Foel Fach Wind Farm Limited.

Foel Fach Wind Farm – Environmental Statement Volume III

Appendix 4.4: Shadow Flicker Assessment

Project Reference: 664094

DECEMBER 2025

Energy for generations

Coriolis Energy

RSK

PAGERPOWER
Urban & Renewables

Shadow Flicker Impact Assessment

RSK Environment Limited

Foel Fach Wind Farm

December 2025

ADMINISTRATION PAGE

Job Reference:	12870B
Author:	Vijayatha Vijayaraghavan (Issues 1 to 3); Waqar Qureshi (Issue 5)
Telephone:	01787 319001
Email:	vijayatha@pagerpower.com; waqar@pagerpower.com

Reviewed By:	Jacob Cunningham; James Plumb
Email:	jacob@pagerpower.com; james@pagerpower.com

Issue	Date	Detail of Changes
1	June 2025	Initial issue
2	July 2025	Report Update
3	November 2025	Report Update
4	November 2025	Updated shadow flicker modelling
5	December 2025	Administrative amendments

Stour Valley Business Centre, Brundon Lane, Sudbury, CO10 7GB

T:*+44 (0)1787 319001* E:*info@pagerpower.com* W: *www.pagerpower.com*

EXECUTIVE SUMMARY

Report Purpose

Pager Power has been commissioned to investigate the potential shadow flicker impact of a proposed wind development located near Bala, Gwynedd, UK upon residential amenity.

The proposed wind turbines have tip heights of 200 meters and 220 m above ground level (agl), hub heights of 112.42 m and 132.46 m agl, and rotor diameters of 175.16 m and 175.08 m, respectively. Coordinate data is presented in Section 2.2.

Assessment Methodology

The model assumes that each dwelling receptor has a single window that is 1 m by 1 m and has a centre that is 1.5 m above ground and directed towards the turbine. A minimum Sun elevation of 2 degrees has been considered. All results are with respect to the reference threshold limits of 30 minutes per day and/or 30 hours per year. See Section 5.2 for further details.

Conservative Approach

Shadow flicker effects can occur only on sunny days. Additionally, other factors could also diminish the effects, including:

- Visibility from the receptor;
- Distance from the receptor;
- Window position;
- Cloud cover;
- Varying wind direction;
- Low wind speed – which could result in the turbines not operating for a period of time.

The analysis used conservative assumptions, considering only clear daylight conditions and window locations with a direct line-of-sight of the turbines.

Overall Conclusions

Shadow flicker effects can only occur if there is a clear, unobstructed path between the turbine and the affected window(s). If the turbine is not visible from a receptor, no shadow flicker effects will be experienced, as the turbine's shadow will not pass over the window.

In total, five dwellings are predicted to experience shadow flicker effects for more than the threshold limits of **30 minutes per day and/or 30 hours per year**, based on a conservative assessment where the model assumes clear skies during all sunlight hours.

Mitigation options will be explored post-consent if required, on the basis of further detailed consideration (this could include the consideration of weather data and ground surveys, accounting for micrositing, and final turbine model selection). If it can be confirmed that the shadow flicker effects received in reality at properties within 11 rotor diameters distance of the

turbines would be less than the threshold limits of 30 minutes per day and/or 30 hours per year, then mitigation would not be necessary.

A typical mitigation measure implemented for shadow flicker from wind turbines is a shutdown scheme. The shutdown scheme should either reduce shadow flicker effects to below the recommended threshold limits or eliminate all shadow flicker effects completely throughout the year.

A shadow flicker control module is proposed to be installed on turbines that are predicted to cause an impact. It is therefore concluded that there will be no significant shadow effect on residential properties and further shadow flicker assessment has been scoped out.

Mitigation Overview

Mitigation for five dwellings could be implemented if deemed necessary at the time of implementation of planning consent. This would most likely be in the form of a shutdown scheme. A shutdown scheme defines the times between which a turbine should be shut down to eliminate shadow flicker effects on each dwelling, assuming clear sunny skies. The term 'shutdown' means that the rotating blade is completely still and does not move for the period of time specified.

A shadow flicker control module is proposed to be installed on turbines that are predicted to cause an impact. It is therefore concluded that there will be no significant shadow effect on residential properties and further shadow flicker assessment has been scoped out.

LIST OF CONTENTS

Administration Page 2
Executive Summary 3
Report Purpose 3
Assessment Methodology 3
Conservative Approach 3
Overall Conclusions 3
Mitigation Overview 4
List of Contents 5
List of Figures 6
List of Tables 6
About Pager Power 7
1 Introduction 8
1.1 Overview 8
2 Proposed Development Details 9
2.1 Proposed Development Layout 9
2.2 Wind Turbine Details 9
3 Shadow Flicker Guidance Review 11
3.1 Overview 11
3.2 Guidance Overview 11
3.3 Discussion – 10 Rotor Diameter Exclusion Zone 14
3.4 Acceptable Limits 15
4 Identification of Receptors 16
4.1 Assessed Receptors 16
5 Technical Assessment 18
5.1 Overview 18
5.2 Methodology and Assumptions 18
5.3 Shadow Flicker Results Summary 19
5.4 Detailed Shadow Flicker Results 19

