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# 1 Introduction

## 1.1 Background

Talladh-a-Bheithe Wind Farm Limited, a wholly owned subsidiary of Eventus BV (hereafter referred to as the Applicant) is proposing a wind energy development, Talladh-a-Bheithe Wind Farm (the proposed development), near Bridge of Gaur, in Rannoch, in the Perth and Kinross Council (PKC) area. This Environmental Statement (ES) has been prepared in support of an application submitted to Scottish Ministers under Section 36 of the Electricity Act 1989 (hereinafter referred to as “the 1989 Act”) seeking consent to construct and operate the proposed development.

## 1.2 Purpose of Environmental Statement

The Applicant has appointed a multi-disciplinary team to undertake an Environmental Impact Assessment (EIA) of the proposed development in accordance with the Environmental Impact Assessment (Scotland) Regulations 2011 (‘the EIA Regulations’). EIA is the systematic process of identifying, predicting and evaluating the environmental impacts of a proposed development. The EIA process is reported in this ES, which identifies the methodologies used to assess the environmental effects predicted to result from the construction and operation of the proposed development. Where appropriate, it also sets out mitigation measures designed to prevent, reduce and, if possible, offset potential significant adverse environmental impacts. An assessment of residual effects, those expected to remain following implementation of mitigation measures, is also presented.

The main findings and conclusions of this ES are summarised in a Non-Technical Summary (NTS), as required by the EIA Regulations. The NTS, provided as a stand-alone document, summarises the key findings of the EIA in easily accessible, non-technical language, ensuring everyone with an interest in the project can understand and access information on its predicted environmental effects.

This ES and NTS accompany the application for consent under Section 36 of the Electricity Act (1989) being submitted to the Scottish Government Energy Consents and Deployment Unit (ECDU).

## 1.3 Availability of the Environmental Statement

Copies of the ES may be obtained from Talladh-a-Bheithe Wind Farm Limited care of JLL. Volumes 2 and 3 of the ES (the written text) are available at a charge of £200 per hard copy, Volumes 4 and 5 of the ES (the Figures) are available at a cost of £300 per hard copy and the short non-technical summary (volume 1) is available free of charge. CD copies of the whole ES are available at a cost of £10.

Copies of the ES are available by request from:

JLL, 7 Exchange Crescent, Edinburgh EH3 8LL (Tel: 0131 225 8344)

Further copies of the ES can also be obtained by emailing: [talladhabheithe@communityline.org](mailto:talladhabheithe@communityline.org)

The ES and all associated application documents will also be available for view and download (as a PDF for screen viewing only) on the project website [www.tab-windfarm.org](http://www.tab-windfarm.org)

Copies of the documents will also be available for viewing at the following locations:

Perth and Kinross Council  
Pitlochry Area Office/Library,  
26/28 Atholl Road,  
Pitlochry,  
PH16 5BX  
and

Aberfeldy and Kinloch Rannoch Medical Practice,  
The Surgery,  
Kinloch Rannoch,  
Pitlochry,  
Perthshire  
PH16 5PR

#### **1.4 Representations to the Environmental Statement**

Any representations to the application should be made directly to Energy Consents and Deployment Unit at:

Energy Consents and Deployment Unit  
Scottish Government  
4th Floor  
5 Atlantic Quay  
150 Broomielaw  
Glasgow  
G2 8LU  
Email: [representations@scotland.gsi.gov.uk](mailto:representations@scotland.gsi.gov.uk)

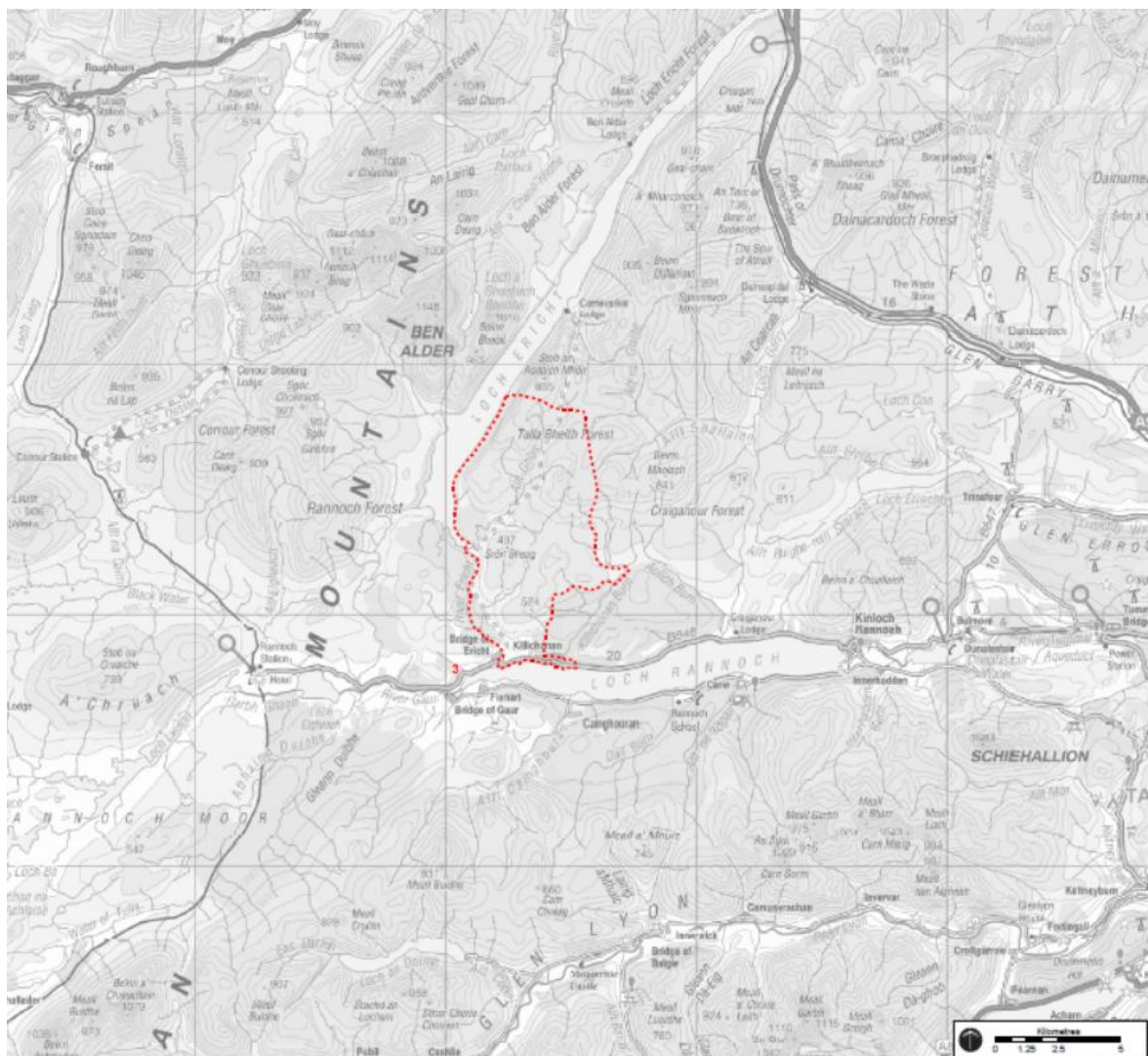
## 2 Overview of Site and Proposed Development

