



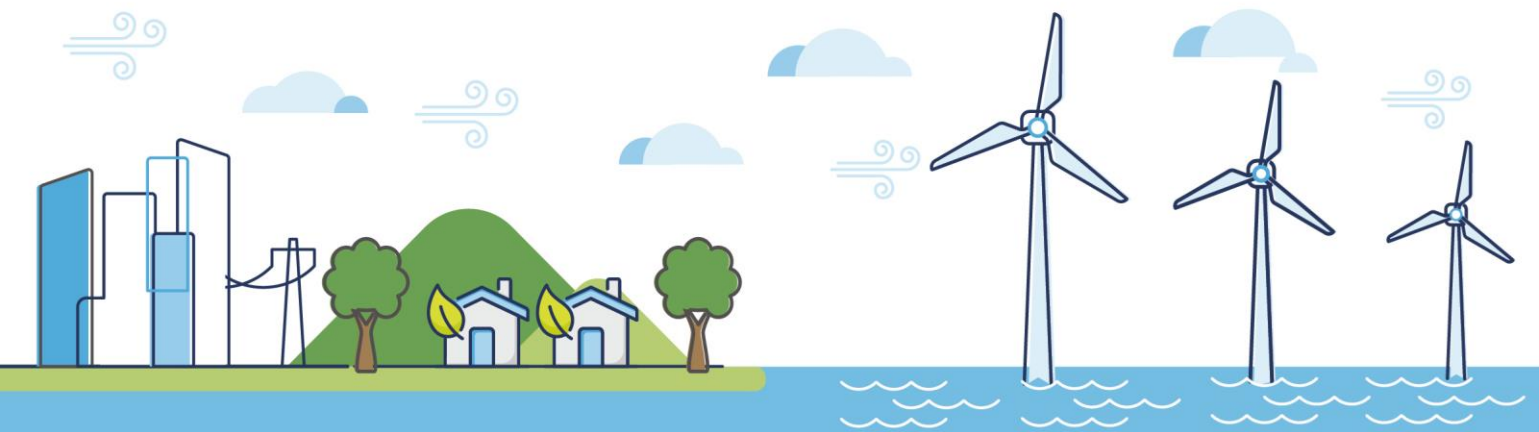
Morecambe Offshore Windfarm: Generation Assets Examination Documents

Volume 9

The Applicant's Response to Spirit Energy Deadline 1 Submissions Appendix B: Helicopter Access IMC Corridor

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Morecambe OWF Helicopter Access

IMC Take-Off Corridor

1 Introduction

1. This note provides information on the Instrument Meteorological Conditions (IMC) take-off distances required for helicopter access to the CPC-1 platform and provides recommendations for an access corridor to mitigate the impacts on helicopter access to the Calder Platform and South Morecambe Platforms due to the presence of the Morecambe Offshore Windfarm (OWF) (the Project).
2. Under the current regulations¹ IMC approaches would be permitted for the majority of meteorological conditions as approaches into the prevailing wind would be from the north and north-east, but take-offs would be restricted with a south westerly wind and are therefore a limiting factor for IMC access if wind turbine generators (WTG) from the Project are located to the south west of the South Morecambe Platforms.

2 Instrument Take-off

3. An offshore take-off into IMC is normally conducted into wind. During the take-off and climb the helicopter must remain 1 nautical mile (nm) laterally clear of obstructions, i.e. outside the red buffer shown in Figure 2.1.

