The Great Grid Upgrade

Sea Link

Sea Link

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Overhead Line Mortality Monitoring Survey Report

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1.1 Introduction

Background

1.1.1 The Sea Link Project (hereafter referred to as the 'Proposed Project') is a proposal by National Grid Electricity Transmission plc (hereafter referred to as National Grid) to reinforce the transmission network in the South East and East Anglia. The Proposed Project is required to accommodate additional power flows generated from renewable and low carbon generation, as well as accommodating additional new interconnection with mainland Europe. This would be achieved by reinforcing the network with a High Voltage Direct Current (HVDC) Link between the proposed Friston substation in the Sizewell area of Suffolk and the existing Richborough to Canterbury 400 kV overhead line close to Richborough in Kent.

1.1.2 The purpose of this document is to:

- detail the results of the Overhead Line (OHL) Mortality surveys of the Kent Onshore Scheme Order Limits conducted in 2024; and
- inform the need for any further surveys required and identify potential ecological constraints associated with birds for incorporation into the **Application Document 6.2.3.2 Part 3 Kent Chapter 2 Ecology and Biodiversity** for the Kent Onshore Scheme and the associated **Application Document 6.6 Habitats Regulations Assessment Report**.

1.1.3 Details of avoidance, mitigation, compensation and enhancement measures (where required) relating to birds are not included in this report and are instead reported within **Application Document 6.2.3.2 Part 3 Kent Chapter 2 Ecology and Biodiversity**.

1.1.4 This appendix should be read in conjunction with the following figures:

- **Application Document 6.4.3.2.G.1 Kent OHL Mortality Locations**.

Scope

1.1.5 The Survey Area is land under existing OHL routes within the Kent Onshore Scheme Order Limits comprising Field Parcels 232, 233 and 236 shown in **Application Document 6.4.3.2.A.2 Kent Phase 1 Land Parcels**. This report aims to detail the results of the overhead line (OHL) mortality monitoring surveys of the Kent Onshore Scheme Order Limits conducted in the winter/spring season of 2024.

1.1.6 This report includes the following information:

- relevant legislation and policy;
- methodologies for desk and field-based assessments undertaken during 2024;
- limitations to the surveys undertaken;

- survey results;
- detail of the approach used for evaluating and extrapolating results in accordance with accepted methodologies (Scottish Natural Heritage, 2017);
- an estimate of mortality rates across the Survey Area; and
- further evaluation of survey findings and mortality rate estimates.

1.1.7 The baseline findings of this report have been used to assess the need for any further surveys required and provide information on potential ecological constraints for consideration within **Application Document 6.2.3.2 Part 3 Kent Chapter 2 Ecology and Biodiversity** and **Application Document 6.6 Habitats Regulations Assessment Report**.

1.2 Bird Legislation, Policy and Guidance

1.2.1 The legislation, policy and guidance detailed within this section has been used to define the 'notable' bird species which are the focus of this report due to their inclusion in relevant legislation, policy or guidance.

Legislation

Conservation of Habitats and Species Regulations 2017 (as amended) / Directive on the Conservation of Wild Birds 2009

1.2.2 A number of bird species recorded in the UK (including those that are resident, overwintering and migratory) are protected at a European level under the European Commission (EC) Directive on the Conservation of Wild Birds 2009 (2009/147/EC). The Directive applies to 193 bird species or sub-species, which are:

- in danger of extinction;
- rare, or have restricted local distribution;
- vulnerable to specific changes in their habitat; or
- in need of particular attention for reasons of the specific nature of their habitat.

1.2.3 These species are afforded enhanced legal protection and EU member states have a responsibility to maintain the populations of these species at a level that corresponds to their ecological, scientific and cultural requirements (Article 2). This Directive was transposed into English law through the Conservation of Habitats and Species Regulations 2017 (as amended).

1.2.4 Species listed on Annex 1 of the Directive are those for which the UK Government is required to take special conservation measures, including the designation of land as Special Protection Areas (SPAs). These sites are automatically included within the Emerald network under the Bern Convention (formerly the Natura 2000 network within the UK); a network of core breeding and resting sites that are protected for rare and threatened species.

1.2.5 While the UK is no longer a member of the European Union (EU), EU legislation which applied directly or indirectly to the UK before 11.00 p.m. on 31 December 2020 has been retained in UK law as a form of domestic legislation known as ‘retained EU legislation’.

1.2.6 The Secretary of State for the Environment, Food and Rural Affairs and Welsh Ministers have made changes to parts of the Conservation of Habitats and Species Regulations 2017 (referred to as the 2017 Regulations) so that they operate effectively. Most of these changes involve transferring functions from the European Commission to the appropriate authorities in England. All other processes or terms in the 2017 Regulations remain unchanged and existing guidance is still relevant.

