.4	The scope of the environmental impact assessment for the Limekiln Wind Farm Resubmission	2-6
2.5	Cumulative effects	2-12
2.6	Consideration of alternatives	2-13
2.7	Site Selection Process	2-14
2.8	Consultation with local residents	2-20
Table 2.1	Establishing the level of effect	2-5
Table 2.3	Scoping responses	2-7
Table 2.4	Wind Farm Developments Assessed for Potential Cumulative Impacts	2-12
Table 2.5	Summary of Design Iterations	2-18

2. The Environmental Impact Assessment Process

2.1 Environmental Impact Assessment

Overview

2.1.1 EIA is a systematic procedure that must be followed for certain categories of project (see **Section 2.1.5 and 2.1.6**) before they can be given development consent. It aims to assess a project's likely significant environmental effects. This helps to ensure that the importance of the predicted effects and the scope for reducing effects are properly understood by the public and the relevant determining authority before it makes its decision.

2.1.2 The information on the development and its environmental effects are presented in an Environmental Statement (ES). The EIA process that culminates in the submission of the ES has a number of key characteristics:

- It should be systematic, comprising a sequence of tasks defined both by regulation and by practice;
- It should be analytical, requiring the application of specialist skills from the environmental sciences;
- It should be impartial, its objective being to inform decision-making rather than to promote the project;
- It should be consultative, with provision being made for obtaining information and feedback from interested parties including local authorities, members of the public and statutory and non statutory agencies; and
- It should be iterative, allowing opportunities for environmental concerns to be addressed during the planning and design of a project.

2.1.3 Typically, a number of design iterations take place in response to environmental constraints identified during the EIA process (in effect, incorporating mitigation measures to avoid, reduce or compensate for identified adverse effects). Further details of such measures in this case are presented in the corresponding environmental topic chapters. A summary of proposed measures is included at the end of **Chapter 3 'Description of the Proposed Development'**.

EIA regulations

2.1.4 The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 (as amended) (the EIA Regulations), apply to any development which requires an application under section 36 of the Electricity Act 1989 for consent to construct, extend or operate a generating station.

2.1.5 Schedule 1 of the EIA Regulations lists those developments for which an EIA will always be required. Schedule 2 of the EIA Regulations lists developments for which the need for an EIA is determined on a case-by-case basis (i.e. if significant environmental effects are likely), whilst Schedule 3 describes indicative thresholds to be used to determine if a Schedule 2 development is an "EIA development". Where an EIA is required, environmental information must be provided by the applicant in an ES. Schedule 4 specifies the information that must or may be provided in the ES.

- 2.1.6 Most wind energy developments fall within Schedule 2 and where the need for EIA is not certain the developer can apply to the determining authority for a screening opinion. It is clear that the potential size of the proposed Limekiln Wind Farm Resubmission means that an EIA would be needed. Limekiln Wind Limited (the 'Applicant') also recognises that the EIA process can play an important role in developing the design of proposals to minimise adverse environmental effects and to realise environmental benefits.
- 2.1.7 While it has been determined that the proposal has the potential for significant environmental effects, this does not mean that a significant effect is the ultimate conclusion of the EIA. The EIA process identifies the potential for adverse effects and then encourages environmental measures (mitigation) to be incorporated into the design of the development, or the method of construction and operation that may reduce or eliminate any negative effects or further enhance positive effects.

Topics to be addressed

- 2.1.8 Schedule 4 of the Regulations specifies that the ES should describe those "*aspects of the environment likely to be significantly affected by the development, including, in particular population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the inter relationship between the above factors*".
- 2.1.9 Establishing which aspects of the environment and associated issues are relevant for a particular project is captured in an EIA scoping process. For the proposed Limekiln Wind Farm Resubmission (the 'proposed development') this is described in more detail in **Sections 2.1.10, 2.1.11 and 2.4.**

The environmental impact assessment scoping process

- 2.1.10 Scoping is the process of identifying those aspects of the environment and associated issues that need to be considered when assessing the potential effects of a particular development proposal. This recognises that there may be some environmental elements where there will be no significant issues or likely effects resulting from the development and hence where there is no need for further investigation to be undertaken.
- 2.1.11 Scoping is undertaken through consulting organisations and individuals with an interest in and knowledge of the site, combined with the professional judgement and experience of an EIA team. Scoping takes account of published guidance, the effects of the kind of development under consideration and the nature and importance of the environmental resources that could be affected.

Spatial scope

- 2.1.12 In its broadest sense, the spatial scope is the area over which changes to the environment would occur as a consequence of the development. In practice, an EIA should focus on those areas where these effects are likely to be significant.
- 2.1.13 The spatial scope varies between environmental topic areas. For example, the effect of a proposed wind energy development on the landscape resource and visual amenity is generally assessed within a zone of up to 35km from the centre of the site (70km for cumulative effects), whilst noise effects are assessed within a much smaller area encompassing the worst affected properties close to the site.

2.2 Assessment methodology

2.2.1 Following the identification of the scope of the EIA, individual environmental topics are subject to survey, investigation and assessment, and individual topic chapters are prepared for the ES. The assessment methodologies are based on recognised good practice and guidelines specific to each topic area, and details are provided in the appropriate chapter. Standard terms and overriding considerations are defined in **Appendix 2.A 'Glossary and Abbreviations'**.

2.2.2 In general terms, the technical studies undertaken for each topic area and chapter include:

- Collection and collation of existing baseline information about the receiving environment and original surveys to fill any gaps in knowledge or to update any historic information, along with identification of any relevant trends in, or evolution of, the baseline;
- Consultation with experts and relevant consultees to define the scope of the assessment and study area and subsequent consultation in response to emerging study findings;
- Consideration of the potential effects of the development on the baseline, followed by identification of design changes to seek to avoid or reduce any predicted adverse effects;
- Engagement with other technical topic specialists and engineers / designers in a design iteration process seeking to optimise the scheme for the differing environmental effects and identify any appropriate mitigation measures;
- Assessment of the final scheme design and evaluation of significant effects, together with an evaluation of any residual significant effects after mitigation measures have been implemented; and
- Compilation of the ES chapter.

