Technical Appendix 8.2: Collision Risk Modelling

2026

Glenouther Wind Farm

Technical Appendix 8.2

Collision Risk Modelling

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Introduction

1. This Technical Appendix relates to the proposed Glenouther Wind Farm (the 'Proposed Development') as defined in **Chapter 4: Development Description** of the Environmental Impact Assessment (EIA) Report and has been produced as a supporting document to **Chapter 8: Ornithology**. It includes details of the collision risk modelling calculations used to predict the annual number of collisions that may be caused by the Proposed Development, based on flight data collected during the 2023-2025 Flight Activity Surveys (**Technical Appendix 8.1: Ornithology Technical Report**).

2. Birds that are not displaced by the Proposed Development would be potentially vulnerable to collision with the turbines. The level of collision with wind turbines is presumed to be dependent on the level of flight activity over the Proposed Development and the ability of birds to detect and manoeuvre around rotating turbine blades. Birds that collide with a turbine are likely to be killed or fatally injured. This may in turn affect the maintenance of bird populations.

3. Further studies in the field of bird-windfarm research are required to establish with certainty the extent to which birds can avoid collision with wind turbines, although an increasing body of evidence suggests that avoidance capacity is very high (Whitfield & Madders, 2006; Urquhart & Whitfield, 2016; NatureScot, 2025). The indications from studies are that collisions are rare events and occur mainly at sites where there are unusual concentrations of birds and turbines, or where the behaviour of the birds' concerned leads to high-risk situations (e.g., Gill *et al*., 1996; Percival, 1998; de Lucas *et al*., 2007). Examples include migration flyways, and where the food resource, and therefore level of bird activity, is exceptional.

Collision Risk Modelling

4. The Band collision risk model (CRM) (Band *et al*., 2007) was used to estimate the potential number of bird collisions likely to occur at the proposed Glenouther Wind Farm. The model requires input data based on species biometrics and flight characteristics, turbine specification and data on flights observed at the site.

5. NatureScot guidance on collision risk modelling was used (SNH, 2000; Band *et al*., 2007). This is a three-stage process, which involves:

    1) An assessment of the probability of a collision, based on a bird flying through an operational turbine; and

    2) An estimation of the number of birds passing through the swept zone of the turbine blades.

    Multiplying stages 1 and 2 provides an estimate of collision risk with the turbines, assuming no avoidance action. After, the third stage is applied:

    3) An avoidance rate is applied (where known) to account for the fact that many species will take avoidance action.

6. The result of the model provides an estimate of the number of collisions that can be expected over a year or for the lifetime of the wind farm.

7. For the turbines proposed, the probability of a bird being struck by a turbine blade when passing through the rotor swept volume has been estimated, assuming no avoidance (see **Appendix 1**). However, it is widely accepted that birds are able to avoid turbine blades in a number of ways. Birds may exercise avoidance by detecting the wind farm or turbine and modifying their flight lines to avoid the structures (Macro avoidance). At close proximity, birds may see an oncoming blade and emergency avoidance action can be taken (Micro avoidance) (SNH, 2000). As such, an avoidance rate (NatureScot, 2025) was applied to each model to estimate the collision risk for each species respectively.

Methods

8. The Band CRM involves two methods to predict estimated collision fatalities, depending on the pattern of flight of the species involved: 'predictable' and 'unpredictable' flight methods. The predictable flight method (PFM) is appropriate when birds tend to move through an area in a relatively consistent direction, such as during migration or when moving between localised feeding and roosting sites. The unpredictable flight method (UFM) is more appropriate when flights are not in any particular direction and assumes that they are random. These two methods also differ in their field data requirements (see **Technical Appendix 8.1**).

9. The two methods differ in the unit of exposure to collision risk. The PFM estimates a horizontal risk area which is the area of the turbine rotors facing a bird as it flies towards (with the 'intention' of flying through) the Proposed Development. The extent of the Risk Area is given by the horizontal span of the proposed turbine array facing the bird on its typical flight direction multiplied by the vertical span of the proposed turbine rotors. The UFM employs an estimated risk volume, in keeping with the assumption that flight directions are random in space. Collision risk is estimated based on flight activity levels and behaviour, turbine numbers and dimensions, and bird biometrics and flight characteristics.