Wildlife and Countryside Act 1981 (as amended)

1.2.7 All active bird nests, eggs and young are protected from intentional and reckless destruction by the Wildlife and Countryside Act 1981 (as amended).

1.2.8 The Act prohibits the intentional killing, injuring or taking of wild birds and, during the breeding season, the taking, damaging or destroying of eggs or nests (whether the nest is in use or being built). In addition to this general protection, certain rare, endangered, declining or vulnerable species are afforded special protection under Schedule 1 of the Act.

1.2.9 Bird species listed on Schedule 1 are additionally protected against disturbance while nesting. This means that it is also an offence to disturb any Schedule 1 nesting birds or their young during the breeding season whilst they are occupying a nest site. This includes causing the parent birds or fledglings apparent stress and any other action which may lead to the parents abandoning their nests or young. Natural Environment and Rural Communities Act 2006 (as amended).

1.2.10 In addition to the above legislation, 49 bird species are listed as being Species of Principal Importance for conservation in England under Section 41 (S41) of the Natural Environment and Rural Communities (NERC) Act 2006. These species are of material consideration during the planning process.

1.2.11 The list of 49 ‘priority species’ comprises those identified as requiring action under the UK Biodiversity Action Plan (UKBAP), which continue to be species of conservation priority under the UK Post-2010 Biodiversity Framework (succeeded the UKBAP in July 2012).

Regional/local planning and guidance

Birds of Conservation Concern (BoCC)

1.2.12 The Birds of Conservation Concern (BoCC) Red, Amber and Green lists (Stanbury, et al., 2021) assigns UK species to those categories in accordance with criteria that are based on their population status and stability.

1.2.13 Where these species are present at a site, their conservation status should be taken into account in determining the likely impacts of a proposed development.

1.2.14 Red status species are those species of highest conservation concern and green status species are those of low or no conservation concern. Amber status species are those species of some conservation concern.

1.2.15 The BoCC assigns bird species red and amber status based on a set of criteria that are summarised in the Table 1.1.

Table 1.1 Birds of Conservation Concern (BoCC) red and amber list criteria.

Criteria	BoCC Status Code	Description
Red list	HD	Historical decline in breeding population.
	BDp[1] / BDp[2]	Severe breeding population decline over 25 years / longer term.
	BDr[1] / BDr[2]	Severe breeding range decline over 25 years / longer term.
	WDp[1] / WDp[2]	Severe non-breeding population decline over 25 years / longer term.
	WDr[1]	Severe non-breeding range decline over 25 years.
	IUCN	Globally threatened – CR (critically endangered) EN (endangered) VU (vulnerable).
Amber list	BDMp[1] / BDMp[2]	Moderate breeding population decline over 25 years / longer term.
	WDMp[1] / WDMp[2]	Moderate non-breeding population decline over 25 years / longer term.
	BDMr[1] / BDMr[2]	Moderate breeding range decline over 25 years / longer term.
	WDMr[1]	Moderate non-breeding range decline over 25 years.
	ERLOB	Threatened in Europe – CR (critically endangered) EN (endangered) VU (vulnerable).
	HDrec	Historical decline in breeding population in recovery.
	BR / WR	Breeding rarity / non-breeding rarity.
	BL / WL	Breeding localisation / non-breeding localisation.
	BI / WI	Breeding bird of international importance / non-breeding bird of international importance.
Green	N/A	Green list species are not of conservation concern and include all other commonly occurring birds in the UK.
Other	N/A	Non-native species (e.g. Canada goose (*Branta canadensis*), feral pigeon (*Columba livia domestica*)) are not afforded Red, Amber or Green list status.

1.2.16 Although it does not offer any legal protection, BoCC 5 (Stanbury, et al., 2021) provides guidance on the conservation status of UK bird species. Thus, it can be used to assess the ecological importance of bird populations and the habitats that they rely on, particularly at a local level.

1.2.17 These lists confer no legal status. However, they are useful when assessing the significance of predicted impacts and determining the level of mitigation that may be required when birds are to be affected by development.