2.2.3 In reality, many of the effects are relevant to more than one environmental topic area, and careful attention has been paid to interrelationships to avoid overlap or duplication between topic chapters. For example, the assessment of effects on cultural heritage features will be aided by the assessment in the landscape and visual chapter. Similarly, secondary effects on ecological resources arising from hydrological change would be considered in the ecology chapter with a cross-reference to the relevant direct effect in the hydrology and hydrogeology chapter.

2.2.4 The following format has been adopted for the presentation of information within the ES. In some cases, technical data and analysis has been moved to a Technical Appendix that is bound separately from the main ES in Volume 3:

- Summary – A short summary of each technical chapter is included at the outset, this text also forms the basis of that included in the Non-Technical Summary that accompanies the ES;
- Introduction and overview – setting the scene for the topic, the nature of the receptors to be considered, and how the proposals might cause change;

- Methodology – describing how receptors were identified through a scoping process, along with the specific methods used for data gathering, predicting levels of effects and evaluating significance of effects;
- Baseline information – describing the current state and circumstances of the receptors and changes that might be expected to arise in advance of the development being implemented as well as those that might arise regardless of the development;
- Topic specific design evolution – identifying where there was potential for an effect and how the scheme (in terms of the location of elements and their scale) has been developed to address that potential;
- Predicted effects of the scheme – the effects predicted to arise as a result of implementing the final design of the project;
- Mitigation and enhancement measures – identification of non-embedded ‘design’ measures which may be necessary to control or manage identified potentially significant effects or provide enhancements;
- Assessment of residual effects – an assessment of any effects remaining after non-embedded mitigation measures have been employed; and
- References.

2.3 Defining significance of effects

- 2.3.1 Development proposals affect different environmental elements to differing degrees and not all of these are of sufficient concern to warrant detailed investigation or assessment within the EIA process. The EIA Regulations identify those that warrant investigation as those that are “*likely to be significantly affected by the development*”. These are identified through a scoping process as described in **Section 2.4**.
- 2.3.2 Conclusions about significance are derived with reference to available information about the project description and the environmental receptors (or ‘receiving environment’), and to predictions about the potential changes that the proposed development would cause to the affected receptors.
- 2.3.3 In each of the environmental topic chapters, professional judgement is used in combination with relevant guidance to assess the interaction of the receptor’s sensitivity (this may be defined in terms of importance, value, rarity, quality) against the predicted magnitude of change to identify a level of effect. In general terms, and in order to assist consistent interpretation of the final results of the EIA, receptor sensitivity, magnitude of change and level of effect for each environmental topic are categorised as shown in **Table 2.1**.
- 2.3.4 The type of categorisation illustrated in **Table 2.1** provides a guide only, and may be moderated by the professional that undertakes the assessment in accordance with judgement and experience. In particular, the divisions between categories of receptor sensitivity, magnitude of change, and level of effect should not be interpreted as definitive (and indeed different definitions for each category may be applied by different professionals), and the lines that represent the boundaries between categories should in many cases be considered as ‘blurred’. In some cases, the judgement can be guided by quantitative values, whilst in other cases

qualitative descriptions are used. The significance of the effect may also need to be qualified with respect to the scale over which it may apply (e.g. local, regional, national, international).

Table 2.1 Establishing the level of effect

Sensitivity of receptor		HIGH	MEDIUM	LOW	NEGLIGIBLE / NONE
Magnitude of change	LARGE	VERY SUBSTANTIAL	SUBSTANTIAL	SLIGHT / MODERATE	NEGLIGIBLE
	MEDIUM	SUBSTANTIAL	MODERATE	SLIGHT	NEGLIGIBLE
	SMALL	MODERATE	SLIGHT	NEGLIGIBLE / SLIGHT	NEGLIGIBLE
	NEGLIGIBLE / NONE	NO EFFECT	NO EFFECT	NO EFFECT	NO EFFECT

2.3.5 Having defined a level of effect, professional judgement in combination with guidance and standards are then applied to identify which of those levels of effect are then considered to be equivalent to significant effects when discussed in terms of the EIA Regulations.

2.3.6 A definition of how the terms are derived for each topic is set out in the corresponding chapter along with the relevant explanation and descriptions of receptor sensitivity, magnitude of change and levels of effect that are considered significant in terms of the EIA Regulations.

Type of effect

2.3.7 The EIA Regulations (Schedule 4, Part 1) require consideration of a variety of types of effect, namely direct / indirect, secondary, cumulative, positive / negative, short / medium / long-term, and permanent / temporary. In this ES, effects are considered in terms of how they arise, their valency (i.e. whether they are positive or negative) and duration. Each will have a source originating from the development, a pathway and a receptor.

2.3.8 Most predicted effects will be obviously positive or negative, and will be described as such. However, in some cases it is appropriate to identify that the interpretation of a change is a matter of personal opinion, and such effects will be described as 'subjective'.

2.3.9 The temporal scope of environmental effects is stated where known. Effects are typically described as:

- Temporary – these are likely to be related to a particular activity and will cease when the activity finishes. The terms 'short-term' and 'long-term' may also be used to provide a further indication of how long the effect will be experienced; and
- Permanent – this typically means an unrecoverable change.

2.3.10 Effects are generally considered in relation to the following key stages of the development:

- Construction – effects may arise from the construction activities themselves, or from the temporary occupation of land. Effects are often of limited duration although there is potential for permanent effects. Where construction activities create permanent change, the effects will obviously continue into the operational period;
- Operation – effects may be permanent, or (as is typical with wind power developments) they may be temporary, intermittent, or limited to the life of the development until decommissioning; and
- Decommissioning - effects may arise from the decommissioning activities themselves, or from the temporary occupation of land. The effects would generally be temporary and of limited duration and additional permanent change would normally be unlikely unless associated with restoration.