5.5 Shadow Flicker Date Time Graph 22
6 Conclusions 23
6.1 Results Overview 23
6.2 Overall Conclusions 23
6.3 Mitigation Overview 24
Appendix A – Technical Information 25
Receptor information 25
Appendix B – Contour Map (Flicker Butterfly) 27
Overview 27

LIST OF FIGURES

Figure 1 Proposed wind turbine layout 9
Figure 2 Assessed dwelling receptors (pink polygon shows a 10 rotor diameter assessment area, white polygon shows the 11 rotor diameter assessment area) 17
Figure 3 Shadow flicker times – all receptors 22

LIST OF TABLES

Table 1 Assessed wind turbine details 10
Table 2 Guidance – shadow flicker 14
Table 3 Key parameters for the shadow flicker assessment 19
Table 4 Results summary – effects at receptors 19
Table 5 Results – shadow flicker per receptor 20
Table 6 Results – shadow flicker per turbine 21

ABOUT PAGER POWER

Pager Power is a dedicated consultancy company based in Suffolk, UK. The company has undertaken projects in 63 countries internationally.

The company comprises a team of experts to provide technical expertise and guidance on a range of planning issues for large and small developments.

Pager Power was established in 1997. Initially, the company's focus was on modelling the impact of wind turbines on radar systems.

Over the years, the company has expanded into numerous fields, including:

- Renewable energy projects.
- Building developments.
- Aviation and telecommunication systems.

Pager Power prides itself on providing comprehensive, understandable and accurate assessments of complex issues in line with national and international standards. This is underpinned by its custom software, longstanding relationships with stakeholders and active role in conferences and research efforts around the world.

Pager Power's assessments withstand legal scrutiny and the company can provide support for a project at any stage.

1 INTRODUCTION

1.1 Overview

Pager Power has been commissioned to investigate the potential shadow flicker impact of a proposed wind development located near Bala, Gwynedd, UK upon residential amenity.

The proposed wind turbines have tip heights of 200 meters and 220 m above ground level (agl), hub heights of 112.42 m and 132.46 m agl, and rotor diameters of 175.16 m and 175.08 m, respectively. Coordinate data is presented in Section 2.2.

This report contains the following:

- Proposed wind farm details;
- Details of technical analysis;
- Shadow flicker explanation;
- Receptor details;
- Assessment of receptors;
- Assessment of hours per year/day;
- Shadow Flicker Hours Chart (per receptor);
- Assessment of hours per year/day;
- Conclusions.

2 PROPOSED DEVELOPMENT DETAILS

2.1 Proposed Development Layout

The proposed turbine layout in the context of the surrounding area is shown in Figure 1 below.

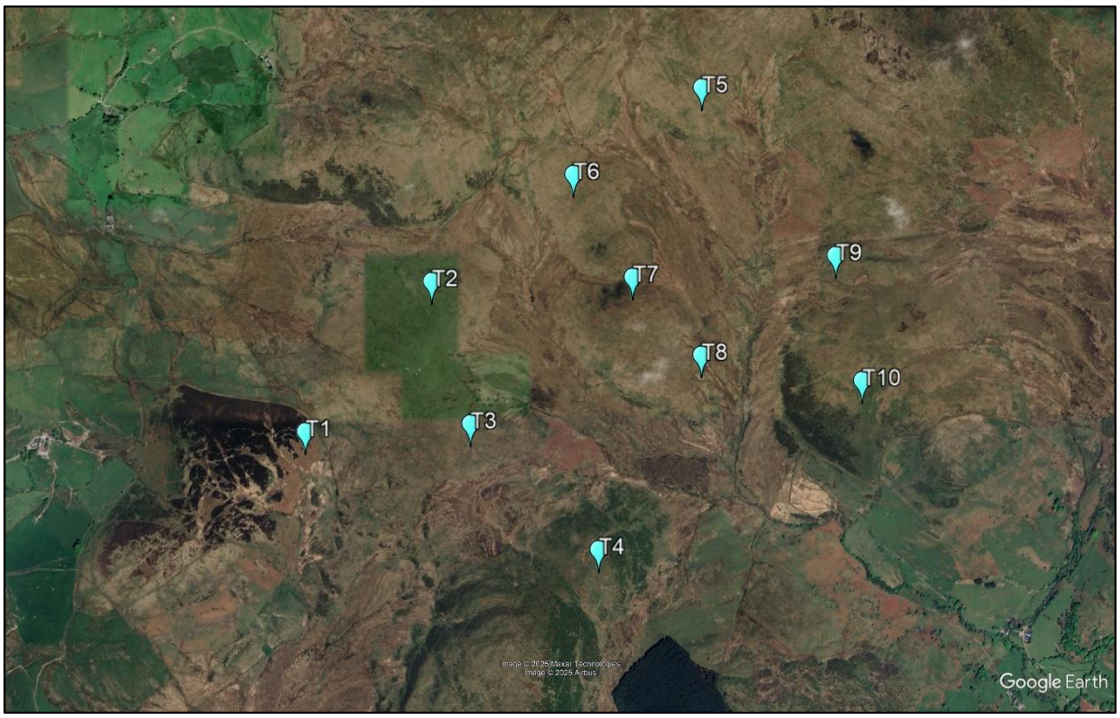


Figure 1 *Proposed wind turbine layout*

2.2 Wind Turbine Details

The wind turbine coordinates and dimensions are presented in Table 1 below and on the following page.