Kent Local Wildlife Site selection criteria

1.2.18 In Kent an individual Local Wildlife Site (LWS) can be selected for birds if it meets the criteria within Kent LWS Selection Criteria (Kent Wildlife Trust, 2022). These guidelines are used as an informative when assessing of the geographic level of importance of a survey site for birds, especially when determining whether a site falls within Local or County importance parameters (noting that meeting LWS criteria does not automatically result in a site being assigned County level importance). These guidelines state that the criteria for selection of LWS applies to birds as follows:

> *'Birds*
>
> *133) A set of criteria has been established by Kent Ornithological Society, as the relevant expert organisation, for the selection of Wildlife Sites on the basis of their bird fauna (which is here taken to mean the naturally occurring populations of wild birds on a site). The criteria are based on established criteria for the selection of Sites of Special Scientific Interest, and on the Kent Red Data Book.*
>
> *134) The criteria are intended to be applied to areas of habitat which are more-or-less discrete and homogenous. For example, a large block of woodland should not be treated as part of the same site as a large block of farmland. However, an intimately mixed area of small fields, hedges and small woods may be treated as a unit, as may the mix of scrub, swamp, marsh and open water vegetation associated with flood plains or around abandoned quarries.*
>
> *135) The criteria have been designed to recognise*
>
> *a) The rarity of certain breeding and wintering bird species;*
>
> *b) Birds which may be considered vulnerable because their populations are in decline;*
>
> *c) Birds which are vulnerable because of their colonial nesting habitats;*
>
> *d) Birds which may be considered vulnerable because their non-breeding populations are concentrated in a small number of sites; and*
>
> *e) Sites of importance for the presence of a diversity of species.*
>
> *A site should be selected as a Local Wildlife Site if it can be considered as a single, identifiable unit (as explained above) in terms of its bird fauna and where:*
>
> *• It is occupied regularly by at least 2.5% of the county population of any one or more bird species, based on the most recent and authoritative data;*
>
> *OR*
>
> *• It is occupied regularly as a breeding site by species with a Kent population of 50 or fewer territories;*
>
> *OR*
>
> *• It holds ten or more Kent Red Data Book 2 (KRDB2) species in the breeding season;*

OR

• It holds three or more Kent Red Data Book 3 (KRDB3) species at the appropriate time of year (normally this should not include a combination of breeding and wintering species);

OR

• It holds one of the five largest colonies of colonial seabirds (with the exception of herring gull and black-headed gull), grey heron, little egret or sand martin;

OR

• It is occupied regularly by 5% or more of the county population of any one or more species in non-breeding seasons, based on the most recent and authoritative data;

OR

• It has been recorded as being regularly used in recent years by at least 50 breeding bird species;

OR

• It has been recorded as being regularly used in recent years by at least 60 wintering bird species;

OR

• It has been recorded as being regularly used in recent years by at least 100 passage bird species.'

1.3 Methodology

Field Survey Method

1.3.1 An adapted version of the (Scottish Natural Heritage, 2009) bird corpse search methodology (incorporating methods for bats (NatureScot, 2021) and the most recent NatureScot guidance on bird assessment (Scottish Natural Heritage, 2017)) for wind turbine mortality monitoring was conducted across areas located in direct proximity to existing Richborough to Canterbury 400 kV OHL within the Survey Area, south of the River Stour canal.

1.3.2 This broadly entailed a walked transect near the existing OHL to record bird corpses that could be attributable to OHL collisions.

1.3.3 A control transect was also walked in fields located away from the OHL, approximately 500m to the south. This was to provide data to account for any comparable background rates of corpse occurrence.

1.3.4 A 3-month survey period was conducted to target the Winter period in January/February (the period when highest bird concentrations may occur in conjunction with periods of poor visibility and weather which may increase the risk of OHL collisions), then continuing into March/April for the Spring migration season (where large numbers of migrant species could also conduct flights through the OHL, again increasing the risk of OHL collision).

1.3.5 Where possible and safe to do so, searches were undertaken following periods of notably cold weather and/or poor visibility, as these conditions were assessed as being when bird collisions with the OHL were most likely to occur.

1.3.6 Weekly or fortnightly searches (subject to access restrictions) were undertaken by suitably experienced and trained surveyors.

1.3.7 The survey visits commenced shortly after sunrise, to minimise opportunism for diurnal scavengers to remove corpses and maximise the chance of finding corpses as a result of nocturnal activity. The surveyors walked each transect within the pre-defined transect visually between the two pairs of OHL and within 25 m were also investigated. An approximate one-hour search time was expected per transect. When a dead bird was encountered, the surveyor recorded the location of the corpse using a GPS device, to an accuracy of +/- 5 m (subject to any spatial accuracy limitations caused by e.g. dense cloud cover).

1.3.8 Upon finding each corpse, information was recorded on the fatality onto a standard recording form. This information included:

- weather conditions (including temperature, wind speed, precipitation, cloud cover and prevailing wind direction) during the previous night;
- date;
- overhead cable section reference number/code;
- species;
- sex and age (if possible to determine);
- condition of corpse (entire, partial, scavenged);
- visible injuries;
- estimated time/day of death; and
- habitat surrounding corpse (vegetation type, height).