10. The PFM of the Band CRM was used to estimate the collision risk of herring gull (*Larus argentatus*) and lesser black-backed gull (*Larus fuscus*).

Wind farm characteristics

11. The Proposed Development comprises of five turbines and in the UFM analyses the flight risk volume (V_W), is based on a buffer constructed with a radius of 200 m (area = 101.3 ha), centred on the turbine locations with a height that was equal to the diameter of the turbine blades (162 m). In the PMF analyses the flight risk area (V_A) is based on the mean of the straight-line length and width of the combined viewshed area with a height of 180 m, where the maximum length is 5,133.7 m and the maximum width is 4,427.6 m (**Figures 1** & **2**).

12. Dimensions and operational parameters of the candidate turbine model[1] were used to populate the CRMs. Turbine dimensions of hub height 119 m and blade length 81 m were utilised, giving a rotor diameter encompassing a bottom blade tip height at 38 m and a top blade tip height at 200 m. Thus, the flight height recording bands between 20 m and 200 m were defined as at collision risk height. A turbine operation rate of 85% is assumed.

[1] Based on the candidate Vestas V162 7.2 MW turbine

Species-specific information

13. Following NatureScot guidance (SNH, 2014) species length and wingspan have been derived using a mean of the figures presented within Snow & Perrins (1998). Flight speeds were derived using Alerstam *et al.* (2007) or Bruderer & Boldt (2001), where more than one flight speed was provided a mean of the figures was taken (**Table 1**). Published avoidance rates were used (NatureScot, 2025).

Table 1. Bird biometrics and flight speeds utilised in the CRMs.

Species	Bird length			Wingspan			Bird Speed			
	Min (cm)	Max (cm)	Average (m)	Min (cm)	Max (cm)	Average (m)	Bruderer min (Va) (m/s)	Bruderer max (Va) (m/s)	Alerstam (m/s)	Mean Speed (m/s)
Herring gull	55	64	**0.595**	138	150	**1.44**	9.9	12.6	12.8	**11.8**
Lesser black-backed gull	52	64	**0.58**	135	150	**1.425**	11.9	12.3	11.9	**12.0**

Viewsheds

14. Flight data were obtained from a total of two Vantage Points (VPs). Viewsheds were estimated using a Digital Elevation Model (DEM) and a 20 m vertical offset above the ground surface (lowest point of rotor sweep at 38 m) (**Figure 1**).

Table 2. Vantage point survey effort and visible areas within the 200 m buffer drawn around the turbines.

VP No.	Visible area with 200m turbine buffer (ha)	Hours of observation between September and March (hrs)	Hours of observation between April and August (hrs)	Total hours of observation (hrs)
1	99.8	74.00	74.00	148.00
2	44.8	77.00	72.00	149.00

Determining flight activity for use within a CRM

15. Utilising all flight observations collected across the study area from all VPs would likely result in inaccurate estimates of collision risk because data were collected for areas in which no turbines were proposed. Therefore, it was appropriate to employ only those observations in which flights were liable to incur a potential risk of collision, i.e., within the areas occupied by proposed turbines. Consequently, only observations collected within a flight activity assessment area (FAAA), comprising a 200 m buffer (centred on the turbine tower) around proposed turbine locations are used. This size of buffer encompasses rotor blade length, possible shifts in proposed turbine location due to micro-siting and, crucially, potential spatial errors in flight recording accuracy.

16. For the UFM, flight time within this buffer was calculated from the proportion of the length of each flight which fell within the 200 m buffer multiplied by the total duration of each flight (i.e., effectively assuming a constant speed for each flight). Time spent at different flight heights was estimated from time-interval data on height. To ensure that the CRM used robust measures of flight activity, a 2 km distance truncation was assumed in the area visible from each VP.

17. A summary of flight activity recorded within 200 m of the proposed turbines is given in **Table 3**. All flights that passed within 200 m of the proposed turbines are shown in **Figure 3**. Full details of all flights that passed within 200 m of the proposed turbines are shown in **Appendix 2**.