Turbine	Easting	Northing	Hub Height (m) (agl)	Tip Height (m) (agl)
T1	293056.67	340953.25	112.42	200
T2	293524.80	341484.12	112.42	200
T3	293653.26	340968.65	132.46	220
T4	294106.05	340505.66	112.42	200
T5	294515.13	342160.50	132.46	220
T6	294044.81	341858.27	132.46	220

Turbine	Easting	Northing	Hub Height (m) (agl)	Tip Height (m) (agl)
T7	294250.73	341483.70	132.46	220
T8	294492.62	341197.72	132.46	220
T9	294985.19	341545.42	132.46	220
T10	295070.71	341093.05	112.42	200

Table 1 *Assessed wind turbine details*

3 SHADOW FLICKER GUIDANCE REVIEW

3.1 Overview

Rotating wind turbine blades can cause brightness levels to vary periodically at locations where they obstruct the Sun's rays. This can result in a nuisance when the shadow is cast over the windows of residential properties. This intermittent shadow is described by the term 'shadow flicker', and it can be a cause of annoyance at residences near onshore wind turbines if it occurs for a significant period of time during the year[1].

3.2 Guidance Overview

There are various sources of guidance with regard to shadow flicker impacts caused by wind turbines. The most relevant extracts have been presented and summarised in Table 2 below and on the following pages. However, the material regarding shadow flicker is quite extensive, and not all aspects have been summarised here.

Source	Extract	Remarks
Scottish Government Onshore wind turbines: planning advice	Under certain combinations of geographical position, time of day and time of year, the sun may pass behind the rotor and cast a shadow over neighbouring properties. When the blades rotate, the shadow flicks on and off; the effect is known as 'shadow flicker'. It occurs only within buildings where the flicker appears through a narrow window opening. The seasonal duration of this effect can be calculated from the geometry of the machine and the latitude of the potential site. Where this could be a problem, developers should provide calculations to quantify the effect. In most cases however, where separation is provided between wind turbines and nearby dwellings (as a general rule, 10 rotor diameters), 'shadow flicker' should not be a problem. However, there is scope to vary layout/reduce the height of turbines in extreme cases.	This has been considered for technical context, although not strictly applicable to Wales. In this assessment, dwellings within 11 rotor diameters of a turbine have been assessed.

[1] No significant negative health effects are anticipated. See Table 2.

Source	Extract	Remarks
Parsons Brinckerhoff, 2011 – *Update of UK Shadow Flicker Evidence Base*	This report presents an update of the evidence base which has been produced by carrying out a thorough review of international guidance on shadow flicker, an academic literature review and by investigating current assessment methodologies employed by developers and case study evidence. Consultation (by means of a questionnaire) was carried out with stakeholders in the UK onshore wind farm industry including developers, consultants and Local Planning Authorities (LPAs). This exercise was used to gauge their opinion and operational experience with shadow flicker, current guidance and the mitigation strategies that can and have been implemented.	The report was read and understood by Pager Power and provides context for flicker reports.
Parsons Brinckerhoff, 2011 – *Update of UK Shadow Flicker Evidence Base*	The three key computer models used by the industry are WindPro, WindFarm and Windfarmer. It has been shown that the outputs of these packages do not have significant differences between them. All computer model assessment methods use a "worst case scenario" approach and don't consider "realistic" factors such as wind speed and cloud cover which can reduce the duration of the shadow flicker impact.	Pager Power uses WindFarm software for its analysis. The exclusion of variable environmental factors within the model (such as cloud cover) produces the conservative results as shown in this report.
	Mitigation measures which have been employed to operational wind farms such as turbine shut down strategies, have proved very successful, to the extent that shadow flicker cannot be considered to be a major issue in the UK.	-

Source	Extract	Remarks
	Companion Guide to PPS22 makes the following statements: • Shadow flicker only occurs inside buildings where the flicker appears through a narrow window opening; • Only properties within 130 degrees either side of north of the turbines can be affected at UK latitudes; Shadow flicker has been proven to occur only within ten rotor diameters of a turbine position.	Note that this guidance was officially withdrawn as of March 2014 however the technical context pertaining to shadow flicker is still relevant for the purpose of this report. In this assessment, dwellings within 11 rotor diameters of a turbine have been assessed, and the properties outside of 130 degrees either side of north have been included in the modelling for completeness.
Parsons Brinckerhoff, 2011 – *Update of UK Shadow Flicker Evidence Base*	On health: *'On health effects and nuisance of the shadow flicker effect, it is considered that the frequency of the flickering caused by the wind turbine rotation is such that it should not cause a significant risk to health. Mitigation measures which have been employed to operational wind farms such as turbine shut down strategies, have proved very successful, to the extent that shadow flicker can not be considered to be a major issue in the UK.'*	-

Source	Extract	Remarks
	[Onshore Wind Energy Planning Conditions Guidance Note, Renewables Advisory Board and BERR (2007)] states that only dwellings within 130 degrees either side of north relative to a turbine can be affected and the shadow can be experienced only within 10 rotor diameters of the wind farm.	Secondary source presented within the Parson Brinckerhoff report. In this assessment, dwellings within 11 rotor diameters of a turbine have been assessed.
Department for Communities & Local Government (July 2013): Planning practice guidance for renewable and low carbon energy.	Under certain combinations of geographical position and time of day, the Sun may pass behind the rotors of a wind turbine and cast a shadow over neighbouring properties. When the blades rotate, the shadow flicks on and off; the impact is known as 'shadow flicker'. Only properties within 130 degrees either side of north, relative to the turbines.	This document replaced 'Planning for renewable energy: a companion guide to PPS22'. It should be noted that no maximum distance is given within this document. In this assessment, dwellings outside of 130 degrees either side of north have been included in the modelling for completeness.