1.3.9 Each corpse was photographed in situ and numbered using a high-resolution digital camera.

1.3.10 Due to the risk of bird flu transmission and other potential disease risks, collection or handling corpses was not undertaken.

1.3.11 While provision was made for quality control checks for searcher efficiency (use of models to calibrate for detection rates) and scavenger checks (placement and monitoring of control corpses), landowner agreement was not possible for these methodologies.

Survey personnel, dates and weather

1.3.12 The OHL search survey visits were led by four experienced ornithologists. One lead ornithologist has over 30 years of ornithological experience, which includes breeding and wintering bird surveys. The second has over 15 years of ornithological survey and bird identification experience. The third has over 30 years of ornithological experience, which includes breeding and wintering bird surveys including internationally. He additionally has held licences for species protected under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and is a bird ringing permit holder. The fourth has

over 10 years of ornithological experience, with over four years' experience of ornithological surveys relating to development projects.

1.3.13 Bird survey visits were conducted in the months of January 2024 to April 2024.

1.3.14 Survey visits were undertaken on the dates and during the weather conditions given in Table 1.2 below.

Table 1.2 Dates and weather conditions for each survey visit.

Date	Visit No.	Sunrise/sunset	Start time	End time	Weather conditions (survey):	Weather conditions (previous night):
30/01/24	1	7:36am	7:37am	8:56am	8°C, 100% cloud cover, Beaufort 4 W; and dry	Approx 6°C, partial cloud, approx. Beaufort 4 SW; and dry
05/02/24	2	7:30am	7:15am	9am	9-11°C, 20% cloud cover, Beaufort 3 W; and dry	9°C, clear, approx. Beaufort 3 W; and dry
15/02/24	3	7:06am	7am	9:30am	11-12°C, 30-50% cloud cover, Beaufort 3 S; and dry	9°C, clear, approx. Beaufort 5 W; and dry
22/02/24	4	6:55am	6:35am	9:10am	9°C, 100% cloud cover, Beaufort 5 S; and dry (drizzle at end of survey)	9°C, cloudy, approx. Beaufort 4-6 SW; and dry
28/02/24	5	6:42am	6:40am	9:40am	9°C, 80% cloud cover, Beaufort 2 SW; and dry. Flood preventing safe access to furthest western extent of Survey Area (i.e. Field Parcels 227 and 228)	5°C, cloudy, approx. Beaufort 1 SW; and dry
14/03/23	6	6:09am	6am	8:45am	8°C, 75% cloud cover, Beaufort 4 SW; and dry. Flooding again preventing access to west extent	Approx 8°C, Beaufort 4 SW, partial cloud
26/03/24	7	5:42am	6am	8:45am	7°C, Cloud NR, Beaufort 2 SW, dry	Approx 8°C, cloudy, calm, dry

Date	Visit No.	Sunrise/sunset	Start time	End time	Weather conditions (survey):	Weather conditions (previous night):
04/04/24	8	6:24am	6:30am	10:10am	11°C, 100% cloud cover, Beaufort 3 SW; spots of rain.	Approx 8°C, Beaufort 4 SW, partial cloud
10/04/24	9	6:09am	6am	9:15am	4-6°C, 30% cloud cover, Beaufort 1-2 NE; dry.	6°C, approx. Beaufort 4-5 strong winds; and dry
17/04/24	10	5:53am	6am	9:10am	5-8°C, 80% cloud cover, Beaufort 4 NW; dry.	5°C, approx. Beaufort 3-4 SW; and dry
24/04/24	11	5:41am	5:20am	8:20am	5-7°C, 20% cloud cover, Beaufort 3-4 NW; dry.	7°C, approx. Beaufort 2 NW; and dry
30/04/24	12	5:27am	5:05am	8am	9°C, 20% cloud cover, Beaufort 2-3 NW; dry.	7°C, approx. heavy rain, Beaufort 2 W.

Data Analysis

1.3.15 As well as recording actual casualties, the total number of bird fatalities was adjusted to take account of intervals between survey visits as per (Scottish Natural Heritage, 2009). As tests for surveyor efficiency and scavenger removal rates could not be carried out, estimates based on the survey observations and results were used within the analysis.

