Noise

Background

Pre-application advice for the proposed Development was requested from the Highland Council (THC) and a response provided in March 2019. The key aspects identified by THC Environmental Health relate to operational noise, cumulative noise, background noise measurements and construction noise and are discussed herein.

Consultant Experience and Expertise

The technical lead for noise will be Mark Jiggins, Hoare Lea. Mark's experience extends to many aspects of environmental noise spanning more than 20 years. Mark is an expert in the assessment of wind farm noise, having been involved since the earliest days of the industry and the UK's first commercial wind farms. Mark was a member of the Department of Trade and Industry Wind Turbine Noise Working Group which wrote the ETSU-R-97 guidance now used throughout the UK when assessing wind farm noise. Mark has developed advanced remote noise monitoring systems.

Baseline

An initial review of the baseline data surveyed for other windfarm schemes, and which are publicly available in the assessments for those schemes, suggests that existing baseline levels have been sufficiently defined for the purposes of an assessment of operational noise in accordance with ETSU-R-97 and best practice (see Table 1). Therefore, undertaking additional noise monitoring is not anticipated to be necessary, which in any case may have to be conducted with nearby adjacent operational wind turbines, and could therefore be contrary to best practice.

Potentially Significant Effects

During construction, noise could arise from both onsite activities, such as the construction of onsite access tracks, turbine foundations, the substation/control building etc., and from the movement of construction related traffic both onsite and travelling on public roads to and from the Site.

During operation, wind turbines have the potential to create noise effects through both aerodynamic noise and mechanical noise. Noise emitted from other operational elements of the development are likely to be negligible, and so the operational noise assessment will focus on the noise emitted from the proposed wind turbines.

Proposed Assessment Methodology and Approach

The noise impact assessment will assess the effects of construction (including traffic) of the proposed Development and operational noise of the wind turbines on nearby noise sensitive receptors (including cumulatively with nearby windfarms as necessary). The assessment will identify where significant effects may occur, what mitigation measures may be necessary, what residual effects there may be and what post commissioning monitoring would be undertaken.

The study area for the assessment will comprise the nearest noise sensitive receptors considered to be representative of residential dwellings in the immediate vicinity. These are dwellings that may experience noise effects from construction or operation of the proposed Development based on professional judgement and initial noise modelling. An initial review of those receptor locations nearby and that require to be assessed is shown below in Table 1 and on Figure 5.1. For each receptor, relevant information is discussed, which it is proposed to reference when assessing noise from the proposed Development. The initial review will be updated and list of receptor locations amended prior to the formal assessment being undertaken in order to ensure that the most accurate baseline environment is taken account of.

Table 1-List of receptor locations adjacent to the proposed Development which may require operational noise to be assessed. Included for each receptor is a discussion of sources of information on background noise levels and derived ETSU R 97 noise criteria

Receptor (Easting, Northing)	Assessment of the Proposed Development
Slickly (nearest location of three dwellings) (329472, 966952)	A baseline noise survey was undertaken at Slickly for the Lyth Windfarm ¹ at the dwelling Mooredge (329784, 966792). This baseline data will be used to represent those receptor locations at Slickly that are to the west of the road.
Slickly Croft (330192, 966236)	A baseline noise survey was undertaken at this location for the Slickly Windfarm ² . This baseline data will be used to represent this receptor consistent with the Slickly Windfarm assessment.
Syster (nearest of several dwellings) (327029, 969084) Lochend (nearest of several dwellings) (327495, 967732)	The noise assessment for the Lochend Windfarm ³ utilised baseline noise data from a noise survey undertaken for the Earl's Cairn Windfarm ⁴ at the location Syster (327029, 969084). This baseline data will be utilised for assessment of the Development at receptors at Syster and Lochend, consistent with the Lyth Windfarm assessment.
Ruthers of Howe (330212, 963012) Bramble Cottage (336028, 964989) Caith Cottage (336286, 965396)	Operational noise from the Development may be sufficiently below the ETSU-R-97 noise limits (at least 10 dB(A) below) that assessment would not be required. Should assessment be required, baseline data obtained at Slickly Croft (330192, 966236) for the Slickly Windfarm (see above) were used to represent these locations and would be utilised for assessment of the Development.
All other receptors near to the Development	Baseline noise surveys were undertaken for the Lyth Windfarm at Mooredge (329784, 966792), Greenfields (328640, 964307), Reaster Cottage (327032, 964392) and Moss-side House (325453, 966507). These baseline data were found to be reasonably consistent from location to location with regard to the relationship of background noise levels to wind speed (both day-time and night-time). It is proposed to use an average of these four baseline survey locations (separate for day-time and night-time periods), to represent all additional locations around the Development.