### 2.1 Site Description

The site of the proposed wind farm lies approximately 25 km south of Dalwhinnie and 14 km west-north-west of Kinloch Rannoch. The site is centred at OS Grid Ref 253489,759190 within the Talladh-a-Bheithe Estate. The Estate extends from the far north western end of Loch Rannoch northwards to the Talladh-a-Bheithe Forest and the southern end of Loch Erich. The proposed development is sited in an area of land which is dominated by a natural bowl in the central area of the Talladh-a-Bheithe Estate adjacent to the existing Scottish Hydro Electric and Estate access road to the east of the foot of Loch Erich.

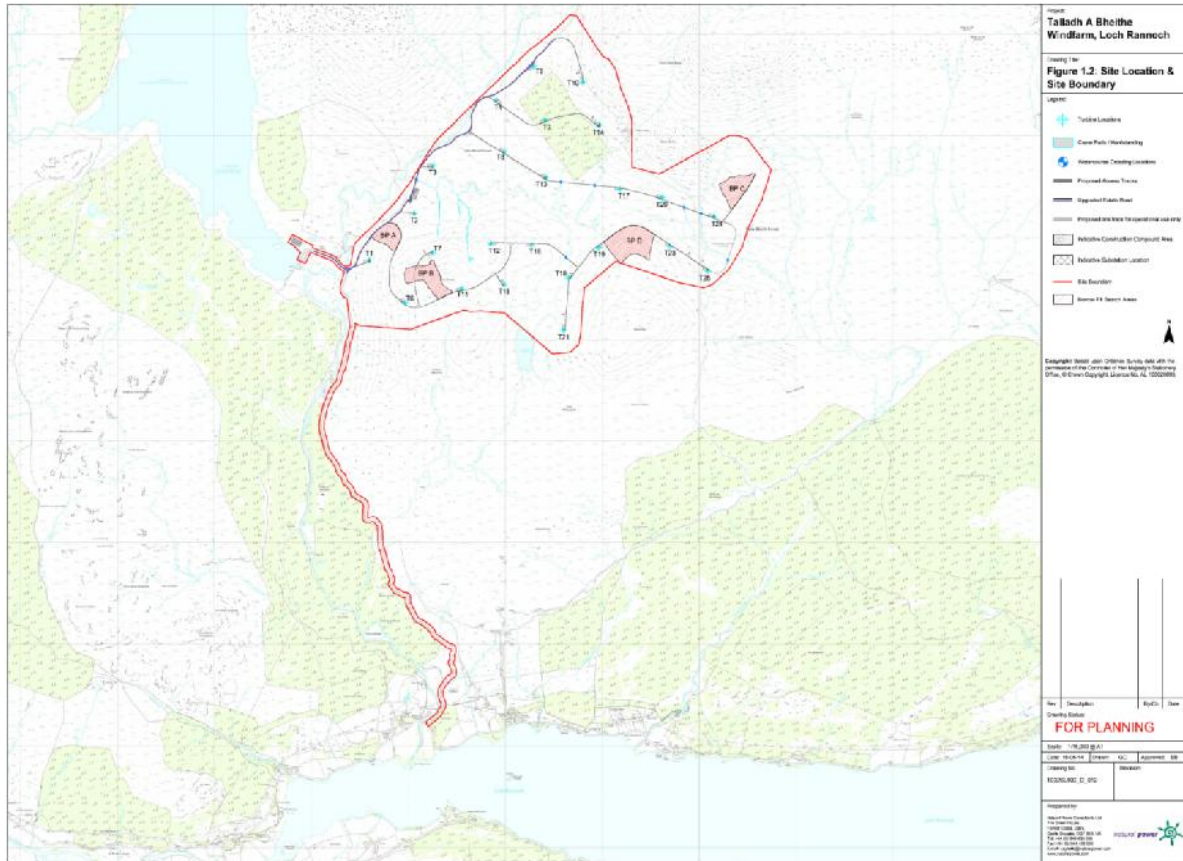
The Estate boundary is shown in Figure 1 below. The site occupies an area of 56.9 km<sup>2</sup>. The site location and site boundary are shown in Figure 2.