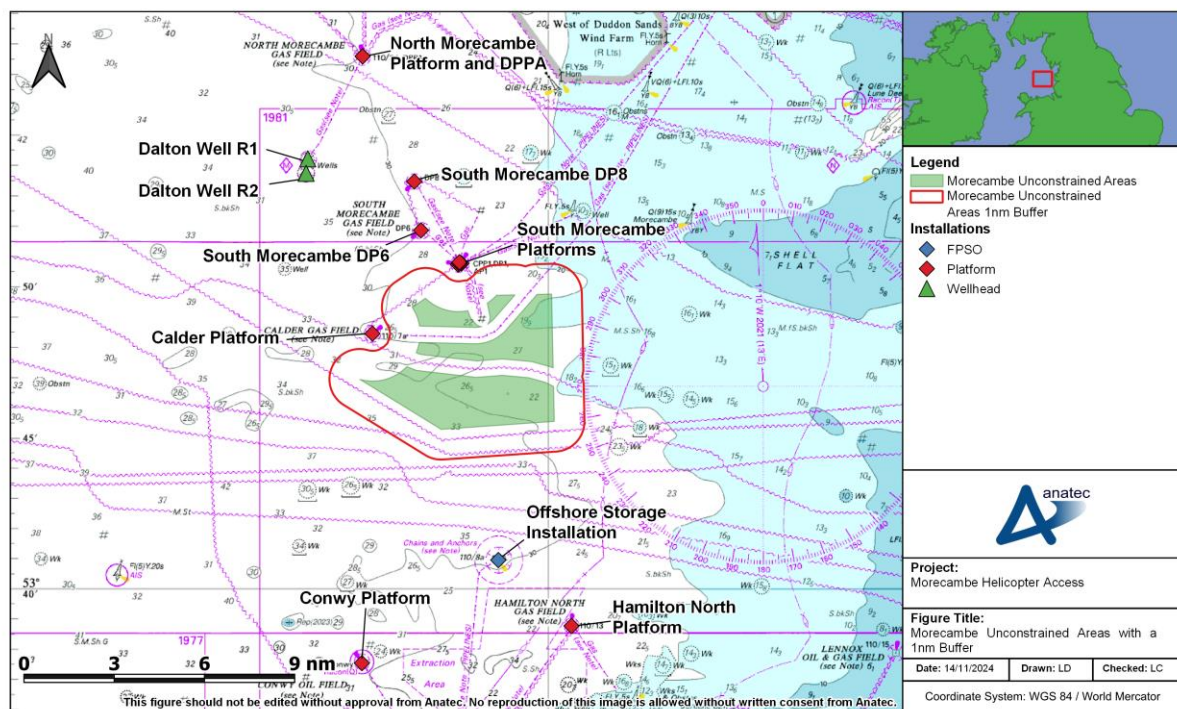


Figure 2.1 Morecambe Unconstrained Areas with a 1nm Buffer

¹ Section 2 of the *Morecambe Offshore Windfarm Helicopter Access Supporting Information*, document reference A5035-FLO-TN-03, Rev03 (the “Supporting Information”)

4. Measured from the CPC-1 platform, the airspace clear of the red line buffer in Figure 2.1 covers the arc from 263° clockwise to 090°. Any take-offs in IMC into this arc would be permitted under the current CAA regulations as they would remain outside the 1nm obstacle buffer. Conversely, any take-offs into IMC with a wind direction from 090° clockwise to 263°, i.e. towards the Morecambe Offshore Windfarm, would not be permitted as the 1nm buffer would be infringed before the helicopter could turn away at a safe height. The Vantage data shows that 408 (76.7%) of take-offs in IMC would have infringed the 1nm buffer and so would not be permitted. This corresponds to 6.9% of all take-offs.²
5. In order to permit an IMC take-off, a sufficient into wind distance must be available to allow for an engine failure occurring on rotation from the helideck, and then for a climb to a safe height before turning away from the wind farm. Following an engine failure a helicopter's rate of climb will be lower than a climb when all the engines are operating. A standard procedure in IMC would be to climb to 1,000ft above sea level before turning away from the wind farm.
6. Whilst flying this manoeuvre, the helicopter must remain 1nm away from obstacles, such as wind turbines. The actual distance required to climb to 1,000ft and then turn away will depend on the ambient conditions, including wind strength, air temperature and air pressure. Additionally, the rate of climb will vary with the mass of the helicopter. Based on work undertaken by Anatec in *Morecambe Offshore Windfarm Helicopter Access Supporting Information*, document reference A5035-FLO-TN-03, Rev02 (the "Supporting Information", the distance required ranges from 2.73nm to 3.26nm.³
7. The regulations require the probability of an engine failure occurring in the first 9 seconds of take-off over hostile terrain⁴ to be 5×10^{-8} (1 in every 20 million take-offs) or lower. Even though an engine failure is highly improbable, it must be taken into account due to the prescriptive nature of aviation regulations.
8. Figure 2.22.2 shows the wind directions for Day IMC, based on meteorological data from the South Morecambe AP 1 Platform, covering the period 19 December 2017 to 19 December 2022 (for further details refer to *Morecambe Offshore Windfarm Helicopter Access Report*, document reference A5035-FLO-HAR-01). Figure 2.3 shows the wind directions for Night IMC when Blackpool Airport is open. It is noted that the number of counts for night IMC when the airport is open is significantly smaller than the day IMC counts.

² Paragraph 84 of the Supporting Information

³ Paragraph 29 and 62 of the Supporting Information

⁴ Any sea areas north of 45°N are classed as hostile terrain.

