

Coille Beith Wind Farm EIA Report

Technical Appendix 2.4: Shadow Flicker Results

June 2025



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1 Technical Appendix 2.4: Shadow Flicker Results

1.1 Summary

1.1.1. This Technical Appendix presents the results of the potential impacts on residential amenity resulting from shadow flicker from the Proposed Development. The shadow flicker model run has been undertaken to consider the maximum tip height of 200 m and a representative rotor diameter (RD) of 172 m. The Scottish Government web-based renewable advice for onshore wind turbines recommends that a separation between turbines and dwellings beyond 10 RD should avoid nuisance issues, such as shadow flicker, and annoyance to nearby residents. The advice quotes:

"In most cases however, where separation is provided between wind turbines and nearby dwellings (as a general rule 10 RD), 'shadow flicker' should not be a problem."

1.1.2. An initial model was run using 10 RD (1.72 km), however no receptors fell within the 10 RD Study Area. For completeness a model run of 15 RD (2.58 km) was also undertaken. At 15 RD, nine receptors potentially susceptible to shadow flicker were identified within the Study Area as shown on **Figure 2.4.1**. The model run indicates one receptor (Receptor 9) located between 10 and 15 RD from the nearest turbine experiences shadow flicker.

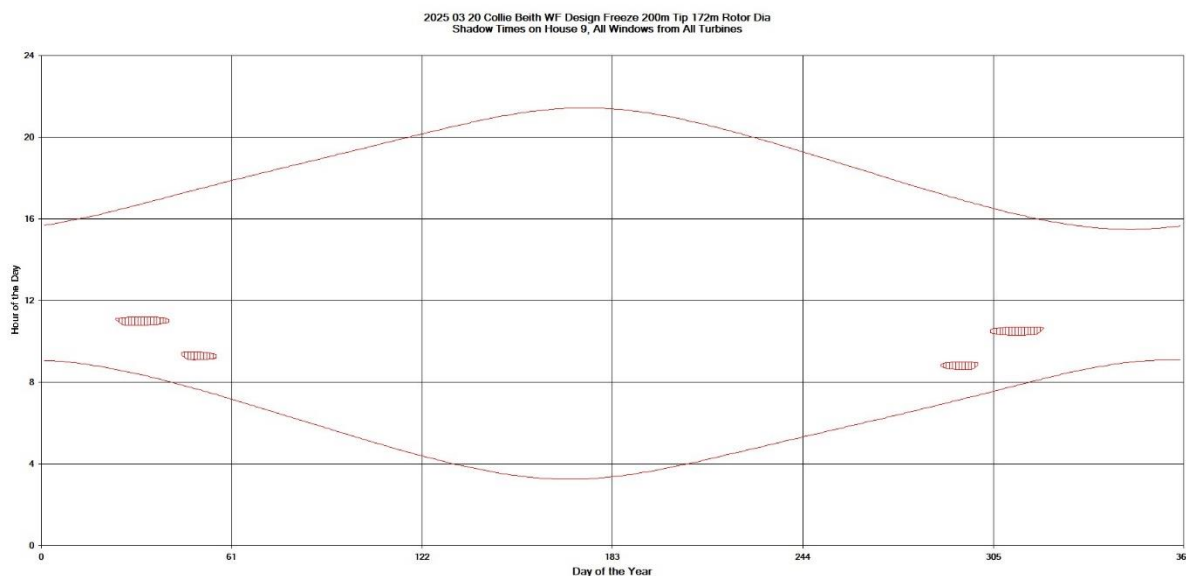
1.1.3. This analysis provides an extremely conservative estimate of the extent that the properties would be affected by shadow flicker. Due to frequent cloud cover, low irradiance intensity, turbines not turning at all times, the presence of intervening vegetation and turbine rotors not being aligned with the sun in a way to cast maximum shadow onto the proposed properties all of the time, the number of hours when shadow flicker would affect Receptor 9 is anticipated to be far lower. Receptors and anticipated shadow flicker results are presented in **Table 1.1**.

Table 1.1 – Receptors Experiencing Shadow Flicker

Receptor Number	Easting	Northing	Max hours per day	Mean hours per day	Total Hours
1	243459	900708	0	0	0
2a	241641	901009	0	0	0
2b	241585	901063	0	0	0
3	238929	900418	0	0	0
4	238922	900410	0	0	0
5	238914	900398	0	0	0
6	238909	900391	0	0	0
7	238901	900380	0	0	0
8	238897	900373	0	0	0
9	239050	900057	0.41	0.32	19.4

1.1.4. **Graph 1.1** shows the duration and time of year Receptor 9 is expected to experience shadow flicker.