1.3.16 The following equation was used to calculate the total number of fatalities for the length of the existing OHL (M), where C is the actual number of dead birds found and E is the searcher efficiency (0 to 1 where 0 = 0% and 1 = 100%) and P is the scavenger rate based on the mean survey interval (where 0.1 = 90% and 1 = 0% corpse removal rate).

$$M = \frac{C}{E} / P$$

1.3.17 The Survey Area was generally either fully accessible or visible for the duration of the survey visits, as it primarily comprised short cropped arable fields, flooded areas or ditches. To account for a number of periods where full access was not available or the area visible (due to some areas of dense vegetation (reedbed) or flooding preventing access to the northwest portion of the survey area), the proportion of the total area that could not be searched was estimated to be 10%. Therefore, the corrected estimated mortality accounted for 10% of the Survey Area not searched is M x 1.11[1].

1.3.18 The estimated mortality has also only been applied to the OHL length south of the River Stour, as the large standing waterbodies present in this area in Winter 2024 were not replicated along the OHL north of the River Stour canal (i.e. bird numbers north of the

[1] 90% searchable area is multiplied by 1.11 to provide an estimated figure of 100% searched Survey Area

Stour are likely to differ). Additionally, the area of focus is south of the River Stour canal based on the Kent Onshore Scheme Order Limits.

1.3.19 An estimated mortality for a full year has not been produced, as such a figure from the wintering and passage period would likely be an overestimate of the lower levels of bird flight and migration activity during the breeding season. Instead, an estimate for a 24-week period is provided (six months) providing an estimate for a Winter/passage period of six months.

1.3.20 The mortality survey results are discussed in relation to observations from the breeding and wintering bird surveys (see **Application Document 6.3.3.2.B Appendix 3.2.B Wintering Bird Survey Report 2023**, **Application Document 6.2.2.3.C Appendix 3.2.C Wintering Bird Survey Report 2024**, **Application Document 6.2.2.3.D Appendix 3.2.D Breeding Bird Survey Report 2023**, and **Application Document 6.2.2.3.E Appendix 3.2.E Breeding Bird Survey Report 2024**), qualifying species and assemblages of designated sites detailed within the wintering and breeding bird reports and the species conservation status using the Birds of Conservation Concern (BoCC) (Stanbury, et al., 2021). The BoCC assessment for birds in the UK uses a well-established approach, based on quantitative assessments against standardised criteria. Birds are placed on Red, Amber or Green lists to indicate the level of conservation concern. Red is the highest conservation priority, with species needing urgent action, Amber is the next most critical group and species on the green list are the least critical group.

1.3.21 By using a transparent and standardised approach, based upon the best available data, and conducted by a multi-partner group drawn from relevant organisations in both statutory and non-governmental sectors, BoCC is a robust assessment of the status of all the bird species considered an established part of the UK's avifauna. These lists report on the fortunes of individual species but also indicate broader changes in the UK's biodiversity.

1.3.22 Note that full details of the legislation and planning policy applicable to breeding and wintering birds as well as detail of the designated sites and associated species relevant to the Survey Area are supplied within the wintering and breeding bird reports listed above.

Limitations

1.3.23 An ecological survey represents a 'snapshot' in time of the ecological condition of a site. The extent and quality of habitats present, and their suitability for protected and priority species, can change substantially throughout both the course of a year and between years. However, any seasonal limitations to the appraisal are clearly identified in this report, and the *Lifespan of the appraisal* section of this report at least partially addresses the potential for changes between years. Therefore, this standard limitation is addressed as far as is reasonably possible.

1.3.24 The aim of a desk study is to help characterise the baseline context of the site and provide valuable background information that would not be captured by a single site survey alone. Information obtained during a desk study was dependent upon people and organisations having made and submitted records for the area of interest. As such, a lack of records for a particular habitat or species does not necessarily mean that the habitats or species do not occur in the study area. Likewise, the presence of records for particular habitats and species does not automatically mean that these still occur within

the area of interest or are relevant in the context of the Kent Onshore Scheme Order Limits.

1.3.25 The Winter 2023/2024 period was noted to be subject to exceptionally high levels of rainfall ('*Southern England was particularly wet with 153% of the 1991-2020 average rainfall*'[2]), resulting in the Survey Area being subject to extensive flooding and containing extensive levels of standing water. Such conditions were not present during previous survey seasons (i.e. Winter 2022/2023) as observed during previous wintering bird surveys (**Application Document 6.3.3.2.B Appendix 3.2.B Wintering Bird Survey Report 2023** and **Application Document 6.3.2.3.C Appendix 3.2.C Wintering Bird Survey Report 2024**). As a result, the large number of waterbirds recorded during the 2023/2024 survey period may not be representative of more 'usual' years and the corresponding recorded number of possible mortalities should also be viewed in this context.

1.3.26 Access to the Survey Area was not available between 28 February 2024 and 14 March 2024, resulting in a fortnight long gap between survey visits. The total number of survey visits however was unaffected and total survey duration was extended by an additional week as compensation.

