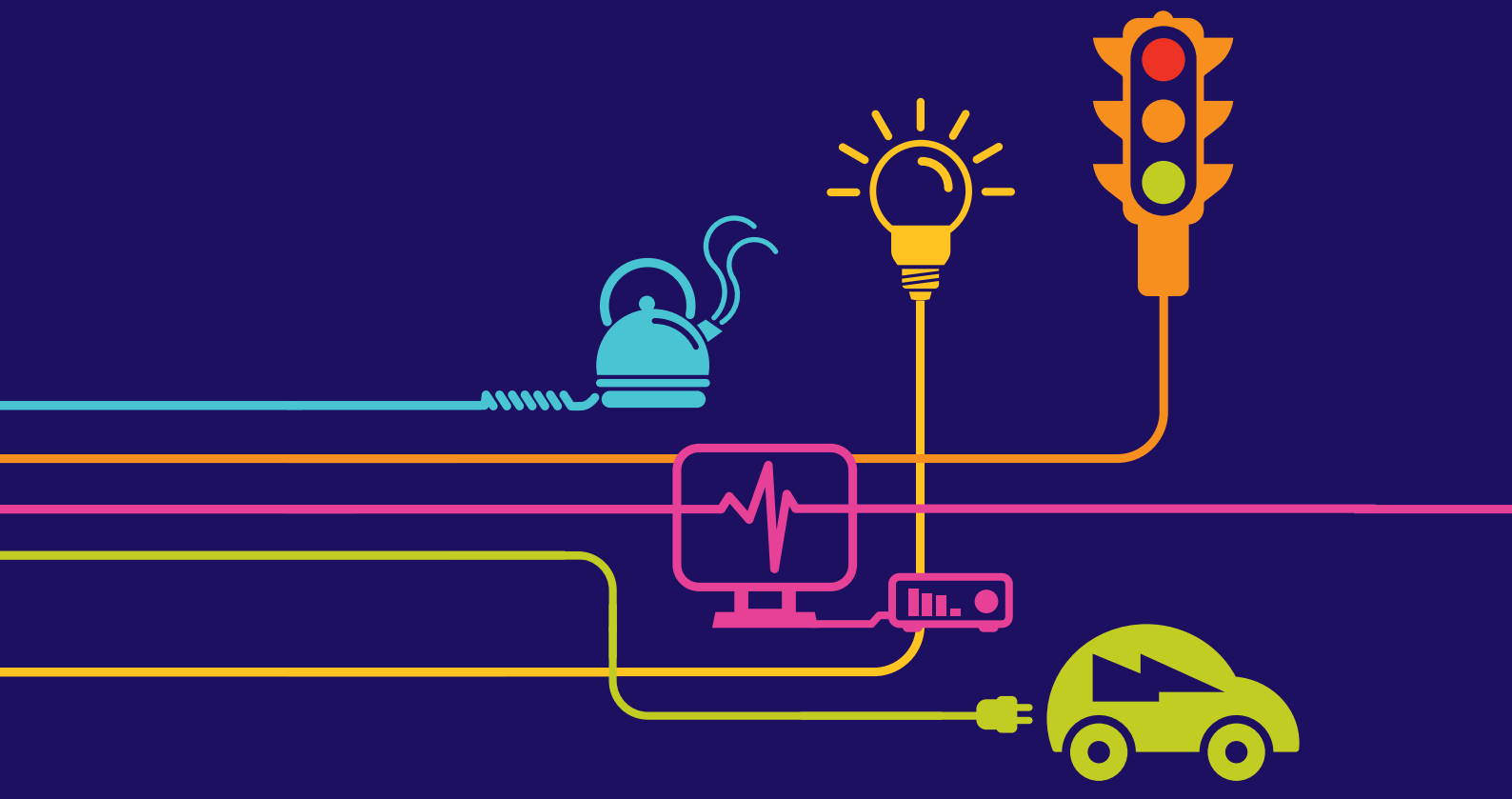
Document 5.33.1

nationalgrid

Environmental Statement Bird Mortality Monitoring and Thresholds South of Mark

Hinkley Point C Connection Project

Regulation 5(2)(q) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009



Application Reference EN020001

June 2015

nationalgrid

Hinkley Point C Connection Project

VOLUME 5.33.1

BIRD MORTALITY MONITORING AND THRESHOLDS SOUTH OF MARK

May 2015

Document Control			
Document Properties			
Organisation		**National Grid**	
Author		**TEP**	
Approved By		**Elizabeth Seal**	
Title		**Bird Mortality Monitoring And Thresholds South of Mark**	
Document Reference		**Volume 5.33.1**	
Version History			
Date	**Version**	**Status**	**Description/Changes**
12/01/15	A	Superseded	
19/01/15	B	Superseded	Changes made following meeting with NE on 16/01/15.
05/02/15	C	Superseded	Changes made following National Grid review on 05/02/15
18/02/15	D	Superseded	Changes made by NE
16/04/15	E	To be agreed	Changes made by TEP
27/04/15	F	Superseded	Changes made by TEP following meeting with NE on 27/04/15.
06/05/15	G	Superseded	Changes made by TEP following comments from NE on 1/05/15.
15/05/15	H	Superseded	Changes made by TEP following comments from NE on 27/05/15.
27/05/15	I	Live	Final version.

Contents

1.0 INTRODUCTION

1.1 This document provides details of the bird collision monitoring strategy (including proposed thresholds) for the Hinkley Point C Connection (HPCC) project. The thresholds specify the numbers of bird collisions of each key species, that if reached would trigger further action to reduce bird collision mortality to an acceptable level. This further action in the first instance may involve further investigatory work, or may involve implementation of further mitigation such as installation of bird flight diverters.

1.2 A summary of this document is detailed within Section 4.7 of the HRA (ES Volume 5.20A).

1.3 Implementation of this strategy will be governed by a Working Group. The Working Group will comprise representatives for National Grid, Natural England, Somerset County Council and Sedgemoor District Council. The RSPB would also be invited to attend. Further information on the Working Group is provided throughout this document.