Table 3. Summary of flight activity recorded within 200 m of the proposed turbines.

Species	Total flights	'At-risk' flights	No. individuals 'at-risk'	CRM undertaken
Greylag goose	2	2	13	No
Hen harrier	1	1	1	No
Osprey	1	0	0	No
Oystercatcher	1	1	2	No
Pink-footed goose	3	3	246	No

18. An 'at–risk' flight is one which passes into the 200 m turbine buffer with at least part of its flight at an altitude between 20 m and 200 m. Professional judgement was used as to whether a CRM was undertaken for each species, based on the Nature Conservation Importance of the species and the number of 'at-risk' flights or the number of individuals potentially 'at-risk'.

19. The total flight duration recorded during the vantage point watches was adjusted to give an estimate for the total expected over the period of occupancy by each species. The total potential flying time for each species was estimated from the sum of the day lengths of each day. Day length was estimated, for each day, using the method of Forsythe *et al*. (1995) at latitude 55.701°N.

20. During Flight Activity Surveys herring gull and lesser black-backed gull were treated as a Target C species. **Technical Appendix 8.1**, **Paragraph 11: Activity Summaries** details the recording methods used for these surveys. These are: -

> *At the end of each five-minute period flight activity within the survey area by species of lesser conservation importance (Target C species) was summarised. The number of birds recorded in any one period was the minimum number of individuals that could account for the activity observed. The height, direction and number of individuals involved in notable bird movements were recorded.*

21. As such, data on the number, height and direction of gulls seen passing through the viewshed during each VP watch was collected. However, as Target C flights are not mapped, flights cannot be clipped to the FAAA (200 m around the turbines in this case); therefore, the total number of gulls seen are those within the 2 km viewshed.

22. There was no predominant flight direction, therefore the flight risk area (V_A) is based on the mean of the straight-line length and width of the combined viewshed area with a height of 180 m, where the maximum length is 5,133.7 m and the maximum width is 4,427.6 m (**Figure 2**). This equates to a risk window length of 4,780.65 m.

23. **Tables 4** and **5** show the number of herring gulls and lesser black-backed gulls passing through the viewshed areas per month. These data are separated by flight height, and the shaded rows are birds that pass through the risk window.

24. For gull flights a precautionary provision that 37.5% of flights were not observed because they occurred in the hours of darkness was included.

Table 4. Flight activity and elevation of herring gull flights recorded during flight activity surveys. Flights at a height of 20 – 200 m agl places them at risk of a collision with the turbine blades (shaded columns).

Height band (m)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Grand Total
<20	2	2	0	1	0	0	1	1	0	0	1	1	9
20-50	5	4	0	1	1	0	2	1	0	0	2	2	17
50-100	3	2	0	1	0	0	1	1	0	0	1	1	10
100-150	3	2	0	1	0	0	1	1	0	0	1	1	11
150-200	4	3	0	1	1	0	1	1	0	0	1	1	14
>200	2	1	0	0	0	0	1	0	0	0	1	0	5
Grand Total	**19**	**15**	**0**	**4**	**3**	**1**	**7**	**4**	**0**	**0**	**7**	**6**	**66**
At 'risk height'	**15**	**12**	**0**	**3**	**2**	**1**	**6**	**3**	**0**	**0**	**6**	**5**	**52**

Table 5. Flight activity and elevation of lesser black-backed gull flights recorded during flight activity surveys. Flights at a height of 20 – 200 m agl places them at risk of a collision with the turbine blades (shaded columns).

Height band (m)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Grand Total
<20	0	0	2	0	5	6	3	4	2	0	0	0	22
20-50	0	0	4	0	10	12	4	9	5	0	0	0	44
50-100	0	0	2	0	6	6	2	5	3	0	1	0	25
100-150	1	0	2	0	6	7	2	6	3	0	0	0	27
150-200	0	0	4	0	9	9	3	7	4	0	0	0	36
>200	0	0	1	0	3	4	1	3	2	0	0	0	14
Grand Total	**1**	**0**	**15**	**0**	**39**	**44**	**15**	**34**	**19**	**0**	**1**	**0**	**168**
At 'risk height'	**1**	**0**	**12**	**0**	**31**	**34**	**11**	**27**	**15**	**0**	**1**	**0**	**132**

Results

25. The PFM was used for herring gull and lesser black-backed gull. Results are presented in **Table 6**.

26. The annual collision risk for herring gull is predicted to be 0.04 birds or one bird every 25.2 years.

27. The annual collision risk for lesser black-backed gull is predicted to be 0.11 birds or one bird every 9.1 years.

Table 6. Results of PFM.