Table 2 *Guidance – shadow flicker*

3.3 Discussion – 10 Rotor Diameter Exclusion Zone

It is common to use 10 rotor diameters as a maximum limit within which significant shadow flicker effects can occur. The validity of this limit is discussed at length within the relevant literature[2]. The guidance on this particular criterion varies in different documents and countries, with some stating that effects can only occur within this distance and others stating that this is a general rule or that the risk beyond this distance is low.

It is typical to consider shadow flicker effects at dwellings within 10 rotor diameters of a turbine. This is generally considered an appropriate zone for potentially significant effects based on the

[2] See Table 1 for references.

available guidance and because other features of the modelling are highly conservative[3] as set out in Table 3.

For this assessment, the 10 rotor diameter area has been extended to consider receptors within 11 rotor diameters. This is to account for dwellings close to the 10 rotor diameter boundary and for micrositing. This is line with consultation feedback received from PEDW at the scoping stage, and wind turbine schemes recently consented in Wales.

3.4 Acceptable Limits

There is no formal limit on the amount of shadow flicker that is considered acceptable within the UK. Other European countries do have limits, and these vary from one country to another[4]. A typical limit, which has been utilised in Northern Ireland, Germany, and Belgium, is 30 hours per year with a maximum of 30 minutes per any one day. Since there is no formal guidance on this subject in the UK, the discussion of the results relative to these limits is for reference purposes only.

If shadow flicker effects are predicted beyond this limit, mitigation may be required to reduce the occurrence of shadow flicker below threshold levels. This is typically controlled by remote automatic wind turbine shutdown so that, in effect, no neighbouring property will experience the occurrence of shadow flicker beyond the limits specified above.

Shadow flicker effects can only occur under specific conditions, so, in reality, turbine shutdown may not be required to eliminate effects, i.e. shadow flicker cannot occur if the weather at the time of predicted effects is not clear and sunny or if the rotor does not face onto the receptor.

[3] For example, the assumption that all properties have a single window facing the nearest wind turbine and ignoring potential cloud cover or low wind speeds that could reduce the effects.
[4] Parsons Brinckerhoff (2011): *Update of UK Shadow Flicker Evidence Base.*

4 IDENTIFICATION OF RECEPTORS

4.1 Assessed Receptors

4.1.1 Dwelling Receptors Overview

The model is based on the conservative assumption that each assessed receptor has a window facing directly towards the proposed wind turbines, with a clear view of the rotating turbine blades. The model has considered windows with a size of 1 m by 1 m with a centre that is 1.5 m above ground level.

4.1.2 Identified Dwelling Receptors

The assessment area is constructed considering an 11-rotor diameter assessment area from each turbine (shown as the white polygon in Figure 2 on the following page). 27 dwellings have been identified within the assessment area, of which eight lie outside of 10 rotor diameters of any turbine (19-22 and 24-27. Figure 2 on the following page shows the receptor identification process for shadow flicker analysis and the wind farm location, specifically:

- The proposed turbines position (blue icons);
- The identified receptors (black and white radial icons).

Receptor details, including coordinates, distance and bearing to the proposed wind turbines, are shown in Appendix A.