2.4 The scope of the environmental impact assessment for the Limekiln Wind Farm Resubmission

Screening

2.4.1 Formal screening was not undertaken, as it was recognised at an early stage that due to the size of the proposed Limekiln Wind Farm Resubmission an EIA would be required.

The scoping request and scoping opinion

2.4.2 The content of the ES and the identification of receptors requiring assessment for the proposed development were determined through an understanding of the ES for the original proposal (see Chapter 1 'Introduction'), the findings of the subsequent PLI (Appendix 1.A) along with the advice provided to the Applicant through a Scoping process. A scoping request (Appendix 2.B) was submitted in January 2016 to the Local and Consents Unit (LCU) of the Scottish Government to define the information to be provided in the ES. The technical disciplines included in the Scoping Report are listed below:

- Landscape and Visual Impact;
- Terrestrial Ecology;
- Aquatic Ecology;
- Ornithology;
- Geology and Soils;
- Hydrology, Hydrogeology and Hydromorphology;
- The Historic Environment;
- Traffic and Access;
- Air Quality;
- Noise and Vibration;
- Aviation and Radar;

- Telecommunications;
- Shadow Flicker; and
- Socio-Economic, Recreation and Land Use.

2.4.3 The LCU duly issued a formal Scoping Opinion on 24th of February 2016 and this is presented in full in **Appendix 1.C**. The scoping responses and where they are addressed in the EIA are summarised in Table 2.3 below.

Table 2.3 Scoping responses

Consultee	Summary of Main Issues	How Addressed in Environmental Statement
The Highland Council	<p>THC provides a list of key documents that make up the relevant Development Plan including:</p> <ul style="list-style-type: none"> • Highland-wide Local Development Plan (2012) • Caithness Local Plan • Emerging Caithness and Sutherland Local Development Plan – Proposed Plan January 2016 <p>And</p> <ul style="list-style-type: none"> • Supplementary Guidance – including Developer Contributions; Flood Risk and Drainage Impact Assessment; Trees, woodlands and development; and Highlands Historic Environment Strategy. <p><u>Landscape and Visual Impact</u> – the applicant must recognise in full the Council’s Visualisation Standards within its ES presentation and is encouraged to provide images for use on the Council’s Panoramic Viewer.</p> <p><u>Noise</u> – The applicant will be required to submit a noise assessment in line with ETSU-R-97 ‘The Assessment and Rating of Noise from Wind Farms’ and the associated Good Practice Guide published by the Institute of Acoustics with regard to the operational phase of the proposed development. They go on to note, that they do not consider the night time limit of 43dB LA90 as suggested in ETSU is acceptable. In addition, THC also requests that a cumulative noise assessment is conducted to take into account existing, consented or proposed wind turbine developments. Construction noise will also need to be addressed.</p> <p><u>Private Water Supplies</u> – the Applicant will need to identify any private water supplies, including pipework, which may be adversely affected by the development and to submit details of the measures proposed to prevent contamination or physical disruption.</p> <p>It is recommended that a summary noting findings/conclusions and any mitigation commitments is provided for each assessment ‘topic’ in the ES.</p> <p>Key issues for Council are likely to be:</p> <ul style="list-style-type: none"> • Impact on the landscape which will have to take account of the area in which it sits, including the landscape qualities, its capacity to accept further development, the pattern of development and cumulative impacts. • Visual impact as it is experienced by receptors in the area, including when viewed from many valued areas across the potential study area (35km from the edge of the development site) including individual houses, housing groups and settlements, key routes including local important roads, tourist routes, cycle ways, walking routes and surrounding hilltops. 	<p>Chapter 4 ‘Planning Policy’</p> <p>Chapter 7 ‘Landscape and Visual Assessment’</p> <p>Chapter 8 ‘Noise’</p> <p>Chapter 13 ‘Hydrology and Hydrogeology’</p>

Consultee	Summary of Main Issues	How Addressed in Environmental Statement
<p>Scottish Natural Heritage (SNH)</p>	<p>Natural Heritage Advice</p> <p>Agree with the majority of the conclusions in the scoping report in relation to the potential for significant environmental effects on matters within our remit. Provide the following points of clarification:</p> <ul style="list-style-type: none"> • Protected Areas: acknowledge that the applicant has adequately identified the protected areas connected to the development site; • East Halladale Flows WLA: There will be an adverse effect on the East Halladale Flows WLF that could result in their objection; as such, SNH require specific assessment of the identified WLA as part of the EIA. SNH notes that it expects the Applicant to follow the methodology referred to in the scoping report and advice provided to SNH through direct consultation with the Applicants LVIA consultant (27 November 2015); • Bird Survey Work: Provided that an application is submitted in 2016, it is possible to rely on the previous bird survey work to inform the new application. However, if the application submission is delayed beyond 2016 then new data will be required following the SNH bird survey guidance; and • Other ecological surveys: It is noted that the protected species surveys carried out for the previous application exceed the age limit defined by their pre-application and scoping advice. However, as SNH are not aware that there have been significant land use or habitat changes since the original surveys and if this is the case, then their advice is that new habitat surveys are not required for the current application. This is conditioned on the requirement that the Applicant make a commitment to carry out pre-construction protected species surveys. However, if the application submission is delayed beyond 2016 then new survey data (following relevant guidance) will be required. 	<p>Chapter 7 'Landscape and Visual Assessment'</p> <p>Chapter 12 'Ornithology'</p> <p>Chapter 11 'Ecology'</p>
<p>SEPA</p>	<p>SEPA indicated in its response to Scoping that the following key issues must be addressed in the EIA:</p> <ul style="list-style-type: none"> • Disruption to Groundwater Dependant Terrestrial Ecosystems (GWDTE); • Disturbance and re-use of excavated peat and carbon balance; • Forest removal and forest waste; • Engineering activities in the water environment; • Existing groundwater abstractions; • Pollution prevention and environmental management • Borrow pits; • Decommissioning/Repowering; and • Impacts on designated sites. <p>SEPA also directed the Applicant to the relevant regulatory advice for the application.</p>	<p>Chapter 5 'Climate Change Policy, Carbon Payback and Peat Management'</p> <p>Appendix 5C Peat Management Plan (PMP)</p> <p>Chapter 13 'Hydrology and Hydrogeology'</p>
<p>Historic Environment Scotland (HES)</p>	<p>HES noted that as the proposed development is identical in all ways to the original proposal that they commented on in a letter dated 1st March 2013. As such, they advise that they have no additional comments.</p>	<p>Chapter 10 'Cultural Heritage'</p>
<p>Forestry Commission</p>	<p>In addition, to the generic Scoping Opinion comments, Forestry Commission Scotland included a specific requirement for the inclusion of a forestry chapter. This will need to</p>	<p>Chapter 16 'Forestry'</p>