Species	Occupancy	Avoidance Rate (%)	Birds colliding per year
Herring gull	All year	99.5	0.04
Lesser black-backed gull	All year	99.5	0.11

Input data and model results

Herring gull

Item	Quantity	Units
Collision risk window width	4780.65	m
Collision risk window height	180	m
X-sectional area of risk window	860517	m^2
Rotor radius	81	m
Hub height	119	m
No. of turbines	5	no.
No. of rotor blades	3	no.
Maximum chord width	4.3	m
Rotation period	4.96	seconds
Average pitch	15	degrees
Estimated operation time	85	%

Herring gull

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Daytime observation effort (hrs)	**16.0**	**16.0**	**24.0**	**30.0**	**33.0**	**33.0**	**30.0**	**20.0**	**27.0**	**24.0**	**24.0**	**20.0**	297.00
No. birds observed in risk window at daytime	15	12	0	3	2	1	6	3	0	0	6	5	52
No. birds per hour of observation at daytime	0.93	0.74	0.00	0.10	0.07	0.02	0.18	0.16	0.00	0.00	0.23	0.24	
Available hours for flight activity at daytime + 37.5% night	329.1	368.1	502.8	582.7	691.7	718.8	720.8	642.2	528.6	447.8	345.5	304.5	**Predicted total flights**
Potential no. birds in risk window during month	307.5	271.6	0.0	61.1	49.5	17.1	132.3	101.1	0.0	0.0	79.3	71.9	**1091.44**

Available daylight hours	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daylight hrs	239.4	267.7	365.6	423.8	503.1	522.8	524.2	467.0	384.5	325.7	251.3	221.4
Total Day + 37.5% night hrs	329.1	368.1	502.8	582.7	691.7	718.8	720.8	642.2	528.6	447.8	345.5	304.5

Species	Potential no. of birds thru risk window	Area of risk window	Area of rotors	Proportion of risk window taken up by rotors	Potential no. of birds thru rotors	Probability of collision	**Assuming no avoidance** No. of birds killed per year	**Assuming 99.5% avoidance** No. of birds killed per year
Herring gull	1091.44	860,517	103059.95	0.120	130.72	7.2%	8.0	**0.040**

Lesser black-backed gull

Item	Quantity	Units
Collision risk window width	4780.65	m
Collision risk window height	180	m
X-sectional area of risk window	860517	m^2
Rotor radius	81	m
Hub height	119	m
No. of turbines	5	no.
No. of rotor blades	3	no.
Maximum chord width	4.3	m
Rotation period	4.96	seconds
Average pitch	15	degrees
Estimated operation time	85	%

Lesser black-backed gull

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Daytime observation effort (hrs)	**16.0**	**16.0**	**24.0**	**30.0**	**33.0**	**33.0**	**30.0**	**20.0**	**27.0**	**24.0**	**24.0**	**20.0**	297.00
No. birds observed in risk window at daytime	1	0	12	0	31	34	11	27	15	0	1	0	132
No. birds per hour of observation at daytime	0.06	0.00	0.50	0.00	0.94	1.03	0.37	1.35	0.56	0.00	0.04	0.00	
Available hours for flight activity at daytime + 37.5% night	329.1	368.1	502.8	582.7	691.7	718.8	720.8	642.2	528.6	447.8	345.5	304.5	**Predicted total flights**
Potential no. birds in risk window during month	20.6	0.0	251.4	0.0	649.8	740.6	264.3	866.9	293.7	0.0	14.4	0.0	**3101.64**