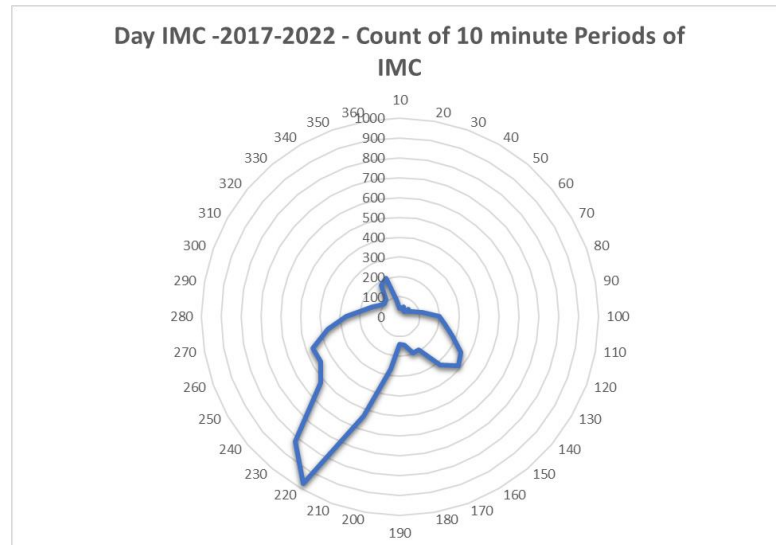


Figure 2.2 Wind Directions for Day IMC Flights Recorded in the Meteorological Data

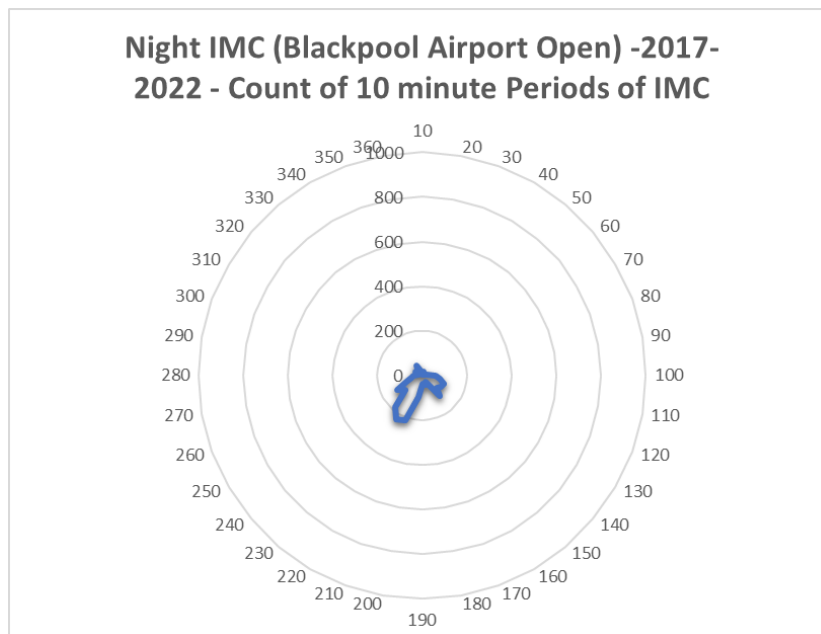


Figure 2.3 Wind Directions for Night IMC Flights (Blackpool Airport Open) Recorded in the Meteorological Data

9. The data shows that the predominant wind direction for IMC during both the day and night (when Blackpool Airport remains open) is from the south-west. If a take-off area from CPC-1 was provided into the prevailing wind, then IMC access would be increased and the impact on the Morecambe Wind Farm would be reduced, compared to providing a 360° obstacle free area. An example obstacle free corridor with a width of 2nm (1nm either side of a 220° bearing from CPC-1) and a length of 4nm is shown in Figure 2.4. This distance would be sufficient for a one-engine inoperative climb.

