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Subject: Hornsea Project Three (UK) Ltd response to Deadline 4 (Part 12)
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Attachments: [image001.png](#)
[D4_HOW03_Appendix 49_Roulund et al 2019a.pdf](#)
[D4_HOW03_Appendix 50_Roulund et al 2019b.pdf](#)
[D4_HOW03_Appendix 51_Defra MCZ Guidance 2010.pdf](#)
[D4_HOW03_Appendix 53_WO_2.1.3.pdf](#)
[D4_HOW03_Appendix 54_Aviation Assessments.pdf](#)
[D4_HOW03_Appendix 55_Development Principles_rev2.pdf](#)
[D4_HOW03_Appendix 56_Manwell et al 2009.pdf](#)
[D4_HOW03_Appendix 57_Helideck Certificates.pdf](#)
[D4_HOW03_Appendix 58_Indicative Array Layout.pdf](#)
[D4_HOW03_Appendix 59_FCLP_rev3.pdf](#)
[D4_HOW03_Appendix 60_Draft CID Budget Notice.pdf](#)
[D4_HOW03_Appendix 62_O2.2.34.pdf](#)
[D4_HOW03_Appendix 63_O2.2.7_O2.2.44.pdf](#)
[D4_HOW03_Appendix 64_Dogger Bank.pdf](#)

Dear Kay, K-J

Please find attached the 12th instalment of documents.

Best regards,
Dr Dominika Chalder PIEMA
Environment and Consent Manager



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Appendix 54 to Deadline 4 submission – List of Aviation Assumptions Used in Assessments

Date: 15th January 2019

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Front cover picture: Kite surfer near a UK offshore wind farm © Ørsted Hornsea Project Three (UK) Ltd., 2019

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1. Acronyms

Acronyms	Description
AEO	All Engines Operative
ARA	Airborne Radar Approach
CAT	Commercial Air Transport
EASA	European Aviation Safety Agency
FAF	Final Approach Fix
IMC	Instrument Meteorological Conditions
MAP	Missed Approach Point
OEI	One Engine Inoperative
SAR	Search and Rescue
VFR	Visual Flight Rules
VMC	Visual Meteorological conditions

2. List of Agreed Aviation Assumptions Use in Assessments

2.1 The Applicant and Spirit Energy met on the December 17th 2018 to progress discussion on Spirit Energy's concerns in regard to helicopter operations. An action from the meeting was for the Applicant to provide the assumptions used to underpin their aviation assessments. The purpose of this action is to enable Spirit Energy's aviation consultants to better understand the assessments undertaken by the Applicant. It also provides a comparative tool to understand the criteria applied by both parties which is not necessarily underpinned by the agreed regulations.

2.2 This table, in draft form as completed by the Applicant, awaits input from Spirit Energy.

Aviation assumptions Used in Assessments		
Topic	Hornsea Project Three	Spirit Energy
IMC	IMC conditions are defined as when it is not VMC	
VMC	Day - Visibility greater than 4 km flying clear of cloud (below a cloud base of not less than 600 ft) and in visual contact with the surface. CAT.OP.MPA.247 (the Ops Rules offshore differ slightly from the normal definition of VFR in EASA Parts SERA) Shuttling within 10nm Day 300 ft and 2km night 500 ft 5 km. SPA.HOFO.130	
IFR	IFR surface obstacle avoidance requirements are 1000ft vertical separation, and 1 nm lateral separation from all known or radar contacts	
VFR	VFR surface obstacle avoidance requirements are 500ft horizontal separation & 500ft lateral separation (ie a 500ft semi-bubble surrounding the obstacle) unless the 'obstacle' is the landing area (platform/installation).	
Shuttle flights	In Class G airspace when flying between offshore locations where the overwater sector is less than 10nm, VFR flight may be conducted when the limits are at, or better than, the following: 2 pilots: Day 300 ft cloudbase 2 km visibility; Night 500 ft cloudbase 5 km visibility. (EASA SPA.HOFO.130). As per VMC row above.	

Shuttle flights	An ARA can be flown to one platform and then proceed in VMC to another as per the AMC 1 SPA.HOFO.125 GENERAL (a) Before commencing the final approach, the pilot-in-command/commander should ensure that a clear path exists on the radar screen for the final and missed approach segments. If lateral clearance from any obstacle will be less than 1 nm, the pilot-in-command/commander should: (1) approach to a nearby target structure and thereafter proceed visually to the destination structure;	
ARA requirements	An ARA can be flown in a flexible manner with an Intermediate Fix at 6nm, Final Approach Fix at 4 nm (EASA GM1 SPA.HOFO.125 (a) General).	
ARA requirements	Only the final section of an ARA from the Final Approach Fix (FAF) needs be flown substantially into wind. The FAF is at a distance of 4 NM (EASA GM1 SPA.HOFO.125 (a)(3)).	
ARA requirements	The final approach path (from the FAF) can be flown out of wind where the drift angle does not cause increased workload. (EASA GM1 SPA.HOFO.125 (a)(3)). An assumption of 30 degrees out of wind has been made.	
Evacuation procedures	SAR helicopters are not limited by CAT weather limits due to SAR autopilot modes and more flexible limits/regulations.	
MAP	It is permitted under AMC 1 SPA.HOFO.125 (e) that pilots have the option to move MAP from 0.75 to 1 or 1.5 nm to provide more room to fly a Missed Approach. AMC 1 SPA.HOFO.125 (e) states that the decision range (MAP) should not be less than 0.75, i.e. more is permitted	
MAP	A Missed Approach can be flown with a turn left or right turn. The MAP and any offset beyond 1.5nm will take account of the obstacle environment.	
MAP	The MAP distance can be increased and/or a secondary turn can be made after the initial go-around when safely established in the climb.	

OEI	It is agreed that OEI can be flown along same route as an AEO go-around. The position of the MAP and go-around will take account of aircraft performance and the obstacle environment.	
MAP	It is agreed that flights turn 10 degrees at 1.5 nm and then 30 degrees at MAP point (Fig 1 to GM1 SPA.HOFO.125) to initially avoid the destination platform.	
MAP	It is agreed that a second turn at a later stage if required, in the same direction, can be made once established in the climb and check list complete.	
Take off	The initial take-off will be into wind but account will be taken of the proximity of the turbines. It is understood that take off will be in VMC (>300ft cloud base and >2 km visibility EASA SPA.HOFO.130) It is understood that in the unlikely event of engine failure at take off (<5 x 10⁻⁸) then a stabilised turn away from the turbines can be made. AMC 1CAT.POL.H.305(b) Engine Reliability Statistics (b). Note that the AW139 used by Spirit Energy has a much lower failure rate and so the overall probability will be lower.	
En-route approach	An "En-route Descent" approach – IMC to level by 500 ft can be flown. This requires a cloudbase of 600 ft and visibility of 4km by day. CAT.OP.MPA.247	

3. References

All citations are sourced from EASA Commission Regulation (EU) No 965/2012 on air operations and related EASA Decisions (AMC, GM and CS-FTL.1) Consolidated version downloaded 2 January 2019 from [https://www.easa.europa.eu/sites/default/files/dfu/Air%20OPS%20965-2012_Rev.11_July%202018.pdf].