1.3.27 No access permissions were granted for the control tests for scavenger removal or surveyor efficiency tests (which utilise methods requiring placement of control corpses and models respectively) detailed within NatureScot guidance (Scottish Natural Heritage, 2017; NatureScot, 2021). As a result, the 'Searcher efficiency rate (E)' and 'Scavenger Rate (P)' have been informed by information obtained during the corpse search and estimated accordingly.

1.3.28 Given that the pylons are known to be used on occasion as hunting perches for raptors, field evidence and professional judgement have been used to assess whether corpses are likely attributable to OHL collisions or predation, noting that collisions and predated corpses both would occur in proximity to pylons.

1.3.29 Overall, despite some limitations above, the survey results can be used to provide an indication of the likely OHL collision rates.

Lifespan of the Appraisal

1.3.30 It should be noted that ecosystems are dynamic and constantly changing, and therefore species may move and/or new species may be recorded in subsequent years. For this reason and in accordance with current guidance, the field survey data detailed in this report are valid for two years from the date of survey (Chartered Institute of Ecology and Environmental Management, 2019). After this date, update surveys may be required, and advice should be sought from an appropriately qualified ecologist to determine survey scope and methods.

[2] https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/summaries/uk_climate_summary_winter_2024.pdf

1.4 Results

Mortality Monitoring

Summary of the recorded bird mortality

1.4.1 The observed mortality for the period 31 January 2024 to 30 April 2024 (12 once-weekly corpse searches, but noting the fortnight-long gap cited in the *Survey limitations* section above) potentially attributable to the OHL is a total of nine birds. The survey results are given in Table 1.3.

1.4.2 Note that no corpses were recorded within the control transect area.

Table 1.3 Register of the bird mortality attributed to existing OHL.

Ref.	Species	Date	OHL section	Distance from OHL (m)	Comment
A	Herring gull (*Larus argentatus*)	22/02/24	N2-N3	22	Large group of over 50 waterlogged feathers appearing attributable to herring gull (white tail feathers and mix of grey, dark and white and down and covert feathers though diagnostic primaries not clearly visible).
B	Mute swan (*Cygnus olor*)	14/03/24	North of N2-N3	51	Incidental mute swan corpse (leg and feathers found during wintering bird survey).
		04/04/24	N2-N3	2	Group of swan feathers – tail/wing and down, possibly plucked. In proximity to previous incidental corpse and likely attributable to movement by scavengers.
C	Mute swan	26/03/24	South of S4-S5	47	Juvenile corpse. Pair of wings only part of corpse remaining with scattered feathers. Within scattered rush adjacent to ditch.
		04/04/24		47	Feathers, wings and partial skeletal remains of spine and breastbone found adjacent to ditch. Appears to be remains of corpse found on previous visit, wings, moved by scavenger and now stripped.

Ref.	Species	Date	OHL section	Distance from OHL (m)	Comment
D	Herring gull	04/04/24	Between N5-N6 and S5-S6	39	Single wing remaining, attributed to OHL collision based on corpse location as reasonable worst case but cause of death not able to determine.
E	Unidentified (likely swan or large waterbird)	10/04/24	N1-N2	0	Partial breast bone from swan or large bird, direct under OHL. Could represent part of other corpse (B) relocated by predator but assessed as separate corpse as reasonable worst case due to distance.
F	Mallard (*Anas platyrhynchos*)	10/04/24	S4	117	Female, adult corpse. Partially scavenged with neck and head missing, though mainly intact and likely only present a day or two.
G	Mute swan	10/04/24	South of S4 - S5	46	Juvenile corpse, partially scavenged but identified and likely present only a day or two.
		17/04/24		46	Remains still present on survey 17/04/24.
		24/04/23		46	Remains still present on survey 24/04/24.
H	Likely swan	10/04/24	South of S5-S6	71	Partial breast bone and wing.
	Mute swan	10/04/24	S5-S6	1	Spine and wing bones. Old remains and directly below OHL. Assessed as likely being part of same corpse due to close proximity, potentially relocated by predators
		17/04/24		1	Remains still present on survey 17/04/24.
		24/04/24		1	Remains still present on survey 24/04/24.
I	Mallard	30/04/24	S1-S2	23	Adult male, fresh entire corpse (from previous night). No gunshot or predation evidence and hypothesised to be OHL collision.

1.4.3 Casualties which were species of Birds of Conservation Concern, either Red or Amber List (BoCC) (Stanbury, et al., 2021) were mute swan, herring gull and mallard. Mute swan, herring gull and mallard are casualties within the target species group (i.e. raptors, owls, waders and waterbirds).