Available daylight hours	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daylight hrs	239.4	267.7	365.6	423.8	503.1	522.8	524.2	467.0	384.5	325.7	251.3	221.4
Total Day + 37.5% night hrs	329.1	368.1	502.8	582.7	691.7	718.8	720.8	642.2	528.6	447.8	345.5	304.5

Species	Potential no. of birds thru risk window	Area of risk window	Area of rotors	Proportion of risk window taken up by rotors	Potential no. of birds thru rotors	Probability of collision	**Assuming no avoidance** No. of birds killed per year	**Assuming 99.5% avoidance** No. of birds killed per year
Lesser black-backed gull	3101.64	860,517	103059.95	0.120	371.47	7.0%	22.0	**0.110**

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Appendix 1

Probability of collision

Herring gull

K: [1D or [3D] (0 or 1)	1		
NoBlades	3		
MaxChord	4.3	m	
Pitch (degrees)	15		
BirdLength	0.595	m	
Wingspan	1.44	m	
F: Flapping (0) or gliding (+1)	0		
Bird speed	11.8	m/sec	
RotorDiam	162	m	
RotationPeriod	4.96	sec	
integration interval	0.05		
Bird aspect ratioo: β	0.41		
Species	Herring gull		

Calculation of alpha and p(collision) as a function of radius

			Upwind:			Downwind:		
r/R	c/C	α	collide			collide		
radius	chord	alpha	length	p(collision)	y(x)	length	p(collision)	y(x)
0				1.00	0		1.00	0
0.05	0.575	2.29	9.42	0.48	0.04842	8.14	0.42	0.04184
0.1	0.622	1.15	5.31	0.27	0.05456	3.92	0.20	0.04032
0.15	0.781	0.76	4.45	0.23	0.06861	2.71	0.14	0.04181
0.2	0.939	0.57	4.11	0.21	0.08448	2.02	0.10	0.04147
0.25	0.971	0.46	3.59	0.18	0.09227	1.43	0.07	0.03673
0.3	0.923	0.38	3.09	0.16	0.09522	1.03	0.05	0.03186
0.35	0.875	0.33	2.76	0.14	0.09932	0.81	0.04	0.02921
0.4	0.827	0.29	2.50	0.13	0.10287	0.66	0.03	0.02711
0.45	0.780	0.25	2.29	0.12	0.10587	0.64	0.03	0.02951
0.5	0.732	0.23	2.11	0.11	0.10832	0.71	0.04	0.03664
0.55	0.684	0.21	1.95	0.10	0.11023	0.76	0.04	0.04322
0.6	0.637	0.19	1.81	0.09	0.11160	0.80	0.04	0.04925
0.65	0.589	0.18	1.68	0.09	0.11241	0.82	0.04	0.05474
0.7	0.541	0.16	1.57	0.08	0.11269	0.83	0.04	0.05969
0.75	0.494	0.15	1.46	0.07	0.11241	0.83	0.04	0.06408
0.8	0.446	0.14	1.36	0.07	0.11159	0.83	0.04	0.06793
0.85	0.398	0.13	1.26	0.06	0.11023	0.82	0.04	0.07124
0.9	0.350	0.13	1.17	0.06	0.10832	0.80	0.04	0.07400
0.95	0.303	0.12	1.08	0.06	0.10586	0.78	0.04	0.07621
1	0.255	0.11	1.00	0.05	0.10286	0.76	0.04	0.07788