Consultee	Summary of Main Issues	How Addressed in Environmental Statement
Scotland	include a Long Term Forest Plan that demonstrates how the management of the woodland will be affected by the proposed development.	
Marine Scotland Science (MSS)	Marine Scotland state in its response that it would like results from all site characterisation surveys to be updated as required if data is older than 5 years, and that a detailed account of proposed monitoring programs should also be provided in the ES.	Chapter 13 'Hydrology and Hydrogeology'
The Crown Estate	The assets of The Crown Estate are not affected by this proposal. No comments.	N/A
Defence Infrastructure Organisation (MOD)	No objection to the proposal. In the Interests of the air safety the MOD requests that the development is fitted with MOD accredited aviation safety lighting. The cardinal turbines should be fitted with combination 25 candela omni-directional red lighting and infra-red lighting, the perimeter turbines should be fitted with 25 candela omni-directional red lighting and infra-red lighting with an optimised flash pattern of 60 flashes per minute of 200ms to 500ms duration at the highest practicable point.	Chapter 15 'Infrastructure'
ScotWays	The National Catalogue of Rights of Way does not show any rights of way affected by the site delineated on the applicant's site plan. However, it is noted that as there is no definitive record of rights of way in Scotland, so there may be routes that meet the criteria but have not been recorded. ScotWays note, that long distance paths and other recreational paths will be assessed by the Applicant within a wider 40km study area, if necessary to inform the EIA. It is additionally highlighted, that there may be general access rights over any property under the terms of the Land Reform (Scotland) Act 2003. As such, ScotWays ' <i>strongly recommend consulting Caithness Core Paths Plan, prepared by THC's access team as part of their duties under this Act</i> '. Although it is acknowledged that there is no definitive guidance regarding the siting of turbines in relation to paths and rights of way, it is suggested that a setback distance equivalent to the height of the blade tip from the edge of any path or right of way be observed, based on the Welsh Assembly Government's Technical Advice Note on Renewable Energy (TAN 8).	Chapter 9 'Landscape and Visual Impact Assessment'
Mountaineering Council of Scotland (MCS)	The proposed development is not in close proximity to any areas of mountaineering interest. The MCofS therefore has no interest in this proposed development.	N/A
NATS Safeguarding	The proposed development has been examined from a safeguarding aspect and does not conflict with our safeguarding criteria. No objection.	Chapter 15 'Infrastructure'
Transport Scotland	Having reviewed the Scoping Report, Transport Scotland ' <i>note there are no changes in relation to the new application which could result in a significant change to the impact upon the trunk road network</i> '. It is confirmed that they have no objection to the development in terms of environmental impacts on the trunk road network. However it requests the following conditions are attached to any consent that may be issued: <ul style="list-style-type: none"> <i>Condition 1: Prior to commencement of deliveries to site the proposed route for any abnormal loads on the trunk road network must be approved by the trunk roads authority and / or its Operating Company prior to the event. Any accommodation measures required</i> 	Chapter 7 'Traffic and Transport'

Consultee	Summary of Main Issues	How Addressed in Environmental Statement
	<p><i>including the temporary removal of street furniture, junction widening, traffic Management etc. must similarly be approved.</i></p> <ul style="list-style-type: none"> <i>Condition 2: During the delivery period of the wind turbine construction materials any additional signing or temporary traffic control measures deemed necessary due to the size or length of any loads being delivered or removed must be undertaken by a recognised QA traffic management consultant, to be approved by Transport Scotland before delivery commences.</i> 	
<p>Caithness District Salmon Fishery Board</p>	<p>The board would like either to be assured that the proposed development will not impinge on the hydrology of the Sandside catchment or have the developer commit to surveying the Sandside populations, as for the 2011 surveys of the Reay and Achvarasdal Burns.</p> <p>The board recommends that riparian exclusion zones are set at 50m.</p> <p>The board recommends that the fish survey's carried out in 2011 to support the original application should be repeated to provide a more up-to-date picture of the fish populations for the current application.</p>	<p>Chapter 11 'Ecology'</p>
<p>Civil Aviation Authority</p>	<p>Having reviewed the proposed development, CAA would identify the appropriate aviation consultees as NATS/NERL, the MOD and Wick Airport. In addition, there may be unlicensed airfields in the area. Associated Aerodrome Licence Holders or operators may also have registered safeguarding maps with their LPAs or have other agreed means of notification and consultation.</p> <p>It is recommended that an aeronautical chart is purchased and the site of the turbine checked to see if it falls within the range of an aerodrome using the distances recommended in CAP 764.</p> <p>If approved, there is an international civil aviation requirement that all structures 300feet (91.4m) or more be charted on aeronautical charts. In addition, on behalf of other non-regulatory aviation stakeholders, in the interest of aviation safety, the CAA requests that any structure 70 feet or greater is notified to the Defence Geographic centre, including location(s), height(s) and lighting status, estimated and actual dates of construction and the maximum height of any construction equipment to be used at least 10 weeks prior to the start of construction.</p> <p>Owing to the height of the turbines in the proposed development there is no CAA requirement for the turbines to be lit.</p>	<p>Chapter 15 'Infrastructure'</p>
<p>Highland and Islands Airports Limited</p>	<p>The development is approximately 35km west of Wick Airport and is therefore outside the safeguarded area around the airport.</p> <p>No objection based on the information provided.</p>	<p>Chapter 15 'Infrastructure'</p>
<p>Scottish Water</p>	<p>Ppreviously advised that there are no Scottish Water drinking water abstraction sources or wider drinking water catchments in the area that are likely to be affected by the development and this advice for the proposed development remains unchanged.</p> <p>There are however, two Scottish Water abstraction sources within the wider vicinity of the site (Scottish Water abstracts from Loch Calder and catchment 5km east and Loch Shurrery 2km south). It is unlikely there will be effects on these sources, however if it is determined that there may be an</p>	<p>Chapter 13 'Hydrology and Hydrogeology'</p>