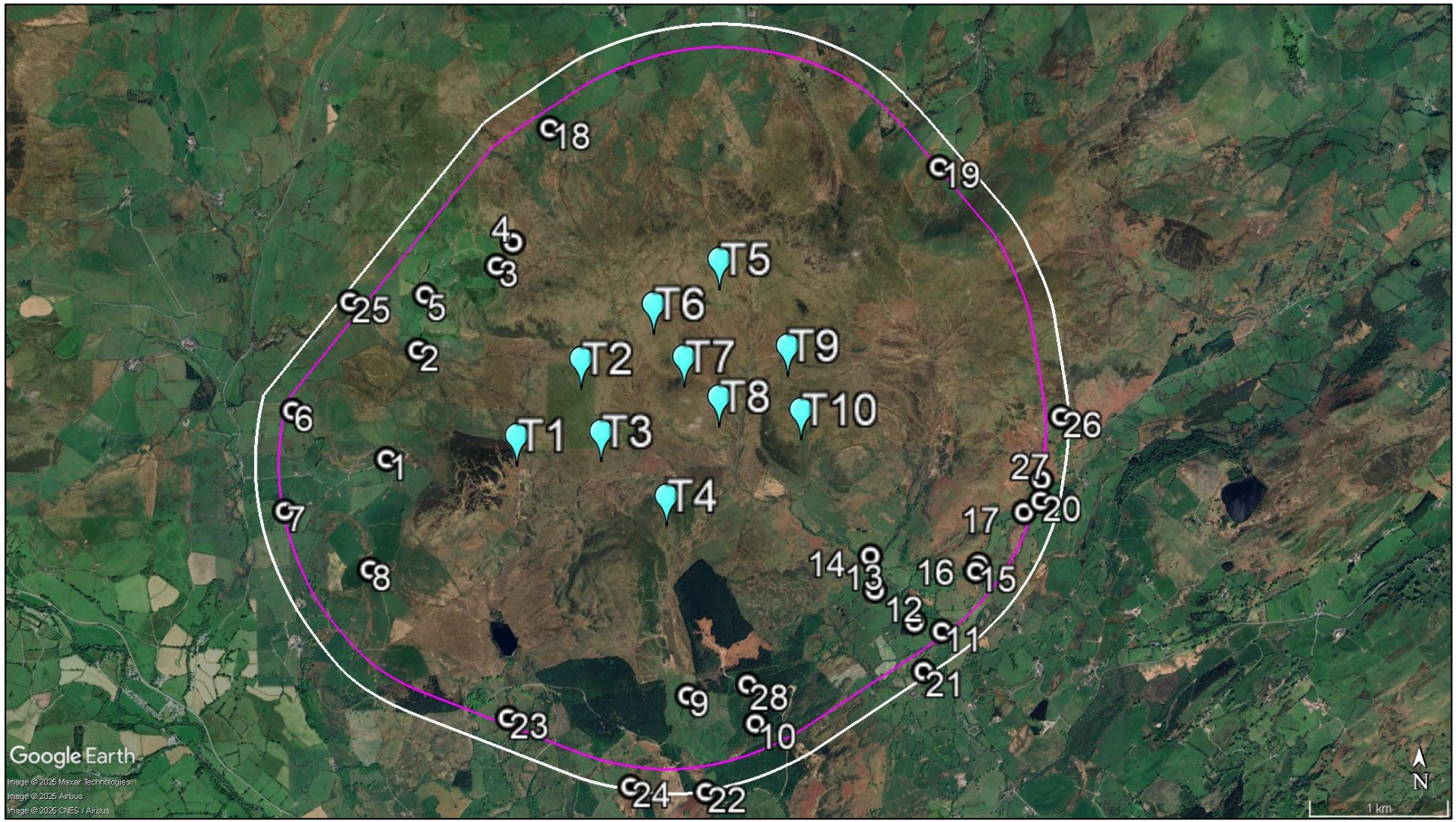


Figure 2 *Assessed dwelling receptors (pink polygon shows a 10 rotor diameter assessment area, white polygon shows the 11 rotor diameter assessment area)*

5 TECHNICAL ASSESSMENT

5.1 Overview

The following sections present an overview of the methodology, assumptions and modelling results. Note that the time results are given as a decimal, where 0.5 hours = 30 minutes.

5.2 Methodology and Assumptions

The model considers terrain, the relative geometry of the turbine to the receptor, the dimensions of the wind turbine and the path of the Sun across the sky throughout a single year. All results are analysed with respect to reference limits of 30 minutes per day and/or 30 hours per year. The main parameters for the assessment are presented in Table 3 below and on the following page.

Parameters	Pager Power Assessment
Terrain Model	OSGB 50m DTM
Software	Windfarm R4
Turbines	10
Assessment area	11 rotor diameters
Minimum sun height over horizon	2 degrees
Meteorological assessment	Assessment considered clear skies
Windows	1 window per dwelling 1 m by 1 m with a centre that is 1.5 m above ground level Used an orientation of windows based on the conservative assumption that windows face the nearest proposed wind turbine.
Eye height	1.5 m above ground level
Cumulative impacts	The nearest existing wind development, Hafoty Ucha, is located over 2 km from the proposed development. The nearest dwelling (Dwelling 18) to both the proposed and existing developments lies beyond the 10 rotor-diameter threshold of Hafoty Ucha. Hence, there will not be any potential for significant cumulative effects.

Table 3 *Key parameters for the shadow flicker assessment*

5.3 Shadow Flicker Results Summary

The result summary for the assessment of the 22 dwellings is presented in Table 4 below.

Number of receptors predicted to experience no shadow flicker	Number of receptors predicted to experience less than 30 minutes per day and less than 30 hours per year	Number of receptors predicted to experience more than 30 minutes per day and/or more than 30 hours per year	Maximum hours per day predicted at any receptor	Maximum hours per year predicted at any receptor
16	Seven	Five	0.96 (Dwelling 2)	80.4 (Dwelling 2)

Table 4 *Results summary – effects at receptors*

5.4 Detailed Shadow Flicker Results

5.4.1 Shadow Flicker Effects Per Receptor

Table 5 below and on the following page, quantifies the potential shadow flicker effects per dwelling, where 0.5 (maximum) hours refers to the threshold limit of 30 minutes.