1.4 The HPCC is different from most proposed overhead line projects as it would replace an existing overhead line that has been in situ since the early 20th century. The existing level of collision mortality, that has been occurring at this location for more than 80 years, is unknown and, therefore, it is not clear whether or not it makes any contribution to any possible cumulative impacts that might currently affect the designated sites. The new overhead line, however, is likely to present a reduced collision risk to birds due to the usage of the T-pylon design (which has a smaller collision risk zone) and the fitting of bird flight diverters at those critical locations where higher levels of bird activity have been recorded.

1.5 The net effect of this replacement power line might be to reduce existing baseline levels of bird mortality occurring as a result of collision. The approach to both any residual risk and remaining uncertainty, as set out within this document, should be considered within this context. For these reasons, the monitoring strategy proposed for this particular overhead line is likely to differ from those projects where any predicted mortality is additional to baseline levels and, therefore, does not set a precedent for other overhead line projects.

2.0 MONITORING STRATEGY

2.1 In addition to the use of the T-pylon and the fitting of bird diverters it is proposed that monitoring work is carried out following installation of the 400kV overhead line.

2.2 The purpose of the monitoring work is to determine whether the number of bird collisions that occur once the overhead line is in place are as predicted in the EIA / HRA (Volume 5.20 of the ES). If it is determined through monitoring that this is not the case and a greater number of bird collisions occur than were predicted, such that the rate of collision is unacceptable, further mitigation will be required. Fitting bird diverters is considered the most effective and viable form of mitigation to reduce bird collision risk at overhead lines. Therefore mitigation would comprise fitting diverters to sections of overhead lines where diverters were not originally proposed to be fitted.

Survey area

2.3 The monitoring work will focus on the section of the route south of Mark where flight speed analysis of radar tracks indicates potential movements of SPA designated duck species. The radar tracks and flight speed analysis is shown at Inset 1. The monitoring locations and analysis will exclude the section of overhead line across Puriton Ridge, as both vantage point studies and radar studies did not detect significant movements of birds over this location.