Consultee	Summary of Main Issues	How Addressed in Environmental Statement
	<p>impact, further contact should be made with Scottish Water.</p> <p>There are Scottish Water assets located to the north of the south boundary along the A836 near the site access. The location of these assets should be confirmed and if any potential impacts identified all Scottish Waters processes, standards and policies in relation to dealing with asset conflicts must be complied with.</p>	
Cairngorms National Park Authority	No comment as the proposed development is outwith its area.	NA
The Joint Radio Company (JRC)	In the case of the proposed development JRC does not foresee any potential problems based on known interference scenarios and the data provided. However, if any details of the wind farm change, particularly the distribution or scale of any turbine(s) it will be necessary to re-evaluate the proposal.	Chapter 15 'Infrastructure'
Visit Scotland	<p>VisitScotland state that given the importance of Scottish Tourism to the economy, and of Scotland's landscape in attracting visitors to Scotland, they would strongly recommend any potential detrimental impact of the proposed development on tourism, whether visually, environmentally and economically – be identified and considered in full. This includes when taking decisions over turbine height and number.</p> <p>VisitScotland would also like consideration of the effect any perceived proliferation of developments may have on local tourism and in turn the economy.</p>	Chapter 6 'Socio-economics'
ScotWays	<p>Have studied the proposed development with respect to EMC and BT point-to-point microwave radio links.</p> <p>Concluded that the wind farm should not cause interference to BT's current and presently planned radio networks.</p>	Chapter 15 'Infrastructure'
RSPB	<p>RSPB state that it does not agree with the Applicant, that the Reporters' 2014 findings in relation to golden eagle remain valid in terms of the resubmission of an ES in 2016. They consider the reoccupation of the golden eagle territory is a material change in circumstances since the submission of the original ES. As such, they suggest the following additional assessments:</p> <ul style="list-style-type: none"> • At least one full year's vantage point survey work covering the application site area, following SNH's current guidance; • 'PAT' (Predicting Aquila Territory) modelling to show the relative importance of land within the application site in the absence of forestry; • An assessment of the potential for forestry operations to open up areas of the application site to eagle flight activity during the 25-year lifetime of any consent; and • 'Focal' VP watches of the known nesting area, using similar methods in 2014, in the order to identify the main areas of eagle flight activity. 	Chapter 12 'Ornithology'

Further evolution in the scope

2.4.4 The process of completing topic specific investigations inherently involves further discussions with consultees. Any topic specific refinements to scope and the detailed assessment methods employed are provided within each of the relevant chapters of the ES.

2.5 Cumulative effects

- 2.5.1 In line with standard practice, projects that have been the subject of full and validated planning applications have been included in the consideration of potential cumulative effects with the assumption that they are successful.
- 2.5.2 Other projects substantially in the public domain either by virtue of a scoping report or indeed a consultation into a specific national infrastructure project may be included if there is sufficient information available to the development team. In the case of other wind energy developments, key information is required about the number, location and size of turbines for a full assessment of cumulative effects to be carried out.
- 2.5.3 In respect of potential cumulative effects with other schemes, the following developments and effects have been identified as requiring consideration as listed in **Table 2.4**.

Table 2.4 Wind Farm Developments Assessed for Potential Cumulative Impacts

Name	Details					Wind farm status
	Nr.	BT	HH	RD	Distance	
Achairn	3	100	59	82	31.89km	Operational
Baillie Hill	21	110	70	80	4.56km	Operational
Bettyhill	2	119	79	80	23.08km	Operational
Buolfrulich	15	75	49	52	29.04km	Operational
Burn of the Whilk	9	116	70	92	34.49km	Operational
Camster	25	121.2	81.2	80	28.06km	Operational
Causeymire	21	100	60	80	18.37km	Operational
Flex Hill/Bilbster	3	93	60	66	28.93km	Operational
Forss Phase 1&2	6	76/78	47/50	56	8.33km	Operational
Strathy North	33	110	69	82	15.24km	Operational
Stroupster	13	113/110	70/74.5	86/71	34.14km	Operational
Wathegar	5	100	59	82	29.58km	Operational
Achlachan	5	110	65	90	17.52km	Consented
Bad a Cheo/Mybster	13	112	65	94	19.99km	Consented
Halsary	15	112	67	90	20.24km	Consented
Hill of Lybster	1	79	55	48	8.47km	Consented
Lochend Farm	4	99.5	64	71	29.67km	Consented
Rumster	3	75	50	50	28.57km	Consented
Taigh na Muir	1	79.6	55	44	28.73km	Consented
Wathegar 2	9	110	69	82	30.59km	Consented
Weydale	1	66	40	52	15.38km	Consented
Cogle Moss	12	99.5	64	71	28.05km	Application