Dwelling	Distance to Nearest Turbine (m)	Days per year of shadow flicker	Maximum hours per day	Mean hours per day	Total hours per year
1	933.83	97	0.84	0.48	46.2
2	1095.74	167	0.96	0.48	80.4
3	1067.19	96	0.67	0.37	35.8
4	1149.40	69	0.53	0.35	24.4
5	1313.20	150	0.55	0.4	59.5
6	1682.80	0	0	0	0
7	1726.56	36	0.43	0.34	12.1
8	1272.90	69	0.37	0.21	14.8
9	1218.02	0	0	0	0
10	1549.88	0	0	0	0

Dwelling	Distance to Nearest Turbine (m)	Days per year of shadow flicker	Maximum hours per day	Mean hours per day	Total hours per year
11	2130.52	0	0	0	0
12	1919.07	50	0.41	0.29	14.4
13	1571.18	36	0.38	0.24	8.5
14	1484.25	40	0.49	0.38	15.1
15	1579.31	0	0	0	0
16	1565.78	0	0	0	0
17	1703.19	0	0	0	0
18	1655.28	74	0.46	0.3	22.1
19	1814.075	0	0	0	0
20	1797.141	0	0	0	0
21	2133.337	0	0	0	0
22	1922.81	0	0	0	0
23	1782	0	0	0	0
24	1891	0	0	0	0
25	1681	83	0.46	0.33	27.6
26	1879	0	0	0	0
27	1771	0	0	0	0
28	1268	0	0	0	0

Table 5 *Results – shadow flicker per receptor*

5.4.2 Shadow Flicker Effects Per Turbine

Table 6 below and on the following page quantifies the total potential shadow flicker effects for each turbine.

Turbine	Days per year of shadow flicker	Maximum hours per day	Mean hours per day	Total hours per year
T1	221	1.02	0.54	119.1
T2	236	0.83	0.49	115.2
T3	109	0.48	0.29	31.3
T4	90	0.67	0.4	35.6
T5	54	0.46	0.32	17.4
T6	104	0.53	0.31	32.2
T7	18	0.38	0.31	5.6
T8	0	0	0	0
T9	0	0	0	0
T10	0	0	0	0

Table 6 *Results – shadow flicker per turbine*

5.5 Shadow Flicker Date Time Graph

Figure 3 below illustrates the combined potential shadow flicker times for all receptors from the proposed wind development (red hatched areas). The red lines illustrate the sunrise and sunset times. The Shadow Flicker is only possible within a few hours of sunrise/sunset when the sun is relatively low in the sky.