Overall p(collision) = **Upwind** **9.5%** **Downwind** **4.8%**

Average **7.2%**

Lesser black-backed gull

K: [1D or [3D] (0 or 1)	1		**Calculation of alpha and p(collision) as a function of radius**								
NoBlades	3					Upwind:				Downwind:	
MaxChord	4.3	m	r/R	c/C	α	collide			collide		
Pitch (degrees)	15		radius	chord	alpha	length	p(collision)	y(x)	length	p(collision)	y(x)
			0				1.00	0		1.00	0
BirdLength	0.58	m	0.05	0.575	2.34	9.58	0.48	0.04817	8.30	0.42	0.04174
Wingspan	1.43	m	0.1	0.622	1.17	5.39	0.27	0.05423	4.01	0.20	0.04030
F: Flapping (0) or gliding (+1)	0		0.15	0.781	0.78	4.52	0.23	0.06814	2.78	0.14	0.04193
			0.2	0.939	0.59	4.17	0.21	0.08382	2.08	0.10	0.04177
Bird speed	12.0	m/sec	0.25	0.971	0.47	3.64	0.18	0.09147	1.48	0.07	0.03717
RotorDiam	162	m	0.3	0.923	0.39	3.10	0.16	0.09366	1.05	0.05	0.03170
RotationPeriod	4.96	sec	0.35	0.875	0.33	2.77	0.14	0.09754	0.82	0.04	0.02899
			0.4	0.827	0.29	2.51	0.13	0.10088	0.67	0.03	0.02681
integration interval	0.05		0.45	0.780	0.26	2.29	0.12	0.10369	0.60	0.03	0.02733
			0.5	0.732	0.23	2.11	0.11	0.10596	0.68	0.03	0.03428
Bird aspect ratioo: β	0.41		0.55	0.684	0.21	1.95	0.10	0.10770	0.74	0.04	0.04069
			0.6	0.637	0.20	1.81	0.09	0.10891	0.77	0.04	0.04657
Species	Lesser black-backed gull		0.65	0.589	0.18	1.68	0.08	0.10958	0.79	0.04	0.05191
			0.7	0.541	0.17	1.56	0.08	0.10972	0.81	0.04	0.05672
			0.75	0.494	0.16	1.45	0.07	0.10933	0.81	0.04	0.06100
			0.8	0.446	0.15	1.35	0.07	0.10840	0.80	0.04	0.06474
			0.85	0.398	0.14	1.25	0.06	0.10693	0.79	0.04	0.06795
			0.9	0.350	0.13	1.16	0.06	0.10494	0.78	0.04	0.07062
			0.95	0.303	0.12	1.07	0.05	0.10241	0.76	0.04	0.07276
			1	0.255	0.12	0.99	0.05	0.09934	0.74	0.04	0.07437
			Overall p(collision) =			**Upwind**		**9.3%**	**Downwind**		**4.6%**
							Average	**7.0%**			

Appendix 2

All flights recorded within VP viewsheds and clipped to 200 m buffer

Part, or all, of these flights at a height of 20 – 200 m agl places them at risk of a collision with the turbine blades (shaded columns).

Species	Season	VP no.	No. of flights	No. of birds	Total fly time (s)	Time in height category (s)					
						<20m	20-50m	50-100m	100-150m	150-200m	>200m
Hen harrier	Sep-Mar	VP2	1	1	31	11	20				
Hen harrier Total			**1**	**1**	**31**	**11**	**20**				
Osprey	Apr-Aug	VP2	1	1	140						140
Osprey Total			**1**	**1**	**140**						**140**
Greylag goose	Apr-Aug	VP2	1	10					*		
	Sep-Mar	VP2	1	3				*			
Greylag goose Total			**2**	**13**				*****	*****		
Oystercatcher	Apr-Aug	VP2	1	2				*			
Oystercatcher Total			**1**	**2**				*****			
Pink-footed goose	Sep-Mar	VP1	3	246					*	*	
Pink-footed goose Total			**3**	**246**					*****	*****	