Name	Details					Wind farm status	
	Nr.	BT	HH	RD	Distance		
East Kirk	1	79.6	56.5	46.2	29.95km	Application	
Enerquip	1	80	56	48	32.18km	Application	
Lower Seater	3	62	35	54	25.26km	Application	
Lower Thura	2	92.5	57	71	26.17km	Application	
Strathy Wood	18	145	100	90	14.48km	Application	
Tresdale	3	99.5	64	71	37.31km	Application	
Strathy South	39	135	83	104	17.84km	Application	
Ackron	9	125			5.03km	Scoping	
Bettyhill Extension	7	125	100	50	22.44km	Scoping	
Brabster	10	120			31.47km	Scoping	
Broubster	20	127			2.17km	Scoping	
Camster II	55	126.5			28.90km	Scoping	
Drum Hollistan	21	119-130	71-104		3.40km	Scoping	
Durrans Mains / Stemster Hill	4	92.5	57	71	19.05km	Scoping	
Earl's Cairn	13	125			29.05km	Scoping	
Flex Hill Extension	3				28.89km	Scoping	
Glebeland	3	125			23.93km	Scoping	
Golticaly	47	130			28.45km	Scoping	
Lynton Cottage	2	77	55	44	37.36km	Scoping	
Red Moss	7	148.5	113	71	35.01km	Scoping	
Thusater Farm	3	120.5	80.5	80	11.51km	Scoping	
Tofts of Tain	3	84	60	48	25.41km	Scoping	
Torranreach	4	77	55	44	36.51km	Scoping	
Key:						HH	Hub height (m)
Nr.	Number of turbines				RD	Rotor diameter (m)	
BT	Blade tip height (m)				Distance	Distance from the wind farm site centre.	

2.6 Consideration of alternatives

2.6.1 National planning and energy policy makes it clear that there is no requirement for renewable energy developments to demonstrate an overall need for new renewable generation or a need to be located in a specific location. Nevertheless, **Section 2.7** does describe the site identification process and design criteria. In EIA terms, the

requirement is only to report on alternatives that have been considered. The examination of alternatives in this ES is therefore restricted as appropriate to alternative design solutions that were considered for the site in question in terms of factors such as site layout / design / turbine height and turbine numbers, and the environmental effects of the options considered. These are discussed in **Chapter 4 'Planning Policy Overview'**.

2.7 Site Selection Process

2.7.1 The careful selection of potential wind farm sites is a critical aspect of the overall wind farm development process.

2.7.2 Infinergy were initially invited to tender for the Limekiln project under a competitive tender process in 2009. Prior to submitting what was eventually the successful tender, preliminary feasibility studies were conducted. The criteria based study carried out was in accordance with the then current national planning policy on renewable energy, the criteria used to assess potential wind farm sites being set out below:

- *Predicted Wind Resource* – the available wind resource is a key factor when considering the commercial viability of a potential site. The available wind resource has a direct effect on the electricity produced and the pollution savings resulting from the project;
- *Distance between turbines* – to minimise the turbulent interaction between wind turbines (wake effect), turbines should be separated by set distances both perpendicular to, and in line with, the prevailing wind direction. This design feature is a key factor in maximising the overall power generating capacity of a development site. Spacing requirements may vary between turbine manufacturers and are also subject to wind conditions. At the proposed Limekiln Wind Farm the wind at the site was observed to be spread around the compass, which meant that a circular separation between turbines was more appropriate than the more usual elliptical separation;
- *Electrical Connection* - most wind farms will be connected into the local electricity distribution network at an intermediate voltage of 33kV, 66kV or 132kV. The connection voltage and the distance from the wind farm to the existing network can have a significant impact on the economic viability of a wind farm proposal;
- *Access* - modern wind turbines are large structures and some components, notably the rotor blades, can only be transported to site as complete structures. The construction of a wind farm will therefore require suitable access for long load items. In rural areas this can be a significant constraint as the environmental and financial cost of upgrading stretches of minor roads to facilitate delivery can significantly affect the viability of the scheme;
- *Military and Aviation Constraints* - wind turbines may affect aviation in two key ways – physical obstruction of flight-paths around airfields, and interference with radar. Physical obstruction generally affects a relatively small area around airfields and is easily defined. Effects on radar may occur over much larger areas. Consultations with MoD, CAA and other aviation interest groups are therefore undertaken at an early stage in site selection;

- *Planning Considerations* - the development plan policies (both adopted and draft) are taken into consideration when assessing potential wind farm sites, together with national guidance contained in planning policy guidance notes and statements;
- *Separation from Dwellings* - wind turbines are large structures. For both visual and noise consideration, a reasonable distance between a wind turbine and the nearest dwelling is required in order to ensure that the amenity of local residents is protected;
- *Landscape Constraints* - landscape and visual design considerations are taken into account and the layout modified accordingly. Experienced landscape architects use their professional judgement aided by computer generated visualisations to carefully modify the number, layout and scale of turbines to achieve an acceptable design solution;
- *Environmental Constraints* - features and areas of environmental sensitivity (ecology, archaeology, hydrology etc.) are identified and their implications considered. It is the Applicant's intention to seek to avoid or reduce these effects as far as possible through the design process – something facilitated by the EIA process;
- *Existing land use* – whilst the wind turbines and their associated infrastructure occupy no more than 1.2% of the application site boundary, the existing use of the land is considered in the layout of tracks and turbines. For example, existing track lines are used where practicable.
- *Health and Safety requirements* - such as stand offs from roads, Public Rights of Way (PRoWs) and aviation infrastructure are all factored into the layout development to ensure appropriate safety standards are achieved and risks minimised; and
- *Underground and overground services* – pipelines and telecommunications links can be affected by wind turbine developments, therefore it is necessary to take into account the presence of such services when designing a wind energy development. Pipelines usually require standoffs at least equivalent to height to blade tip (plus an additional margin) as well as possible strengthening of proposed access crossings. Means of avoiding effects on telecommunications links vary and include: avoidance of defined Fresnel zones by blade swept areas; stand back from lines of sight or use of relays or in some cases re-routing of signals via other connection means.