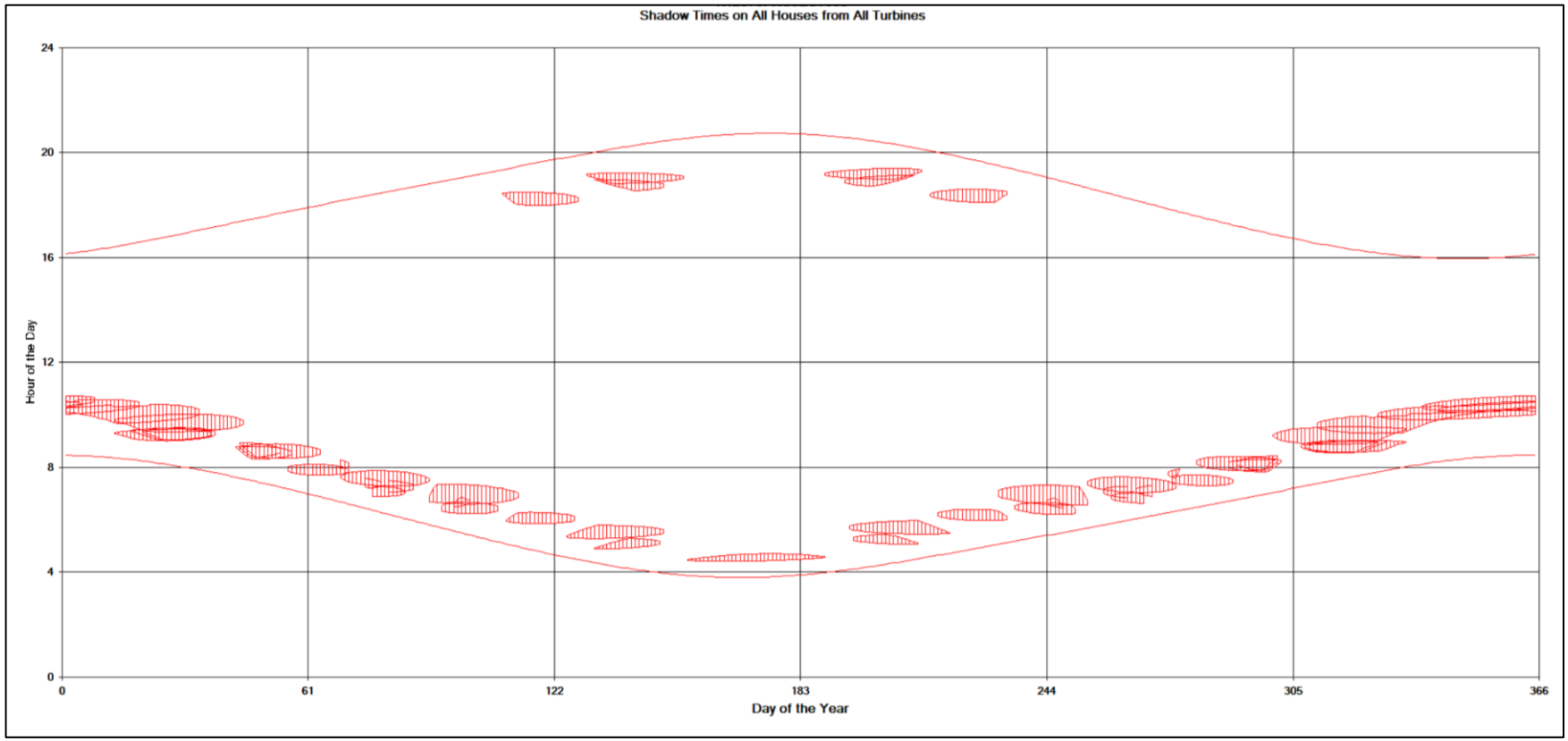


Figure 3 *Shadow flicker times – all receptors*

6 CONCLUSIONS

6.1 Results Overview

The overall conclusions are presented below:

- The modelling results indicate that five of the 28 assessed dwellings would receive shadow flicker effects for more than the reference threshold limit of 30 minutes per day and/or 30 hours per year;
- The modelling results indicate that seven of the 28 assessed dwellings would receive shadow flicker effects for less than the reference threshold limit of 30 minutes per day and/or 30 hours per year;
- The remaining 16 dwellings are predicted not to experience shadow flicker effects from the proposed wind development;
- The nearest existing wind development, Hafoty Ucha, is located over 2 km from the proposed development. The nearest dwelling (Dwelling 18) to both the proposed and existing developments lies beyond the standard 10 rotor-diameter threshold of Hafoty Ucha. Hence, there will not be any potential for significant cumulative effects.

6.2 Overall Conclusions

Shadow flicker effects can only occur if there is a clear, unobstructed path between the turbine and the affected window(s). If the turbine is not visible from a receptor, no shadow flicker effects will be experienced, as the turbine's shadow will not pass over the window.

In total, five dwellings are predicted to experience shadow flicker effects for more than the threshold limits of **30 minutes per day and/or 30 hours per year**, based on a conservative assessment where the model assumes clear skies during all sunlight hours.

Mitigation options will be explored post-consent if required, on the basis of further detailed consideration (this could include the consideration of weather data and ground surveys, accounting for micrositing, and final turbine model selection). If it can be confirmed that the shadow flicker effects received in reality at properties within 11 rotor diameters distance of the turbines would be less than the threshold limits of 30 minutes per day and/or 30 hours per year, then mitigation would not be necessary.

A typical mitigation measure implemented for shadow flicker from wind turbines is a shutdown scheme. The shutdown scheme should either reduce shadow flicker effects to below the recommended threshold limits or eliminate all shadow flicker effects completely throughout the year.

A shadow flicker control module is proposed to be installed on turbines that are predicted to cause an impact. It is therefore concluded that there will be no significant shadow effect on residential properties and further shadow flicker assessment has been scoped out.

6.3 Mitigation Overview

Mitigation for five dwellings could be implemented if deemed necessary at the time of implementation of planning consent. This would most likely be in the form of a shutdown scheme. A shutdown scheme defines the times between which a turbine should be shut down to eliminate shadow flicker effects on each dwelling, assuming clear sunny skies. The term 'shutdown' means that the rotating blade is completely still and does not move for the period of time specified.

A shadow flicker control module is proposed to be installed on turbines that are predicted to cause an impact. It is therefore concluded that there will be no significant shadow effect on residential properties and further shadow flicker assessment has been scoped out.

APPENDIX A – TECHNICAL INFORMATION

Receptor information

The table below and on the following page shows the receptor information incorporated into the modelling.

Receptor	Easting	Northing	Latitude (°)	Longitude (°)	Distance to Nearest Turbine (m)	Bearing of Window (°)
1	292126	341030	52.95576	-3.60723	933.83	94.71
2	292360	341799	52.96272	-3.60400	1095.74	140.52
3	292948	342382	52.96808	-3.59545	1067.19	147.28
4	293073	342541	52.96953	-3.59364	1149.40	156.85
5	292420	342194	52.96628	-3.60324	1313.20	122.72
6	291431	341388	52.95884	-3.61769	1682.80	104.97
7	291354	340667	52.95235	-3.61859	1726.56	80.46
8	291997	340248	52.94871	-3.60888	1272.90	56.35
9	294238	339299	52.94063	-3.57523	1218.02	324.47
10	294720	339082	52.93877	-3.56799	1549.88	318.37
11	296080	339704	52.94463	-3.54796	2130.52	292.10
12	295881	339776	52.94524	-3.55095	1919.07	292.35
13	295598	340013	52.94731	-3.55524	1571.18	288.27
14	295570	340261	52.94953	-3.55573	1484.25	279.49
15	296327	340136	52.94856	-3.54443	1579.31	307.30
16	296347	340186	52.94901	-3.54415	1565.78	305.40
17	296685	340550	52.95234	-3.53924	1703.19	288.59