**Figure 1: Estate Boundary**



The site is characterised by open grassland and intermittent coniferous plantations and on part of which exists hydro energy infrastructure comprising power buildings, overhead power lines, large diameter pipework and roads. The Estate has been a producer of renewable hydroelectricity since the 1930's. The Estate is partially within the Loch Rannoch and Glen Lyon National Scenic Area (NSA) and includes the Coire Bhachdaidh Site of Special Scientific Interest (SSSI). The site of the proposed wind farm is not within either of these designations.

**Figure 2: Site Location and Site Boundary**



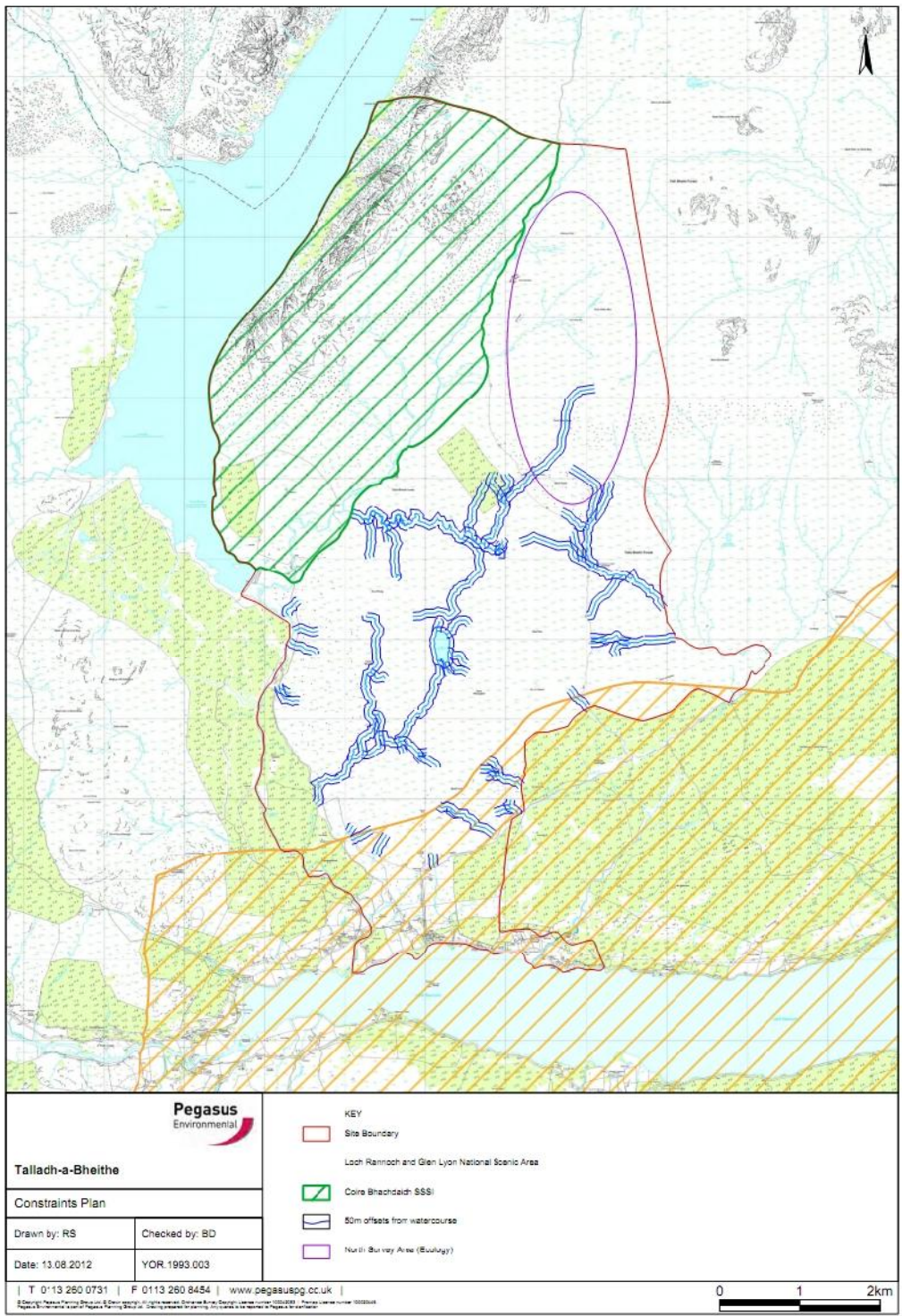
**2.2 Site Selection and Design**

The location of the site was selected as part of a review process undertaken by the Estate Owner seeking to diversify their operations, and to explore the potential for additional opportunities through energy and renewables, building upon the existing presence of significant hydro-electric infrastructure across large areas of the Estate.

In 2003 the Talladh-a-Bheithe estate owners, operating through a joint venture with the neighbouring estate Craiganour, jointly commissioned a development team to look into the feasibility of wind farm development focussing on the landholdings of both estates. During the review and site selection stage of the development extensive wind data collection was undertaken and several detailed studies on ecology, landscape, transport/access amongst various other assessments were performed. Although the first results determined a possible site on the neighbouring Craiganour estate, ongoing technical studies made it clear later in the development that for reasons of landscape and other technical issues, the selected search area had to be marked as less favourable for the proposed development. Talladh-a-Bheithe estate therefore decided in 2007 to undertake a more detailed assessment focussing on alternative search areas which had not been assessed before.

### Site Constraints Plan

Based on the feasibility study undertaken, it was determined that there was potential for a viable wind energy project at the site. The wind turbine locations have evolved in response to the detailed assessment work undertaken, with consideration especially given to the landscape and visual impacts, ecological impacts (mainly with respect to birds and their habitats) and the access for transportation of turbine parts and construction traffic.