2.7.3 The conclusion of this preliminary assessment was that the Site was suitable for a wind farm development comprising 30-50 turbines. As a result, the Applicant conducted an EIA, which subsequently led to the development of a 24 turbine wind farm proposal, which was ultimately presented in the 2012 ES for the original Limekiln Wind Farm ('original proposal'). As outlined in **Chapter 1 'Introduction'** of this ES, the Scottish Ministers refused the 2012 application for consent, after a Public Local Inquiry (PLI), conducted in August 2014.

2.7.4 On reviewing the Reporters' PLI findings, the Applicant determined that the site, in EIA terms, was in all respects acceptable, apart from the fact that further

assessment in relation to Wild Land was considered necessary to understand the potential impact of the proposal on the East Halladale Flows Wild Land Area adjacent to the site.

- 2.7.5 The proposed development described in this ES is the result of the combined consideration of the Reporters' findings for the original proposal, advice provided through the scoping process, and detailed consultation with relevant statutory and non-statutory consultees.

Technical Considerations

- 2.7.6 The Applicant has monitored the technical, environmental and planning factors affecting the project design throughout the site selection and development phases. This included detailed discussions with the local planning authority and statutory consultees, as well as consultation with local residents at an appropriate stage. The following sections assess the compatibility of the proposed development with site selection criteria.

Wind Resource

- 2.7.7 Historical anemometry mast data alongside the Met Office Virtual Metmast service has been used to show that the wind resource at the proposed Limekiln Wind Farm is more than sufficient to make this a feasible project.

Electrical Connection

- 2.7.8 As noted in **Section 3.1.22**, the connection point into the grid is anticipated to be at Dounreay substation via 4km of overhead line.

Wind Farm Access

- 2.7.9 Access to the Limekiln Wind Farm will utilise the existing highway network. It is assumed that turbines would be delivered to Scrabster harbour, and would follow the A9 to the south towards Thurso, then, just before reaching Thurso, the vehicles would turn right and head west on the A836. After approximately 12km, the road bends right before entering Reay and this minor road leads to the site entrance to the north of the development site.

Ground Conditions

- 2.7.10 The Site is underlain by peat. A preliminary ground investigation has been undertaken at the site which is presented in **Appendix 5.A**.

Military and Aviation Constraints

- 2.7.11 A desk-based study identified the following facilities as having the potential to be affected by the Limekiln Wind Farm:
- Tactical Training Area to the south of the site which includes a Low Fly Zone (14T), and
 - Wick Airfield;

Environmental Considerations

Nature Conservation

- 2.7.12 The site lies adjacent to one SAC and three SSSIs, with a further SAC and two SSSIs are located within 5km of the site. The potential impact of the proposed Limekiln Wind Farm on these designated areas has been assessed in the EIA, further details of which are presented in **Chapter 11- Ecology and Nature Conservation** and **Chapter 12 - Ornithology**.

National Landscape Designations

- 2.7.13 The site contains no landscape planning designations. Five national landscape designations lie wholly or partly within the 35km radius defined study area as follows:

- Kyle of Tongue National Scenic Area;
- Ben Griam and Loch nan Clar Special Landscape Area;
- Flow Country and Berriecale Coast Special Landscape Area
- Dunnet Head Special Landscape Area; and
- Farr Bay, Strathy and Portskerra Special Landscape Area.

- 2.7.14 The latter designation is partly present within 15km of the site i.e. within the detailed study area. The extent of visual influence exerted by the proposed Limekiln Wind Farm upon the designations has been fully assessed within the context of the landscape assessment. Effects on visitor attractions, and long distance walking & cycling routes, has also been considered with the users of these facilities assessed as recreational visual receptors further details of which are presented in **Chapter 9 'LVIA'**.

Wild Land

- 2.7.15 Wild Land is covered by National Policy through SPP and Local Policy through the HwLDP. The designation of Wild Land and publication of associated policy and guidance is the responsibility of SNH. Four Wild Land Areas (WLA) occur within the study area, namely;

- the East Halladale Flows WLA;
- the Causeymire - Knockfin Flows WLA;
- the Ben Klibreck – Armine Forest WLA; and
- the Ben Hope – Ben Loyal WLA.

- 2.7.16 A preliminary assessment of the potential effects of the proposed development on the four WLAs is presented in **Appendix 9.B** of the Landscape and Visual Impact Assessment. This assessment found that only the East Halladale Flows WLA has the potential to undergo significant effects as a result of the proposed development. As such, a detailed assessment of the potential effects of the proposed development on the East Halladale Flows WLA is presented in **Appendix 9.E** of the **Chapter 9 'LVIA'**.

