

Hornsea Offshore Wind Farm

Project Two

Collision Risk Modelling Note

Appendix B to the Submission of 4 December 2015

Application Reference: EN010053

4 December 2015

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1 Collision risk modelling

1.1 Collision risk modelling

1.1.1 Collision risk modelling has been conducted incorporating turbine parameters for a 6 MW turbine with an 8.97m increase to the minimum blade tip height relative to Lowest Astronomical Tide (LAT).

1.1.2 The seasonal extents used to present seasonal collision risk in this note are consistent with those advocated by the Applicant and Natural England throughout the examination process. For gannet, lesser black-backed gull and great black-backed gull, the seasonal extents advocated by the Applicant and Natural England are the same. However, for kittiwake, Natural England advise that April should be considered part of the breeding season and not the pre-breeding season.

1.1.3 The apportioning of collision risk estimates to the gannet and kittiwake populations at the Flamborough and Filey Coast pSPA has been conducted using the apportioning values employed by the Applicant in their submissions at Deadline 2a (REP2A-016, REP2A-017, REP2A-018, REP2A-019, REP2A-020) and those employed by Natural England in their submissions at Deadline 3 (REP3-034, REP3-035, REP3-036, REP3-037, REP3-038).

1.1.4 The in-combination and cumulative collision risk totals for Natural England have been calculated using the values presented in Tables 3 and 4 of Natural England's Deadline VI submission. The collision risk estimates considered for Hornsea Project Two in that submission have been subtracted from the relevant total to provide the cumulative collision risk of all other projects. The collision risk estimate for Hornsea Project Two presented in this note is then added to the revised total. No attempt has been made to correct any in-combination or cumulative totals based on the submissions of the Applicant or Natural England at Deadline VI, with any such changes considered by the Applicant and Natural England (see Natural England's Deadline VI submission) to represent a non-material change in the assessment.

1.2 Gannet

HRA

Option	Avoidance rate (%)	Apportioning approach	Density data	Collision risk (no. of collisions)				
				Breeding	Post-breeding	Pre-breeding	Total	In-combination
2	98.9	Natural England	Mean	5	1	0	6	179
			UCL	12	1	1	14	
			LCL	2	0	0	3	
4	98	Applicant	Mean	4	1	0	4	204
			UCL	8	1	1	10	
			LCL	1	0	0	2	

EIA

Option	Avoidance rate (%)	Apportioning approach	Density data	Collision risk (no. of collisions)				
				Breeding	Post-breeding	Pre-breeding	Total	Cumulative
2	98.9	Natural England	Mean	7	14	6	27	2,976
			UCL	16	25	15	55	
			LCL	3	7	2	12	
4	98	Applicant	Mean	5	9	4	18	2,570
			UCL	11	17	10	37	
			LCL	2	5	1	8	

1.3 Kittiwake

HRA

Option	Avoidance rate (%)	Apportioning approach	Density data	Collision risk (no. of collisions)				
				Breeding	Post-breeding	Pre-breeding	Total	In-combination
1	98.9	Natural England	Mean	14	0	0	14	314
			UCL	23	1	0	24	
			LCL	7	0	0	8	
4	98	Applicant	Mean	1	0	0	1	108
			UCL	1	0	0	1	
			LCL	0	0	0	0	

EIA

Option	Avoidance rate (%)	Apportioning approach	Density data	Collision risk (no. of collisions)				
				Breeding	Post-breeding	Pre-breeding	Total	Cumulative
1	98.9	Natural England	Mean	16	9	3	27	3,412
			UCL	28	16	5	48	
			LCL	9	4	1	14	
4	98	Applicant	Mean	2	1	1	4	1,377
			UCL	3	2	1	6	
			LCL	1	1	0	2	

1.4 Lesser black-backed gull

EIA

Option	Avoidance rate (%)	Density data	Collision risk (no. of collisions)					Cumulative collision risk (no. of collisions)	
			Breeding	Post-breeding	Non-breeding	Pre-breeding	Total	Applicant	Natural England
2	99.5	Mean	2	1	0	1	4	441	472
		UCL	6	9	0	2	18		
		LCL	1	0	0	0	1		
3	98.9	Mean	2	1	0	1	3	440	471
		UCL	6	8	0	2	15		
		LCL	0	0	0	0	1		
4	98.9	Mean	0	0	0	0	0	437	468
		UCL	0	1	0	0	1		
		LCL	0	0	0	0	0		

1.5 Great black-backed gull

EIA

Option	Avoidance rate (%)	Density data	Collision risk (no. of collisions)			Cumulative collision risk (no. of collisions)	
			Breeding	Non-breeding	Total	Applicant	Natural England
2	99.5	Mean	3	20	23	567	664
		UCL	8	63	71		
		LCL	1	5	6		
3	98.9	Mean	3	20	23	567	664
		UCL	8	65	73		
		LCL	1	5	6		
4	98.9	Mean	1	9	10	554	651
		UCL	3	28	32		
		LCL	0	2	3		