## 2.3 Description of Development

The proposed development comprises 24 wind turbines of up to a maximum blade tip height of 125 m when vertical (up to 80 m hub height and up to 90m rotor diameter), each being around 3 MW in power rating. A number of ancillary development components are also proposed, including temporary construction compounds; borrow pits; permanent hardstandings adjacent to the wind turbines for construction, maintenance and decommissioning cranes; external transformers; access tracks; underground cables between turbines; an onsite substation and maintenance building with welfare facility and two permanent meteorological monitoring masts.

The total power output of the proposed development would be around 75 MW. Based on current typical capacity factors, the annual indicative total power output for the site would be around 167,141 MW hours per annum (MWh/p.a), and displace around 149,591 tonnes of carbon dioxide annually. The proposed development would contribute towards international and national targets for the generation of renewable energy and reduction in greenhouse gas emissions.

The electricity produced at the site will be exported to the national grid. The likely point of connection to the transmission network is at the Rannoch Power Station sub-station and thereafter utilising the existing overhead line to Tummel Bridge substation approximately 30km to the east of the site, although the final detail of this requires to be confirmed with the transmission licence holder. The capacity of the Tummel Bridge substation has recently been increased through the implementation of the Beauly to Denny overhead line upgrade. The grid connection will be subject to a separate consent, which is likely to be progressed by the transmission licence holder.



**Construction of a Turbine**

## 2.4 Operation and Maintenance

During operation, only site maintenance vehicles and local utility company vehicles will normally be required on the site. Regular and in some cases daily visits to the control building by maintenance personnel in four wheel drive or conventional passenger vehicles will occur following the commissioning phase. In the unlikely event that a major turbine component requires replacement, vehicles will use the new access tracks and crane pads.



## 2.5 Decommissioning

The operational lifespan of the proposed development would be approximately 25 years, after which it would be appropriately decommissioned unless further consents are granted.

All phases of decommissioning would be carried out in accordance with the approved Construction Method Statement (CMS) and would be managed by the Principal Contractor. Mitigation measures are discussed further within Chapter 4 of the ES; however, the potential decommissioning phase environmental impacts would be addressed through specific mitigation outlined within specific construction method statements, e.g. Environmental Management Plan (EMP), Traffic Management Plan (TMP), Drainage Management Plan (DMP), Peat Management Plan (PMP) etc.

## 2.6 Consultation

The Applicant has carried out extensive consultation with the communities close to the proposed development site. The consultation process is described in detail in the Pre-Application Consultation Report submitted as part of the Section 36 Electricity Act 1989 consent application, and is summarised in the accompanying Pre-Application Consultation Report which details the extent of engagement, results from this and how information has been taken into account in the development of the design for the proposed development.

The public consultation for the proposed development has used a variety of different methods during the engagement process, including direct consultation, two rounds of public exhibitions at Bridge of Gaur and Kinloch Rannoch in each case (in November 2013 and May 2014), newsletters distributed to local residents, and the setting up of a Community Liaison Group.

The Applicant has conducted a very extensive consultation on the proposed development. The Applicant believes strongly in adopting a best practice approach to community consultation and aims to be seen as the meeting and indeed exceeding the expected requirements of developer consultation for wind farm planning applications.

## 2.7 Policy Context

The EU, UK and Scottish Government renewable energy policy documents, and associated renewable energy and climate change targets all provide considerable support in favour of renewable energy development. Such targets and policies provide the basis of the need case for the proposed development.

The proposed development would aid the realisation of policy objectives and would make a valuable contribution to the respective unmet EU, UK and the Scottish 2015 and 2020 targets.

The proposed development site is covered by a Strategic Development Plan (SDP) and a Local Development Plan (LDP). Together, the SDP and the LDP constitute the Development Plan. The Development Plan for the proposed development is therefore:

- The TAYplan Strategic Development Plan 2012 – 2032; and
- The Perth and Kinross Local Development Plan 2014.

Policy 6 “Energy and Waste / Resource Management” of the SDP and Policy ER1 “Renewable and Low Carbon Energy Generation” of the LPD support the development of renewable and low carbon energy sources subject to

consideration of specified criteria including: individual effects on biodiversity, landscape character, visual integrity, transport implications, etc.

It is found that the Proposed Development can draw significant support from the Development Plan in a number of areas, and is in accordance with it when read as a whole.

## 3 Environmental Impact Assessment

### 3.1 Landscape and Visual

Chapter 7 of the ES presents a Landscape and Visual Impact Assessment (LVIA) of the proposed Talladh-a-Bheithe Wind Farm development and has been prepared by chartered landscape architects from Pegasus Group.

This LVIA considers the potential effects of the proposed development upon:

- individual landscape features and elements;
- landscape character;
- specific views; and
- the visual amenity of people who view the landscape



**Photomontage from Kinloch Rannoch**

#### **Summary of Effects on Landscape Features**

The construction phase would result in the removal of existing ground level vegetation, to facilitate the construction of the access tracks, borrow pits, the construction compound, substation, hardstandings, foundations and crane pads. The vegetation removed will be bog, mire and heathland type vegetation, prevalent across much of the surrounding landscape. The area of moorland affected as a proportion of the total within the surrounding landscape would be minimal. It is therefore considered that there would be no more than a slight effect on the existing land cover.

It has been assessed that there would be no significant effects on existing landscape features during the construction, operational or decommissioning phases of the development.

#### **Summary of Effects on Landscape Character**

The Talladh-a-Bheithe site boundary spans three character types all within the Tayside Landscape Character Assessment No.122.