Graph 1.1 - Potential Shadow Flicker Effects: Receptor 9

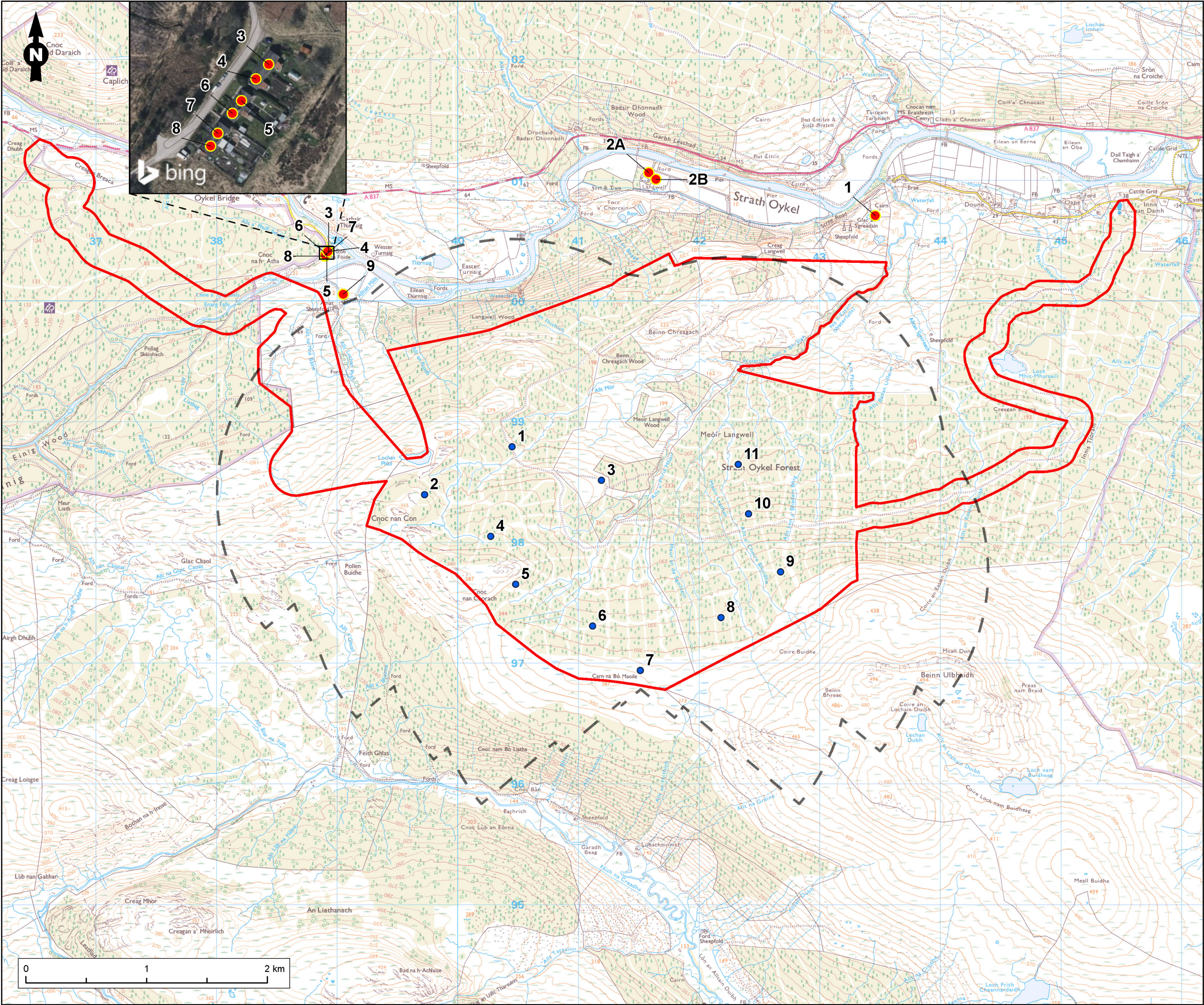


- 1.1.5. There are no published guidelines in Scotland that define acceptable levels of shadow flicker. In the absence of specific guidelines, the assessment has considered the Parsons Brinckerhoff (2011)¹ paper which considers guidelines from different countries relating to shadow flicker. This assessment has used the following criteria that are based on Northern Irish and German guidance as listed in the above paper: shadow flicker should not be allowed to exceed 30 hours per year or 30 minutes per day. As such, properties where shadow flicker would potentially exceed these thresholds would be subject to significant effects, in the absence of mitigation.
- 1.1.6. As shown above there are no receptors within the standard 10 RD Study Area and only Receptor 9 within the 15 RD Study Area experiences shadow flicker. The level anticipated does not meet the significance criteria listed above, as such no mitigation is required as there are no significant effects.

1.2 Conclusion

- 1.1.7. The results of this assessment and the running of the model has shown that there are no receptors within the standard 10 RD Study Area. Within 15 RD there are nine receptors with only one (Receptor 9) experiencing shadow flicker. The level of shadow flicker experienced at Receptor 9 does not meet the significance criteria and as such no mitigation is required as there are no significant effects.

¹ Parsons Brinckerhoff. (2011). Update of UK Shadow Flicker Evidence Base. Report prepared for Department of Energy and Climate Change. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48052/1416-update-uk-shadow-flicker-evidence-base.pdf [Accessed 15/03/2025].



Legend

Site Boundary

Study Area (10X RD)

Turbine

Receptors

Figure Title

Shadow Flicker Study Area

Project Name

Coille Beith Wind Farm

Project No./Filyr ID

1620016742 / REH2024N00315

Date

April 2025

Figure No.

1

Revision

1.0

Prepared By

RD

Scale

1:30,000 @A3

Client

Statkraft

Statkraft

RAMBOLL

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