The assessment of construction noise effects will be undertaken in accordance with the guidance contained within BS 5228:2009+A1:2014: Code of Practice for Noise and Vibration Control on Construction and Open sites. Part 1: Noise (BS 5228-1). An assessment of potential impacts arising from any changes in traffic flows as a result of the proposed Development will also be undertaken as part of the construction noise assessment. Where necessary, appropriate levels of mitigation will be identified, in accordance with best practice, to ensure that noise levels are acceptable during the construction phase.

The assessment of operational noise effects will be undertaken using ETSU-R-97 'The Assessment of Rating of Noise from Wind Farms' (The Working Group on Noise from Wind Turbines, 1996). The report defines a procedure for assessing and rating windfarm noise.

ETSU-R-97 recommends that noise limits should be set relative to existing background noise levels at the nearest receptors and that these limits should reflect the variation in background noise with wind speed. Separate noise limits apply for day-time and for night-time periods. Daytime limits are chosen to protect a property's external amenity, and night time limits are chosen to prevent sleep disturbance indoors, with windows open.

Based on the approach set out in Table 1 above and the adopted quiet day and night-time wind varying background noise levels for each identified noise sensitive receptor, noise emission limits will be derived in accordance with the methodology set

¹ Lyth Windfarm Environmental Statement, Chapter 10: Noise, Eurowind May 2013.

² Slickly Windfarm Environmental Statement, Chapter 11: Noise, Statkraft, December 2019.

³ Lochend Windfarm Noise Impact Assessment, Chapter 5, Wind Harvest, July 2013.

⁴ The Highland Council application 12/00317/SCOP, Eurowind, January 2012.

out in ETSU-R-97. The significance of the predicted scheme noise emission levels will then be determined against these criteria when operating in combination with other wind energy schemes (operating, consented but not yet operational or proposed within the planning system). Consideration of cumulative operational noise effects will be completed in accordance with the IOA Good Practice Guidance (2013).

A representative wind turbine that meets the design requirements for the proposals will be nominated for the assessment of noise from the operational windfarm. A computer model will be constructed and used to predict noise levels resulting from the operation of the proposed Development, based on the methodology detailed in ISO 9613-2:1996, with the specific modelling procedure defined in the IOA Good Practice Guidance (2013).

Issues to be Scoped In or Out

Ground borne vibration resulting from the operation of wind turbines is imperceptible at typical receptor separation distances and is therefore proposed to be scoped out from the noise impact assessment.

Noise associated with the operation of the substation and routine maintenance visits and operational traffic is likely to be negligible, and therefore will be scoped out of the noise impact assessment.

Due to advances in turbine design, low frequency noise and vibration from turbines has been reduced. The Scottish Government references a report for the UK Government and concerning Low Frequency Noise that notes:

"...there is no evidence of health effects arising from infrasound or low frequency noise generated by wind turbines that were tested."

Therefore, it is proposed that low frequency noise is scoped out from the impact assessment.

Consultees

The consultees below will be approached for information to inform the EIA. These consultees may also be contacted by the Scottish Government regarding the scope of the EIA:

• The Highland Council, Environmental Health

Consultee Questions

• Do consultees agree with the proposed approach to the noise and vibration assessment as set out above?

Relevant Policy and Guidance

The noise assessment will be undertaken with reference to the following documents:

- The Working Group on Noise from Wind Turbines, (1996). ETSU-R-97 The Assessment and Rating of Noise from Wind Farms.
- Scottish Government, (2011). PAN 01/2011 Planning and Noise and associated Technical Advice Note.
- Scottish Government, (2014). Onshore Wind Turbines: Planning Advice. Online planning advice.
- (Institute of Acoustics (IoA), (2013). A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise
- British Standards Institution, 2014). BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise
- HMSO Department of Transport (1988). Calculation of Road Traffic Noise
- The Highways Agency, Transport Scotland, Transport Wales, the Department for Regional Development (Northern Ireland), (2011). Design Manual for Roads and Bridges (DMRB), Volume 11, section 3, Part 7, Traffic Noise and Vibration.
- The Highland Council, (2018). Caithness and Sutherland Local Development Plan (CaSPlan).
- The Highland Council, (2012). Highland-wide Local Development Plan (HwLDP).



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