- 2a Upper highland Glens with Lochs
- 2b Mid Highland Glens with Lochs

- 3 Highland Summits and Plateaux

Beyond a short distance from the site the ground level components of the development would not be prominent. Therefore impacts on landscape character as experienced in the wider landscape arise principally in relation to the introduction of turbines into the landscape and the resultant impact on the perceptual experience of landscape character.

It is noted that in general, the magnitude of change in landscape character will incrementally decrease with distance from the turbines as they gradually become less prominent. Some of the character areas considered in this appraisal extend for several kilometres. Inevitably therefore the effect on landscape character in the tract of landscape nearest the site will be more affected than the landscape within the same character area but at a greater distance from the site.



**Photomontage from Rannoch Station**

It has been assessed that there would be a significant effect on part of 7 landscape character units which cover the 35km study area surrounding the site. It is however acknowledged, that a much greater proportion of the landscape would not experience a significant effect on landscape character.

### Summary of Visual Effects

It has been assessed that there would be a significant visual effect at fourteen out of the twenty five assessment viewpoints, namely:

Viewpoint 4 - Leagag	Viewpoint 11 – Ben Alder Summit
Viewpoint 5 – Meall Buidhe	Viewpoint 19 – Rannoch Moor (within the Moor)
Viewpoint 6 – Meall a Mhuic	Viewpoint 21 – Meall Gorm
Viewpoint 7 – Meall Garbh	Viewpoint 22 – Sgor Gaibhre
Viewpoint 8 – Schiehallion	Viewpoint 23 – Sron Bealach
Viewpoint 9 – Beinn Mholach	Viewpoint 24 – Beinn Udlamain
Viewpoint 10 – Loch Erich, shoreline	Viewpoint 25 – Carn Dearg

Whilst it is acknowledged that there would be a significant effect on many of the assessment viewpoints included in the LVIA, it should be noted that these viewpoints were specifically selected to represent the locations within the study area which would have the greatest visibility of the proposals and therefore the greatest potential for significant effects. There are many further areas which would lie outside of the ZTV of the proposed development and which are therefore not represented by an assessment viewpoint, in line with best practice guidance. These areas include important tourist viewpoints such as Queens View, the northern shore of Loch Rannoch and the majority of the landscape to the north and northeast of the estate including the Cairngorms National Park.

It should also be noted that there would be no significant visual effect on any residential receptors, settlements, major roads, or railways in the vicinity of the site.

### **Summary of Effects on Landscape Designations**

It has been assessed that there would be significant effects on landscape character and visual amenity within parts of the Loch Rannoch and Glen Lyon National Scenic Area (NSA). It is not considered however that the proposals would have significant harm to the special qualities of the NSA. The mountain grandeur, wild summits and natural beauty within the NSA would not be directly affected by the proposed development, which lies beyond the NSA boundary with the nearest turbine over 1.8km away, and would remain appreciable following construction of the development.

There would be no significant effect on any of the other National Parks or National Scenic Areas which are located within the study area. These include the Cairngorms National Park and the Ben Nevis and Glen Coe NSA.

With regard to the Ben Alder Area of Search for Wild Land, it is judged that whilst being located within a Search Area the northern part of the Talladh-a-Bheithe estate does not have the same characteristics and attributes of core wild land as much of the central section of the Search Area to the west of Ben Alder and to the east of Ben Nevis. These areas are more rugged, remote and inaccessible when compared to the Talladh-a-Bheithe estate which lies adjacent to a loch managed and dammed as part of hydroelectric generation scheme and areas of plantation forestry and is traversed by a tarmac road. However, should it be considered that this area did form wild land, it is acknowledged that the assessment of effects on visual amenity landscape character did identify some significant effects within this area.

### **Summary of Cumulative Landscape and Visual Effects**

At the time of preparing this LVIA, there are no other wind farms or wind turbine schemes within 35km of the Talladh-a-Bheithe site which are either operational, under construction or in the planning system. An assessment of the potential for significant cumulative effects has been undertaken and no significant cumulative effects on landscape character or visual amenity have been assessed.

## **3.2 Ecology**

Ecology surveys were carried out to inform an Environmental Statement for the proposed Talladh-a-Bheithe wind farm.

Potential habitat receptors for the proposed site were identified from survey results and through consultation with statutory regulators and other consultees. These potential habitat receptors were blanket bog, wet heath, coniferous plantation, dry heath and acid grassland. Of these habitats, coniferous plantation was scoped out of the assessment as this habitat is not considered valuable within the site.

There will be some small losses of blanket bog and wet heath habitats.

Potential fauna species receptors identified for the proposed site, again from survey results and through consultation, were otter, water vole, pine marten, red squirrel, bats and fish. The nationally scarce plant species, interrupted club-moss and dwarf birch, were also identified as receptors. Red squirrel was scoped out of the assessment, as this species was not recorded within 4km of the site.

Three otter holts were found within the vicinity of the site during ecology surveys; however, these features were too far from the proposed construction areas to be at risk of disturbance by the works. Otters were found to forage within watercourses at the site.

Survey results show that a small water vole population is present within the Study area. The construction phase will have no significant effect on the water vole population.

Pine marten occasionally use land near to the proposed access track to the east of Loch Ericht for foraging or commuting; however, no evidence of pine marten was found within 200m of the proposed turbines.

Due to the lack of features for roosting bats within the development area, as well as the lack of bat activity recorded within the site, the proposed development will have no significant effect on bats.



**Proposed Location of Turbine T1 (View West down small watercourse)**

A number of fish species are qualifying features of the nearby River Tay SAC. Prior to construction, surveys will be undertaken to determine whether any sensitive fish species are present within water courses throughout the site. If such sensitive fish species are identified, method statements will be produced to minimise the potential impacts of the construction phase on these species.

Pre-construction surveys for protected and nationally scarce species will be carried out in order to check for changes in baseline conditions and any requirements for additional mitigation measures which would be agreed with SNH.