1.4.4 There was no obvious indication that adverse weather (i.e. strong wind/poor visibility) had been a factor in the observed mortalities. Most (8/9) casualties were recorded within 100 m of the existing OHL, with 55% (5/9) of casualties within 25 m of the OHL.

1.4.5 Casualties appear to be distributed across the existing OHL with no section causing significantly more casualties than the others.

Additional corpses and remains

1.4.6 An additional five corpses (or bird remains attributable to a corpse) were recorded but assessed as likely attributable to other causes of death (where feather groups are small and could be attributable to moult, loss or predation). These corpses provide some information in background removal rate by scavengers.

1.4.7 Including these remains gives a total of 14 corpses recorded during a 90-day survey period.

1.4.8 This remains were recorded as follows:

- 05 February 2024 – Handful of likely woodpigeon feathers with fox droppings. It did not constitute a full corpse and was potentially attributable to fox kill or scavenging. Cause of death not determinable.
- 15 February 2024 – Group of feathers (less than twenty) and fox droppings appearing attributable to black-headed gull, not constituting full corpse.
- 04 April 2024 – Dead woodpigeon attributed to likely bird of prey kill with head missing and chest cavity torn out as indicators of predation.
- 10 April 2024 – Gull feathers below existing OHL at S2-S3 but scavenged, and no evidence of full corpse. Feathers also present on 17 April 2024.
- 24 April 2024 – Duck remains between S2-S3 but plucked with breast and head cavity removed, attributed to likely bird of prey kill.

1.4.9 Feather groups were recorded but without sufficient evidence to be attributed to a corpse as follows:

- 14 March 2024 – Group of down feathers recorded (likely attributable to teal) but no evidence of corpse.
- 04 April 2024 – Several small groups of down feathers were recorded across the site but could not attribute a cause of mortality.
- Occasional individual feathers were recorded on several survey visits.

Estimate of Mortality Across the Survey Area

1.4.10 In accordance with the established methods, the observed collisions were extrapolated to estimate mortality for the proposed OHL across the entire Survey Area and for an extended duration. Table 1.4 and Table 1.5 show the results.

1.4.11 The contribution of each recorded species to the estimated mortality is summarised in Table 1.4. This assumes that (a) estimated mortality only relates to the species observed during the survey (b) that immediately after a bird is killed the territory is re-occupied by another of the same species, (c) that mortalities during the observed Jan to April survey period are equivalent to mortality rates across the passage and winter season and (d) that mortality is more than just a rare random or chance event. This combination of circumstances cannot be substantiated by available data and seems unlikely to be applicable to all sites and all species.

1.4.12 Given the above limitations, estimates should be treated with caution. They are approximate as their exactness cannot be determined accurately. The true mortality is likely to be between the observed mortality of nine birds and the worst-case estimate of 23 birds (see Table 1.4).

Table 1.4 Estimate of mortality calculation.

Mortality is derived using the equation M = (C / E) / P					
Number of bird corpses at OHL (C) – derived from **Table 1.3**	9	**Searcher efficiency rate (E)** – estimated as below.	0.90	**Scavenger rate (P)** – estimated as below.	0.64
Uncorrected estimated mortality (M) – for 90 days (during winter/passage season)	15.625	**Corrected estimated mortality (M x 1.11)** – accounting for 10% of search area not searched (primarily due to flooding preventing access but also some small areas of dense reedbed) (1.00/0.9)		17.1875	
Corrected estimate for entire OHL route for a six-month (winter and passage period) M x 2 (doubling of 90 day survey period)	Estimated mortality of birds = 34.375				

1.4.13 As searcher efficiency rates and scavenger rate trials could not be conducted, estimates for these rates have been substituted instead.

- The Searcher efficiency rate (E) is estimated as 90%. This high rate is based upon the predominately open short cropped arable field types within the majority of the Survey Area, coupled with a number of corpses being repeatedly found between survey visits. Searcher efficiency rate is also likely to be high given that a large proportion of corpses are attributable to mute swans, gulls and other large species with notably large corpses and white plumage. Smaller species could have been missed, but surveyor efficiency remains assessed as high given the success in

finding small feather groups and smaller birds are less likely to be OHL collision fatalities (less likely to make contact with two wires simultaneously).

- Scavenger rate (P) is estimated at 0.64. This is based upon almost all small corpses/groups of feathers being removed between weekly or fortnightly searches with the notable exception of the larger swan carcasses being present for at least two (and sometimes four) survey visits/14 days. As five of the 14 total corpses found were repeatedly found on a subsequent survey visit, a broad estimate of 0.64 (9/14) has been used.