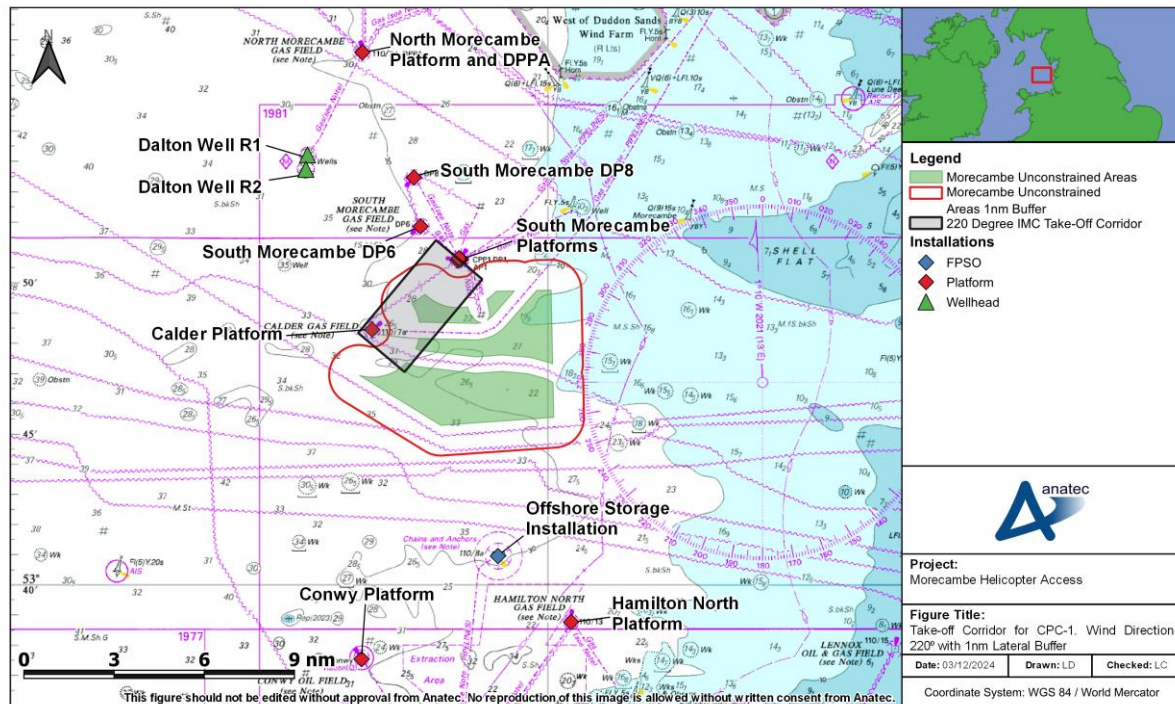


Figure 2.4 Take-off Corridor for CPC-1. Wind Direction 220° with 1nm Lateral Buffer

3 Benefits of a Helicopter Take-off Corridor

10. The currently drafted protective provisions within the draft Development Consent Order (dDCO) would only permit an IMC take-off or approach from an angle of 263° clockwise to 090°, i.e. remaining outside the 1nm lateral buffer shown by the red line. Additional mitigation, in the form of a corridor to the south-west, would expand the approach and departure directions permitted.
11. If a helicopter corridor was aligned 040° / 220°, with a 1nm obstacle free buffer to the east, it would permit an increased number of take-offs and approaches in IMC. The available take-off arc would be 220° clockwise to 090°. Airborne Radar Approaches (ARA) can be flown up to 30° out of wind, subject to a maximum crosswind of 10°, because the helicopter is turned into wind after the Missed Approach Point. The take-off case is more wind critical due to performance considerations. Assuming the helicopter has to take-off exactly into wind, then a take-off from CPC-1 could be conducted in 62.9% of day IMC, based on analysis of meteorological data provided. If a take-off up to 20° out of wind was agreed by the helicopter operator, then this would expand to 77.0% in day IMC.
12. Due to diurnal variations, the night IMC wind direction differ slightly from day IMC. When Blackpool Airport is open, the combination of the currently available access and the take-off corridor could permit helicopter access in 52.3% of night IMC. If a take-off up to 20° out of wind is agreed then this would increase to 73.6%.

13. In addition to enhancing the access to CPC-1, the corridor would provide additional space around the Calder Platform and permit a direct transit between Calder and CPC-1 in day VMC.

3.1 Comparison with Helicopter Access Report

14. The Helicopter Access Report (A5035-FLO-HAR-01) identified that an average of 5.8% of day conditions were IMC. Assuming all take-offs were directly into wind, a 1nm wide helicopter access corridor aligned 040° / 220° would permit 62.9% of the day IMC flights to be conducted, reducing the impact from 5.8% to 2.2%. The impact on night IMC availability would reduce from 11.6% to 5.5%. Therefore, with the additional mitigation of a helicopter take-off corridor in place the percentage of flights that would be permitted in all meteorological conditions would be 97.8% during the day and 94.5% during the night (when Blackpool Airport is open).

Met Conditions	Day %	Night (+ Blackpool open) %
VMC	94.2	88.4
IMC	5.8	11.6
IMC 220-090° (take-off possible with corridor) (i.e. access permitted with corridor)	3.6	6.1
IMC 090-220° (i.e. access still constrained with corridor)	2.2	5.5

15. Note, this table does not include a take-off up to 20° out of wind if permitted – this would further increase the access permitted with the corridor.

4 Alternative Means of Compliance

16. As identified in the Supporting Information at Section 3.3, post a CAA rule change regarding flights within 3nm of wind turbines, IMC operations would have to be conducted under an Alternative Means of Compliance (AltMoc). However, this is standard aviation practice that is dependent on the application demonstrating equivalent or higher standards of safety compared to the requirements in the Acceptable Means of Compliance. The corridor would result in an equivalent level of safety to current operations.