A number of mitigation measures are proposed to ensure the retained blanket bog and wet heath habitat is not affected by changes in hydrology brought about by construction works. Measures include the use of floating roads in areas of deep peat and the use of through drains.

The conifer plantation will be felled and the underlying habitat will be restored to blanket bog. This restoration process will follow the methods set out in the Talladh-a-Bheithe Outline Habitat Management Plan. Other

restoration measures, including the use of grip blocking and deer management to aid restoration of degraded peat adjacent to the site, are also detailed in the Outline Habitat Management Plan.

All other mitigation measures will be implemented through a Construction Method Statement to be prepared in consultation with Scottish Natural Heritage. Mitigation measures will include silt and pollution control measures to avoid impacts to watercourses. Site speed limits will be imposed to reduce the risk of animal collision. Good practice measures will be adopted to minimise effects on otter and water vole. If pre-construction surveys identify pine marten or mountain hare within the potential influence of the scheme, good practice measures to minimise the effects on these species will also be adopted. An Ecological Clerk of Works will be present on site to oversee enabling works and construction.

The assessment concluded that following the implementation of identified mitigation measures there will be no significant negative impacts on ecology.

### 3.3 Ornithology

Ornithology surveys were carried out to inform an Environmental Statement for the proposed Talladh-a-Bheithe Wind farm. The following protected sites were scoped into the Environmental Impact Assessment due to a combination of their proximity to the site and the bird species they were designated for: Coire Bhachdaidh SSSI, Ben Alder and Aonach Beag SSSI, Drumochter Hills SPA/SSSI.

Through a combination of detailed bird surveys over 6 years (2009-2014), existing data and consultation with relevant organisations, the following ornithological receptors were identified: pink-footed goose, golden eagle, hen harrier, merlin, osprey, golden plover, greenshank, black grouse and red throated diver.

One pair of golden eagle has regularly nested within 4 km of the proposed development during the last 10 years. Surveys show that the wind farm area is infrequently used by the resident eagle pair at Talladh-a-Bheithe. It is possible that during the construction phase barge traffic on Loch Ericht could cause low level disturbance to a golden eagle nest site. Mitigation measures to reduce this disturbance to eagles will be carried out including fixed barge routes across the loch and speed limits.

Surveys identified high levels of sub adult eagle activity within the site only during 2013. These anomalous results are likely to be the result of high levels of deer shooting on the estate which resulted in an increase in easily available food (deer entrails) attracting sub-adults into the site from traditional foraging areas.

Including the 2013 survey data within the collision risk model results in high levels of predicted mortality for golden eagle sub-adults. If the anomalous 2013 data is removed from the model, mortality rates are no longer significant. Furthermore operational phase displacement effects are likely to reduce the potential collision risk to eagles and mitigation measures (food resource management) will be used to encourage eagles away from the collision risk area.

The development will result in the loss of a historic merlin nest site (last used in 2009). It is not envisaged that this impact will affect merlin nesting productivity in the locality since there are a number of potential alternative nest sites available and construction works will be phased to avoid disturbance during the breeding season.

A pair of greenshank and two pairs of golden plover have nested within the survey area. Construction works would be phased to avoid disturbance effects on breeding greenshank and golden plover.

Two red throated diver nest sites have been recorded within 3km of the site (on the neighbouring estate), however intensive surveys revealed that this species very rarely flies through the site at collision risk height.

A black grouse lek was recorded in the east part of the Garracher Plantation within the study area in 2010. The importance of the lek site has decreased since 2010. To minimise the disturbance of black grouse lek sites vehicular movements during the construction phase would not be permitted prior to sunrise or after sunset during the peak black grouse lekking period.

A Construction Method Statement (CMS) will be prepared in consultation with Scottish Natural Heritage to avoid, reduce and compensate impacts on birds. This document will secure the mitigation measures and will be delivered by an Ecological Clerk of Works.

In addition to the CMS, an Outline Habitat Management Plan identifies habitat creation, enhancement and management proposals to benefit birds and other biodiversity within the estate.

Following the implementation of the proposed mitigation measures, the proposed development alone or in combination with other developments will not have a likely significant effect on any of the valued bird receptors or any protected site designated for birds.

### 3.4 Historic Environment

The Cultural Heritage chapter considers the likely effects on archaeology and built heritage interests of the construction and operation of the proposed development. The assessment has been undertaken by CFA Archaeology Ltd (CFA), informed by comments and information supplied by HS, PKC and PKHT. The assessment was conducted in accordance with the Institute for Archaeologists Code of Conduct (2013), and Standard and Guidance for Historic Environment Desk-based Assessment (2012) and Field Evaluations (2013).

A desk-based assessment and reconnaissance walk-over field survey of the site and the proposed access route was carried out to inform the proposed wind farm design. The study also identified heritage assets within 10km of the proposed wind farm that could have their settings affected.

The assessment has identified eight heritage assets of varying levels of importance, including two concentrations of shieling huts, assessed as being of regional heritage importance, within the site. Assets identified largely relate to medieval / post-medieval settlement, farming and pastoral activity. An assessment of the known historic environment assets of the surrounding area indicates that there is a low to moderate probability of encountering sites or features of archaeological interest within the site; but it is assessed that there is a low to negligible potential of encountering features of archaeological importance during construction works.

The windfarm layout has been designed to avoid all significant archaeological remains; but one feature, a trackway of lesser importance, would receive a residual construction impact of negligible significance (non-significant in EIA terms). It is possible that archaeological remains such as artefacts and features, relating to the repeated use of the shieling grounds identified through the study, may survive below the current ground level. Mitigation, in the form of a watching brief in the vicinity of those assets, would offset (through archaeological recording and the recovery of archaeological data) any predicted construction impact.