1.4.14 The estimated number of casualties based on corpse searches calculated for a six-month Winter and passage period, derived from the calculation in Table 1.4, is given in Table 1.5 below.

Table 1.5 Estimated number of casualties per species for a six-month winter/passage period.

Species	Observed number of possible OHL casualties	Estimated mortality (with a corrected estimate based on Table 1.4) to the nearest whole bird
Mute swan	4	15 (but noting scavenger removal rate appears much lower for this species than others based on results observation)
Mallard	2	8
Herring gull	2	8
Unidentified (likely swan or large waterbird)	1	4
Total	9	35

1.4.15 Estimated mortality as adjusted in Table 1.5 predicts 35 bird casualties (similar to Table 1.4) during a projected six-month Winter and passage period. The estimates for mute swan are believed to be an over-estimate due to the fact that scavenger removal rate estimates are likely to be lower than for other species (as scavenger rates have been estimated and mute swan corpses were noted to persist for longer durations than the smaller species).

1.5 Evaluation

1.5.1 Nine birds were found as possible existing OHL casualties within the Survey Area.

1.5.2 Of the casualties found during the 90 days of corpse monitoring, all species are target species: four mute swan, one unidentified large bird (likely swan), two mallard and two herring gull. None are qualifying species of the nearby designated sites, but all are BoCC Red or Amber listed species.

1.5.3 The lack of corpses on the control transect provides evidence that background rates of corpse occurrence are low or minimal.

1.5.4 Incidental observations or relevant context from other bird survey reports (**Application Document 6.3.3.2.B Appendix 3.2.B Wintering Bird Survey Report 2023**, A**pplication Document 6.2.2.3.C Appendix 3.2.C Wintering Bird Survey Report 2024**, **Application Document 6.2.2.3.D Appendix 3.2.D Breeding Bird Survey Report 2023,** and **Application Document 6.2.2.3.E Appendix 3.2.E Breeding Bird Survey Report 2024**) is additionally described below.

Relevant Incidental Observations

1.5.5 A number of incidental observations recorded during the survey visits (and 2023-2024 wintering bird surveys) provide a number of hypothetical factors for the mute swan corpses recorded, as follows:

- Overall, waterbird numbers recorded in the fields south of the River Stour canal were much higher than in previous years due to the exceptional rainfall and flooded field recorded during the 2023-2024 Winter season.
- Mute swan aggregations in fields were generally recorded south of the existing OHL. Coupled with an observation of swans flying from the north to land in these fields, this means that swans may have to fly low and through the existing OHL to land in these fields.
- A low flight by mute swan was observed incidentally on the survey 04 April 2024, with a swan observed flying through the existing OHL (between individual cables) to land in fields to the south.
- Mute swans have been observed in small groups north of the River Stour canal, which may require a flight north to south (potentially through the existing OHL) to reach fields south of the existing OHL.

1.5.6 Corpses were generally not recorded during the early part of the survey period and began to be recorded during March onwards. Since poor weather (heavy rainfall and cloud) were relatively consistent across the survey period, this could be correlated to the build-up of standing water in the arable fields and increasing numbers of waterbirds using the fields south of the River Stour canal later in the survey period (as observed during the Winter bird surveys (**Application Document 6.3.3.2.B Appendix 3.2.B Wintering Bird Survey Report 2023**, and **Application Document 6.2.2.3.C Appendix 3.2.C Wintering Bird Survey Report 2024**. This, in turn, could be partially responsible for the increase in recorded possible collision mortalities.

Notable Species Not Recorded

1.5.7 A number of species recorded in large numbers during other surveys within the Survey Area (i.e. vantage point or wintering) were not recorded as possible collision corpses. A brief description of key species is provided below.

1.5.8 The very large numbers of cormorants (potentially vulnerable to collision with the OHL due to its large size) recorded as part of other survey types (notably during vantage point surveys) flying in proximity to the OHL have notably not resulted in any corpses of this species being found during the survey. Hypothetical reasons for this include the height bands recorded for this species during the vantage point surveys generally being

above OHL height, as well as birds potentially using the existing pylons and OHL as a navigational aid and being aware of their presence as ‘learnt avoidance’.

1.5.9 A similar situation occurs for marsh harrier where this large species (potentially again vulnerable to collision) was frequently observed to conduct flights at OHL level heights during the vantage point surveys. These birds may be familiar with the OHL ‘learnt avoidance’ and also may conduct fewer flights in poor weather or bad visibility.

1.5.10 Despite other large waterbirds (potentially vulnerable to collision with the OHL (e.g. shelduck)) being recorded in large numbers adjacent to the OHL during the Winter 2023-2034 surveys, no corpses were found attributable to these species.

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