245000 246000 247000 248000 249000 250000 251000

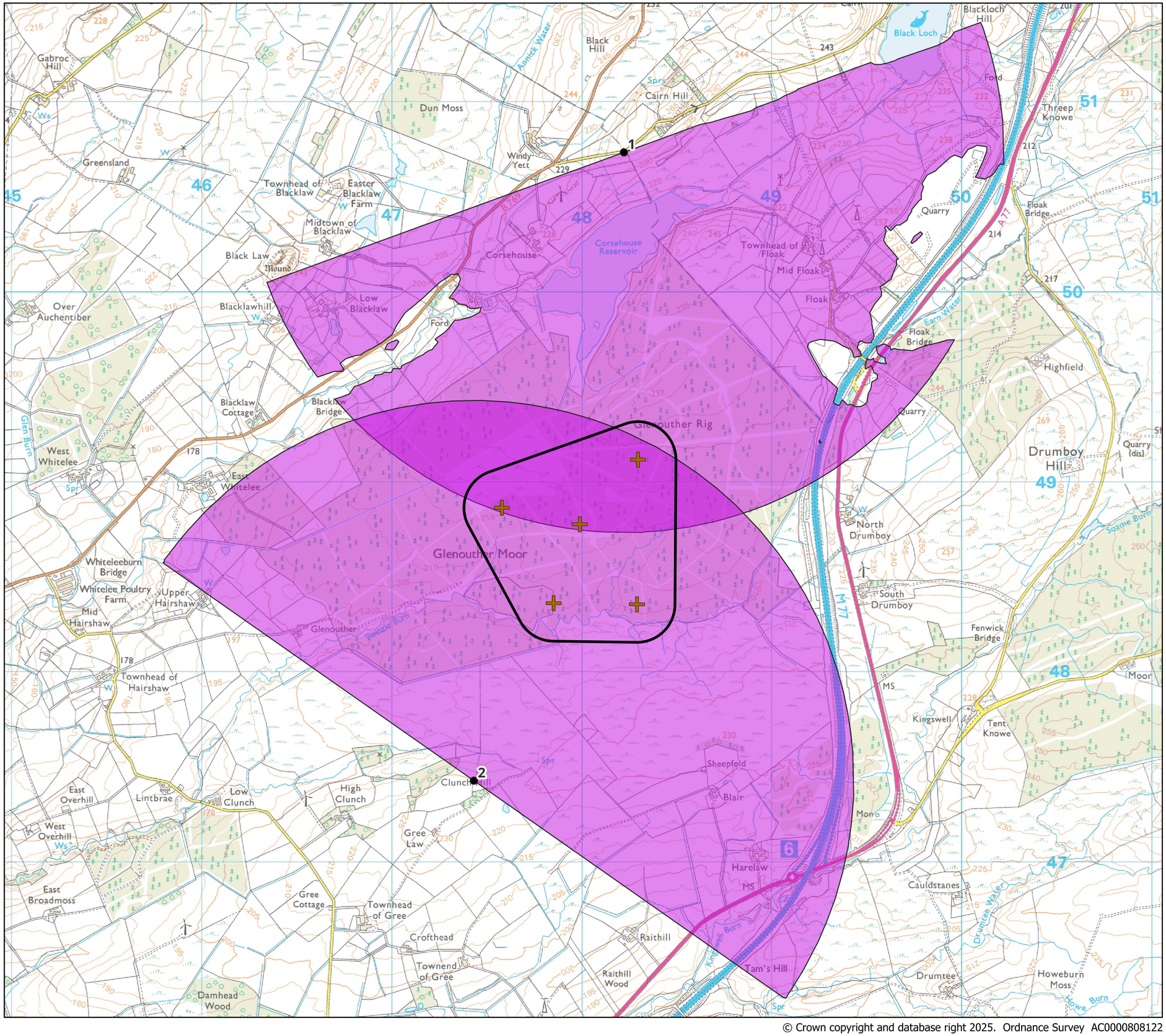
651000

650000

649000

648000

647000



nrp NATURAL RESEARCH PROJECTS LIMITED

Key

- Turbines
- 200m buffer
- Vantage Points
- Viewsheds

Date produced: 12/03/2026
Source: NRP LTD

N

0 0.5 1 km

Figure 1.

Vantage Points and viewsheds

Glenouther

245000 246000 247000 248000 249000 250000 251000

652000 651000 650000 649000 648000 647000 646000

4,427.6 m

5,133.7 m

1

2

NATURAL RESEARCH PROJECTS LIMITED

Key

- Vantage Points
- Viewsheds
- Viewshed extents

Date produced: 12/03/2026
Source: NRP LTD

N

0 0.5 1 km

Figure 2.