### **Trackway on Talladh-a-Bheithe site**

There would be no significant residual operational or cumulative impacts on heritage assets and therefore historic environment interests.

## **3.5 Geology, Hydrogeology and Hydrology**

This section presents a summary of Chapter 11, regarding the potential impacts from the proposed development upon the geology, hydrogeology and hydrology of the site. The assessment of effects covers the construction, operation and decommissioning of the proposed development and identifies aspects of the proposed development which may have the potential to influence the existing baseline conditions.

A desk study and several site walkovers were carried out to assess the proposed development in terms of geological, hydrological and hydrogeological conditions. There are no designated sites within the site boundary of the proposed development, however, the main watercourse, drains into the River Tay Special Area of Conservation (SAC). It is assessed that there will be no negative impact arising due to the proposed development.

There are a number of watercourses within the proposed development boundary that are at risk from flooding. Any change to the hydrological regime could increase the risk of on-site and downstream flooding due to the increase in impermeable areas and construction of watercourse crossings. Due to the moderately steeped sloped topography there is also the potential for overland flow to occur, exacerbated by the dominance of slowly permeable peat and peaty soils.



**Example of Peat Core on Talladh-a-Bheithe site**

A Construction Environmental Management Plan (CEMP), or similar, will ensure that mitigation measures are put in place and activities are carried out in such a manner as to prevent or minimise effects on the ground and surface waters.

During the construction of the proposed development there will be a number of activities taking place that could result in negative effects upon surface and ground waters. A number of potential pollutants will be present on site, including oils, fuels, chemicals and unset concrete as well as waste and wastewater from staff facilities. Furthermore, increased levels of sediment are likely to be generated through the excavation of borrow pits and turbine foundations and erosion of stockpiled soils and peat, bare ground, site and access tracks and drainage ditches.

Prior to the implementation of mitigation measures, the magnitude of effect will be minor to negligible, which will be reduced to an anticipated significance of effects of minor to not significant following consideration of mitigation measures.

The implementation of the mitigation measures and the ongoing operational effects on the surface and ground water environment are anticipated to be of minor or no significance.



**Proposed Location of Turbine 3 (View SE)**

### 3.6 Noise

The assessment of construction and decommissioning noise considered typical noise emissions from anticipated construction plant during each stage of the development construction, commissioning and decommissioning. The assessment considered a pessimistic scenario of construction plant operating simultaneously at the activity point closest to noise sensitive receptors.

Predicted noise levels were below derived construction noise limits for daytime period, but exceeded noise limits for evenings and weekends, and night-time. Consequently, no construction activities are proposed within 1 km of noise sensitive receptors during evenings and weekends and no activities at night.

No significant noise effects are, therefore, expected during the construction and decommissioning phases of the proposed development. The assessment of operational noise considered noise emissions from the development across a range of operational wind speeds.

Predictions of operational noise levels at the nearest noise sensitive receptors were undertaken in accordance with industry best practice and with the conservative assumption of no topographic screening of noise by the natural land relief. Allowing for the conservative assumptions in the noise calculations, the predicted noise levels are below both the most stringent noise limits for the protection of outdoor amenity and those for the prevention of sleep disturbance. No significant noise effects are, therefore, expected during the operational phase of the development.

The potential for adverse effects from low frequency noise and infrasound, or amplitude modulation from the operational turbines was also considered with reference to published research on each phenomenon. On the basis of published research it is considered that it is unlikely that any of the phenomena will occur on the site, thus no significant effects are predicted.

### 3.7 Electromagnetic Interference, Aviation and Shadow Flicker

This section presents a summary of Chapter 13, regarding the potential impacts from the proposed development upon aviation, MoD interests, communication operations and existing site infrastructure. This section also presents the assessment of the potential impacts of shadow flicker arising from the proposed development.

In relation to impacts on civil aviation interests, the assessment shows that the site is outwith any of the zones where visibility to radar could be possible for turbines up to 125m. Indeed due to the remote location of the site there is no radar visibility within 10km of the site. Equally, in relation to military aviation interests the proposed development falls comfortably outside of the visibility zone of MoD radar. The wind farm is also in an area of low priority for military low flying.

In relation to telecommunication infrastructure consultation with Ofcom, the Joint Radio Company (JRC), British Telecom and Atkins Ltd have concluded that there will be no impact on telecommunications.

In terms of potential impacts on TV reception significant impacts are unlikely as there are so few residences nearby who could be affected. If any impacts on TV reception are experienced the developer will ensure that mitigation is implemented to restore any affected properties to a normal service.

In relation to impacts on infrastructure an online search (using linesearch.org) found that no operators had assets within the site boundary. However, detailed map investigation has identified a large diameter pipe feeding the pen stock at Rannoch Power Station from Loch Ericht crosses part of the site access route at NN 51223 61635. Should any other infrastructure be found around or within the site boundary subsequent to the application the Applicant would undertake mitigation to avoid any adverse impacts.

In relation to potential shadow flicker Impacts, no residential dwellings lie within ten rotor diameters (900 m) of the turbines. It is therefore considered that the proposed development will not create any adverse impacts due to shadow flicker.

### 3.8 Access, Traffic and Transport

Potential transport effects can arise principally through the construction phase of the proposed development. The approach to developing the transport strategy for the proposals is founded upon minimising the use of local roads, and utilising alternative means of transport wherever possible. The transport of abnormal loads (turbine components) will be prioritised using rail options to Rannoch Station, and by road to Dalwhinnie, where they will be transferred to the site by barge on Loch Ericht.