Design Evolution

- 2.7.17 As the design of the proposed development is in all ways identical to the final design of the original proposal developed for the site, the design of the proposed development evolved through the feasibility studies, wind mapping, scoping, consultation and EIA studies that were used to develop and refine the layout of the wind farm which was described in the original 2012 ES.
- 2.7.18 Early feasibility studies determined that the site was suitable for up to 30-50 turbines and an initial layout was prepared which used a 52 turbine design as a starting point for revisions.
- 2.7.19 The initial layout was refined based on turbines of 145m tip height, which were setback from the northern site boundary to reflect landscape and visual concerns. A circular separation of 6 rotor diameters was used between turbine positions, rather than the more usual elliptical layout, as the wind conditions at the site exhibited a significant spread around the compass. The resulting 50 turbine layout was submitted with the scoping request.
- 2.7.20 The scoping layout for the original proposal was optimised based on wind characteristics obtained from the Met Office Virtual Metmast (VMM) service and historical wind data collected at the site. Both of these factors reduced the number of turbines to a 27 turbine layout. Some minor revisions were also made at this point to avoid environmental constraints such as watercourses and Groundwater Dependant Terrestrial Ecosystems (GWDTEs).
- 2.7.21 A review of key viewpoints from around the area was then undertaken in order to determine the acceptability of the wind farm design in relation to landscape and visual effects, to determine if any further revisions were necessary. Some concerns were raised about balancing the tip heights across the site, recognising the change in landform through the central north-south rise of the site. This layout was presented at public exhibition, with options for tip height configurations, to gather feedback from local residents.
- 2.7.22 A further, final set of revisions were made to the layout to improve design from a landscape and visual perspective, to arrive at a 24 turbine design freeze, with mixed tip heights. A small number of other minor changes were made in response to local conditions and access tracks were adjusted to minimise site clearance and maximise use of existing paths.
- 2.7.23 The final design of the original proposal that arose through the design evolution process described above and presented in more detail in **Table 2.5** below, is the wind farm design that has been adopted for the proposed development described in this ES. The main design iterations are shown in Figure 2.1, while the final layout is discussed in **Chapter 3 'Description of the Proposed Development'**.

Table 2.5 Summary of Design Iterations

Issue Addressed	Detail of Change
Starting Point following site identification process by Infinergy (not based on any environmental constraint mapping)	Feasibility work identified that fifty two turbines with a blade tip height of up to 145m could be potentially accommodated.
Adjacent land use	Turbines have been located at least 41m away from the site boundary to avoid blade overhang onto neighbouring land.

Issue Addressed	Detail of Change
Telecommunication links	No telecommunication links or infrastructure have been identified within the site boundary.
Watercourses and waterbodies	<p>Proposed turbines have been located at least 50m from larger watercourses (greater than 2m wide) and waterbodies (e.g. ponds) located within the site. Access tracks have been located at least 50m from watercourses, except at watercourse crossings.</p> <p>Track design minimises watercourse crossings to those that are essential (with the result that there are only 5 proposed). The design avoids standing freshwater bodies, ensuring that a minimum 50m buffer is maintained between all proposed construction work and watercourses and waterbodies.</p> <p>Marshy grassland has been avoided where possible to avoid impacts on GWDTE.</p>
Flood risk areas identified by SEPA	No infrastructure related to the proposed Limekiln Wind Farm other than tracks at watercourse crossings has been located in these areas.
Forestry	Tree felling would be carried out on a keyholing basis rather than clearfelling in order to comply with the Forestry Commission Scotland policy on woodland removal.
Peat	<p>A Peat Management Strategy (PMS) will be developed to ensure that peat excavated during construction is suitably re-used within the extent of the development site.</p> <p>Infrastructure where possible has been sited to avoid areas of deep peat. Installation of cables will aim to minimise disturbance to peatland habitats.</p>
Ecology	Existing access tracks would be upgraded where possible to minimise habitat loss. The proposed alignment of access tracks, developed through consultation with the ecology team has sought to avoid identified constraints (areas of deep peat, waterbodies, areas of potential for salmonid and water vole habitat etc).
Bat flight lines	A stand-off distance of at least 50m from blade tip to any hedgerows/woodland on the Site has been incorporated into the design. This is in accordance with Natural England's (February 2009) Bats and Onshore Wind Turbines Interim Guidance TIN051. 80m radius keyholes would be felled in the existing forestry to ensure that this standoff distance would be maintained.
Separation distances	It is necessary to ensure adequate separation distance perpendicular to, and in line with, the prevailing wind direction. Separation distances are necessary to minimise turbulent interaction (wake effect) between the turbines which would affect the power generation capacity of the wind farm. A circular (rather than the more usual elliptical) separation distance of 3 rotor diameters was used as the wind conditions at the site exhibit a significant spread around the compass. The layout is based on a turbine with a hub height of either 98.4m or 84.6m with a 41m blade giving a tip height of 139 or 126m respectively.
Noise	The initial design was refined through a series of iterations taking into account the results of a background noise survey at surrounding properties. This ensured that noise levels at nearby residential receptors meet the limits derived from the approach set out in <i>ETSU-R-97 The Assessment and Rating of Noise from Wind Farms</i> . Noise levels are below 35dB at all locations, the lowest noise level which can be set following the above guidance.
Landscape and visual amenity (including concerns raised by local residents during consultation)	The iterative design process refined the original layout to help mitigate the potential effects of the proposed Development on the landscape and visual receptors. The key consideration has been the potential effects on the close range settlement of Reay, but also taking into account other sensitive receptors using wirelines from key viewpoints to inform the process. Environmental constraints, relating to areas with special sensitivities in respect of ornithology and hydrology, have been taken into

-
- 2.8.4 Infinergy felt that while the local community were aware of the resubmission plans, those in the wider community might not be and decided to widen the scope of the newsletter distribution to take in all of postcode areas KW12,13 and 14, which includes Thurso. This took the distribution from 625 to over 7500 households.
- 2.8.5 It was also decided to include a more detailed questionnaire, similar to that used at the Community Open Days, in the newsletter mailing. This allowed Infinergy to better gauge public opinion and also to introduce the concept of Shared Ownership.
- 2.8.6 At the time of writing, 334 responses have been received.
- 2.8.7 In addition, the Limekiln Community Liaison Forum will be re-established allowing Infinergy the opportunity to share and discuss the results from the consultation exercise as well as develop thinking on issues such as Community Benefit and Shared Ownership.
- 2.8.8 A full statement of community consultation has been provided with the section 36 application.