Vertical and horizontal extents of viewsheds

Glenouther

245000 246000 247000 248000 249000 250000 251000

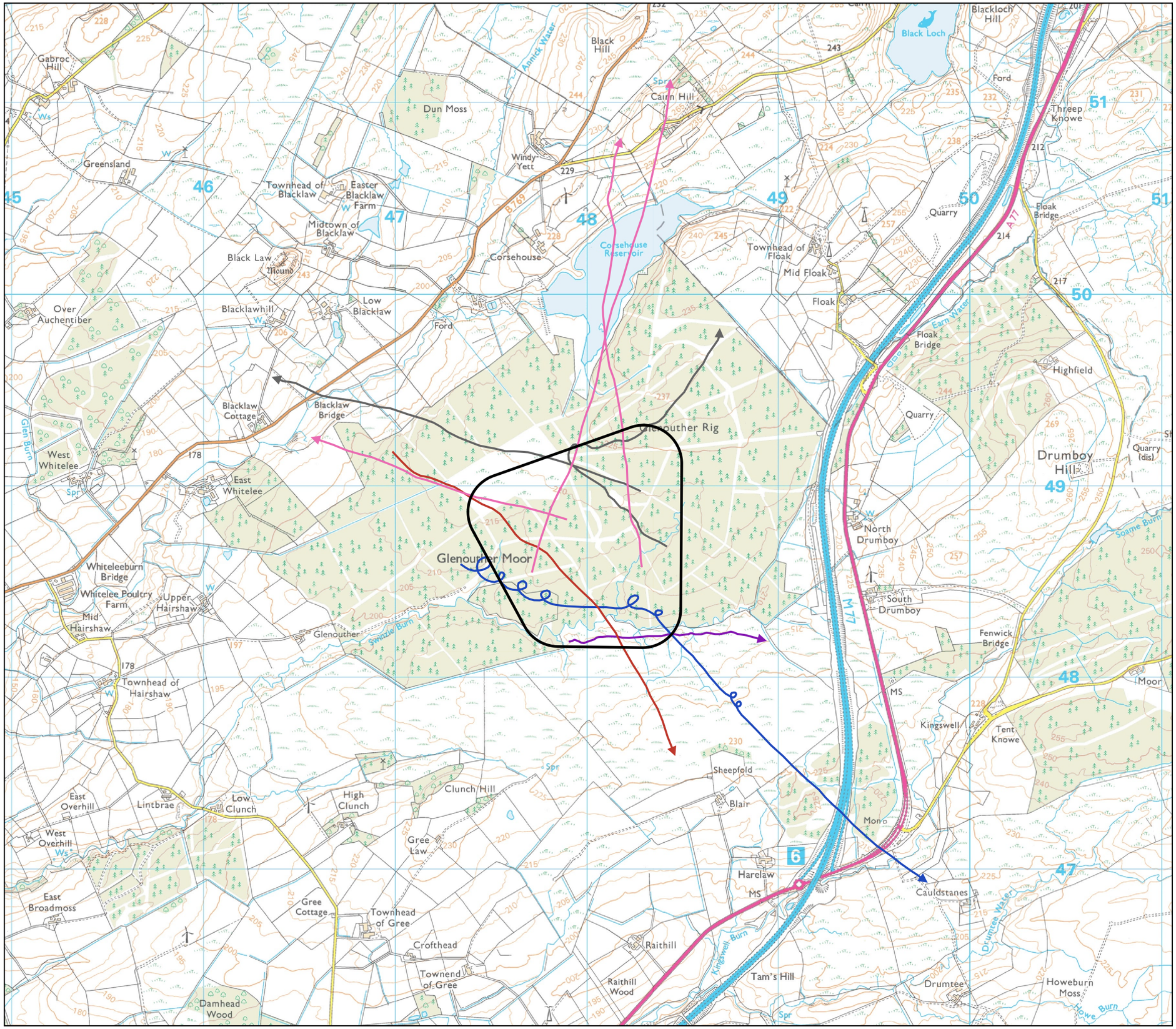
651000

650000

649000

648000

647000



nrp NATURAL RESEARCH PROJECTS LIMITED

Key

200m buffer

Flight lines

- Greylag goose
- Hen harrier
- Osprey
- Oystercatcher
- Pink-footed goose

Date produced: 24/06/2026
Source: NRP LTD

N

0 0.5 1 km

Figure 3.

All flights which passed within the Flight Activity Assessment Area

Glenouther