The potential effects on transportation are reported in a Transport Statement which has informed the content of the transport chapter in the ES. This assessment considers the effects of the proposed development on the local road network and the capacity of the network to support the additional construction traffic. Operational traffic is considered to be low, infrequent and not significant enough to merit assessment. Due to baseline data and the anticipated end of operation being unavailable, a separate assessment would be produced to cover the chosen decommissioning option prior to this phase

Baseline traffic flows were recorded and sensitive receptors identified on two potential construction routes to the proposed development and an assessment undertaken on each. The routes are as follows:-

- Route 1 – B846 (utilising rail to deliver to Rannoch Station);
- Route 2 – A889 from the A9 (transport of larger component parts by road to Dalwhinnie and then by barge on Loch Ericht to the site).



**Example of Component Transport by Rail**

Whilst the percentage increase of traffic flows on each route is high, particularly on the B846, the overall increase in vehicle trips compared to the existing capacity of the road network is negligible. It is, therefore, considered that the existing road network can accommodate the anticipated construction traffic. The construction phase extends over a 15 month period, with varying construction vehicle flows per month. Assessment was undertaken for the highest traffic generating month.

Although construction traffic will be temporary, a range of mitigation measures are proposed to support the proposals, including the implementation of a Traffic Management Plan, which will be agreed in advance with Perth & Kinross Council, Transport Scotland and The Highland Council. The proposed mitigation will reduce the effects of severance, driver delay and safety to non-significant. In addition, the Applicant will be responsible for maintenance and repair of the surface on each haulage route resulting from the increase in traffic during the construction period.

The full assessment of effects on traffic and transport is provided in Chapter 14 of the ES.

### 3.9 Socio-Economics and Tourism

The socio-economic assessment has considered how the proposed development might be expected to affect the economy in Perth and Kinross. The assessment has been undertaken in respect of both the economy and tourism sector as a whole and with regard to individual tourism receptors.

The socio-economic assessment found one potential effect that has found to be significant (a beneficial effect), the impact of construction spending at the level of the Perth and Kinross economy, which is expected to generate a total economic impact of £19.8 million GVA and 158 job years in Perth and Kinross. Other economic impacts include:

- the total economic impact during the operations and maintenance phase is an estimated total annual economic impact of £1.4 million GVA and 14 jobs in Perth and Kinross and an estimated £3.9 million GVA and 42 jobs in Scotland;
- the contribution to public sector finances through non-domestic rates paid each year would be an estimated £1.8 million. This would be worth £45.5 million during the 25 year life time of the proposed development;
- the contribution to the Local Area through the community benefit fund which could be worth £0.5 million annually and £9.4 million over 25 years and could support the equivalent of almost 7 jobs in the local social economy; and
- the economic impact from the anticipated community ownership model.

Significant impacts are assessed for how they can either be optimised or mitigated. The impact of construction spend at the level of the Perth and Kinross economy was assessed to be beneficial. Therefore the assessment considered how to optimise these impacts. The magnitude of these beneficial effects in Perth and Kinross will depend on the proportion of expenditure that occurs in Perth and Kinross so in order to maximise these beneficial effects the developer could take steps to ensure that local businesses secure as high a proportion of available contracts as possible.

No significant adverse effects have been identified in the socio-economic assessment.

In summary during construction phase the residual effects have been assessed as;

- Perth and Kinross economy – moderate (beneficial); and
- Scottish economy – negligible.
- during the construction phase no potential effects in terms of a change in visitor numbers or a change in visitor spend was assessed as likely to occur.

During the operational phase the potential significance of the potential effects has been assessed as;

- local economy – major (beneficial);
- walking and cycling routes in Local Area – minor;
- individual accommodation business in Local Area (estate) – negligible;
- individual accommodation business in Local Area (non estate) – negligible;
- outdoor activities – negligible;
- West Highland Railway – negligible;
- tourism sector in Local Area as a whole – minor; and
- tourism sector in Perth and Kinross – negligible.

It has been assessed that the potential effect in relation to the proposed development which has been found to be significant (beneficial), relates to construction spend at the level of the Perth and Kinross economy. In addition, no significant adverse effects have been identified in the socio-economic assessment.

### 3.10 Carbon Balance

Electricity produced by a wind farm development replaces electricity which would otherwise have been produced by a conventional (coal or gas) power station, and therefore presents carbon savings. There is however, a carbon cost associated with the manufacture, construction and decommissioning of a wind farm development. A carbon balance assessment was undertaken to assist consultees with their review of the wind farm's impact on the existing peat body within the proposed site, and to assess the impact in terms of carbon dioxide (CO<sub>2</sub>) emissions against the total potential carbon savings attributed to the proposed development.

The assessment revealed that the expected annual energy output of the proposed development is 167,141 MW/Yr. Therefore, the potential expected CO<sub>2</sub> emissions saved per year, should the wind farm energy replace the most carbon intensive form of electricity generation (coal-fired generation), is 149,591 tonnes of CO<sub>2</sub> (tCO<sub>2</sub>). If the wind farm energy replaces grid-mix electricity generation which is the mix of all generation types including electricity from low carbon methods such as hydropower, the potential expected emissions saved per year is 71,871 tCO<sub>2</sub>.

The conclusion of the assessment reveals that the proposed wind farm will effectively pay back its expected carbon debt from manufacture, construction, impact on habitat and decommissioning within 1.6 years, if it replaces the fossil fuel electricity generation method. The fossil fuel electricity generation type is the mix of all type of fossil fuels (e.g. gas, oil and coal) and is considered to represent the intermediate scenario between best case scenario (payback of 0.1 years), whereby the wind farm energy replaces coal-fired electricity generation, and worst-case (payback of 3.8 years), whereby the wind farm energy replaces grid-mix generation. The results also illustrate that over the 25 year lifespan of the proposed development, if the wind farm electricity replaces fossil fuel electricity generation, then it is expected to generate 23 years' worth of clean energy.



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