

14 Shadow Flicker

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14 Shadow Flicker

14.1 Executive Summary

14.1.1 This Chapter has assessed the difference between the potential for shadow flicker from the 2020 Layout compared to the 2019 Layout of the Proposed Development. Removal of the north-westerly most turbines (as described in Chapter 3 of the 2020 SEI) from the 2019 Layout has pulled back the study area from the seven potential shadow flicker receptors, and all turbines are now beyond 1.6 km from the receptors. There is now no potential for shadow flicker effects on any of the identified receptors and as such no requirement for mitigation.

14.2 Introduction

14.2.1 Chapter 14 of the 2019 EIA Report describes and assesses the potential shadow flicker effects resulting from turbines of the 2019 Layout on neighbouring residential and commercial receptors.

14.2.2 This chapter describes and assesses the potential shadow flicker resulting from the proposed turbines of the 2020 Layout, providing an updated assessment of the potential for shadow flicker effects having regard to the removal of turbines.

14.2.3 The differences between the layouts is described in Chapter 3 of the 2020 SEI.

14.3 Response to Consultation Responses

14.3.1 No responses were received to the 2019 EIA Report relating specifically to the shadow flicker assessment.

14.4 Assessment of Residual Effects

14.4.1 Following the change in design of the Proposed Development a re-assessment of the residual effects of the Proposed Development upon the receptors identified in the 2019 EIA Report has been undertaken. This assessment assumes that all mitigation detailed within the 2019 EIA Report is undertaken.

Study Area

14.4.2 The study area within which receptors could potentially be affected by shadow flicker is based on the worst-case assumption of a rotor diameter of 160 m. Following the methodology used within the 2019 EIA Report, the shadow flicker study area extends to 1.6 km from each turbine and is shown on **Figure 14.1**.

Operational Effects

14.4.3 With the removal of the north-westerly most turbines from the 2019 Layout, the study area of the 2020 layout now excludes the potential shadow flicker receptors identified within the 2019 EIA Report. As such, all seven previously identified receptors are now outwith the study area and there are no potential receptors within the study area (refer to Figure 14.1).

14.4.4 Despite being outwith the study area, the shadow flicker model was run on the 2020 Layout for the previously identified shadow flicker receptors to provide a comparison of the change in effect.

14.4.5 The modelling results presented in Table 14.1 below represent the theoretical worst-case scenario, showing comparison of the maximum shadow hours predicted to be experienced at the seven identified receptors. Five of the receptors are predicted to have no shadow flicker with the 2020 Layout, and the theoretical worst case duration of shadow flicker calculated at receptors D and E is assessed to be not significant (less than 30 hours per year).

Table 14.1 - Worst-case Scenario Shadow Flicker Occurrence

Shadow Flicker ID	2019 Layout		2020 Layout	
	Shadow Hours per Year	Max Shadow Hours per Day	Shadow Hours per Year	Max Shadow Hours per Day
A	36:59	00:35	0	0
B	39:35	00:38	0	0
C	46:37	00:30	0	0
D	48:10	00:31	11:36	00:20
E	63:21	00:51	21:50	00:21
F	48:36	00:33	0	0
G	57:56	00:50	0	0

14.4.6 The results presented in Table 14.2 below represent the realistic scenario, calculated with the inclusion of indicative wind data and average sunshine hours into the shadow flicker model. The results indicate that the 2020 Layout has removed the potential for shadow flicker completely from five of the receptors. At receptors D and E the likelihood of experiencing shadow flicker has greatly reduced, to less than an hour and a half of shadow flicker per year predicted at the worst effected receptor.

Table 14.2 – Realistic Scenario Shadow Flicker Occurrence

Shadow Flicker ID	2019 Layout		2020 Layout	
	Shadow Hours per Year	Max Shadow Hours per Day	Shadow Hours per Year	Max Shadow Hours per Day
A	02:34	00:02	0	0
B	02:46	00:03	0	0
C	03:30	00:02	0	0
D	03:39	00:02	00:35	00:01
E	04:56	00:04	01:24	00:02
F	03:49	00:02	0	0
G	04:15	00:04	0	0

14.4.7 Although the shadow flicker modelling predicts there will be potential for a low amount of shadow flicker at two of the receptors, these are both located more than 1.6 km from the nearest turbine. This is beyond the distance at which guidance considers shadow flicker to be a noticeable problem as the rotor will not appear to be ‘chopping’ the light, but the turbine will appear as an object on the skyline (DECC, 2011). Therefore, it is considered that any residual effect will be negligible or absent at all receptors, and not significant.

14.5 Assessment of Cumulative Effects

14.5.1 As was previously assessed within Chapter 14 of the 2019 EIA Report, there are no receptors within the area of overlap between the study area of the Proposed Development and potentially cumulative developments within 3 km (refer to Figure 14.1), therefore there is no potential for cumulative shadow flicker effects.

14.6 Comparison of Effects

14.6.1 The 2019 EIA Report determined that the maximum possible occurrence of shadow flicker within a realistic scenario was a maximum of under five hours a year at one property (receptor E). With implementation of proposed mitigation measures including a Shadow Flicker Protocol the residual effect was expected to not be significant. The removal of turbines from the north-westerly area of

the site in the 2020 Layout has removed the potential shadow flicker effects all together. There are now no potential significant effects and therefore no proposed mitigation measures necessary.

14.7 References

DECC- Department of Energy and Climate Change (16 Mar 2011). *Update of UK Shadow Flicker Evidence Base*. Prepared by Parsons Brinckerhoff.

Table 14.3 – Summary of Effects

Description of Effect	2019 Effects		2020 Effects	
	Significance	Beneficial/ Adverse	Significance	Beneficial/ Adverse
Shadow Flicker effects on 7 nearby residential properties	Not significant	N/A	No effect or Negligible (at two receptors)	N/A

Table 14.4 – Summary of Cumulative Effects

Receptor	Effect	Cumulative Developments	2019 Cumulative Effect		2020 Cumulative Effect	
			Significance	Beneficial/ Adverse	Significance	Beneficial/ Adverse
Receptors 1-7	Shadow Flicker	Tulac, Uphouse, SW Cullivoe Hall, Niaroo, Dalsetter, Innhouse and Garth	No effect	N/A	No effect	N/A