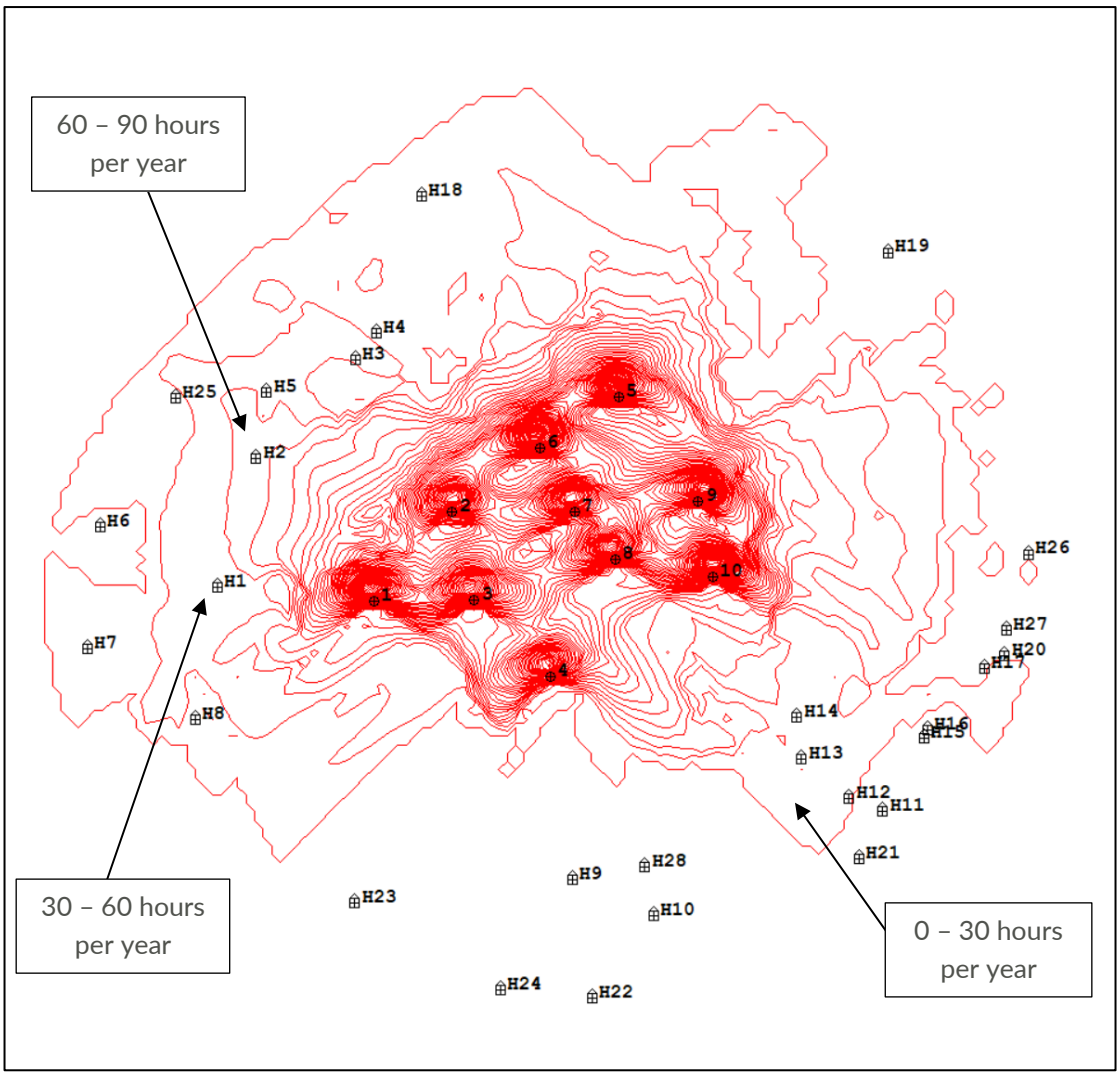
Receptor	Easting	Northing	Latitude (°)	Longitude (°)	Distance to Nearest Turbine (m)	Bearing of Window (°)
18	293340	343356	52.97690	-3.58993	1655.28	154.80
19	296111	343021	52.97445	-3.54856	1814.075	241.67
20	296806	340628	52.95308	-3.53745	1797.141	284.99
21	295941	339419	52.94205	-3.54993	2133.337	300.62
22	294353	338595	52.93434	-3.57329	1922.81	352.62
23	292943	339155	52.93908	-3.59446	1782	39.4
24	293811	338638	52.93461	-3.58138	1891	7.69
25	291879	342154	52.96582	-3.61128	1681	134.23
26	296946	341229	52.95850	-3.53557	1879	264.51
27	296814	340779	52.95443	-3.53740	1771	279
28	294670	339370	52.94136	-3.56884	1268	332.32

Assessed receptor details

APPENDIX B – CONTOUR MAP (FLICKER BUTTERFLY)

Overview

The figure below shows the shadow flicker contours associated with the proposed wind development relative to the receptor locations. The contour spacing is 30 hours per year.



Contour Map

PAGERPOWER

Urban & Renewables

Pager Power Limited
Stour Valley Business Centre
Sudbury
Suffolk
CO10 7GB

Tel: +44 1787 319001 **Email:** info@pagerpower.com **Web:** www.pagerpower.com