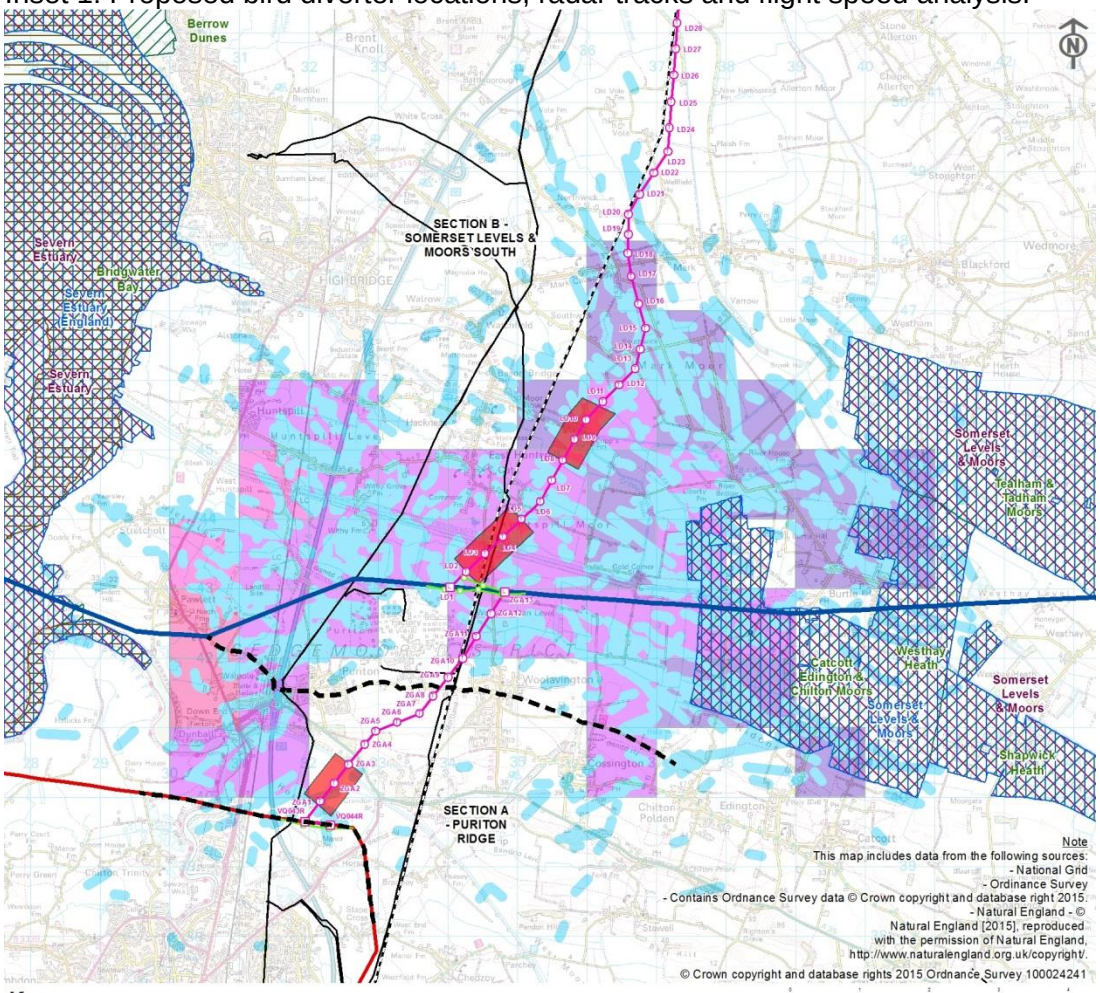
2.4 The section of overhead line to be monitored is illustrated at Insets 1 and 2. It will include the overhead line between pylons VQ043R and ZGA3, and between pylons ZGA9 and LD18. It will be necessary to determine the collision mortality occurring over this entire stretch of overhead line, therefore the monitored section will include areas where bird diverters are to be fitted as well as those areas where they are not proposed.

2.5 To enable sufficient search intensity, such that adequate detection of bird carcasses can occur, a sampling method will be used. Eight spans of overhead line have been identified within the overall section of the overhead line south of Mark. These sections are illustrated at Inset 2. These spans have been identified as they are considered representative of the route of the overhead line as a whole, due to the habitats present adjacent to each span and likely movements of birds across the route. They are also distributed along the overall monitored section as evenly as possible.

2.6 The chosen spans are also located in areas where it will be possible to adequately search the required area, and no significant obstacles are present such as main roads, rivers, or residential areas.

2.7 The monitoring section (the overhead line between the Bridgwater Tee and Mark, excluding Puriton Ridge) comprises 23 spans. The eight spans chosen for detailed study therefore comprise just under 35% of this section. Three of these eight spans will have bird flight diverters fitted, equal to 13% of the monitoring section.

Inset 1: Proposed bird diverter locations, radar tracks and flight speed analysis.



Key

Section Boundary
- Section Boundary

Proposed Infrastructure
- Proposed 400kV Standard Lattice Pylon Position
- Proposed 400kV T-Pylon Position
- Proposed Temporary Pylon Position
- Proposed Route for 400kV Overhead Line
- Proposed Route for Temporary Overhead Line

Existing Infrastructure
- Existing 400kV Overhead Line
- Existing 275kV Overhead Line
- Existing Western Power Distribution 132kV Overhead Line To Be Removed
- Existing 132kV or Lower Voltage including Western Power Distribution Overhead Line on Pylons

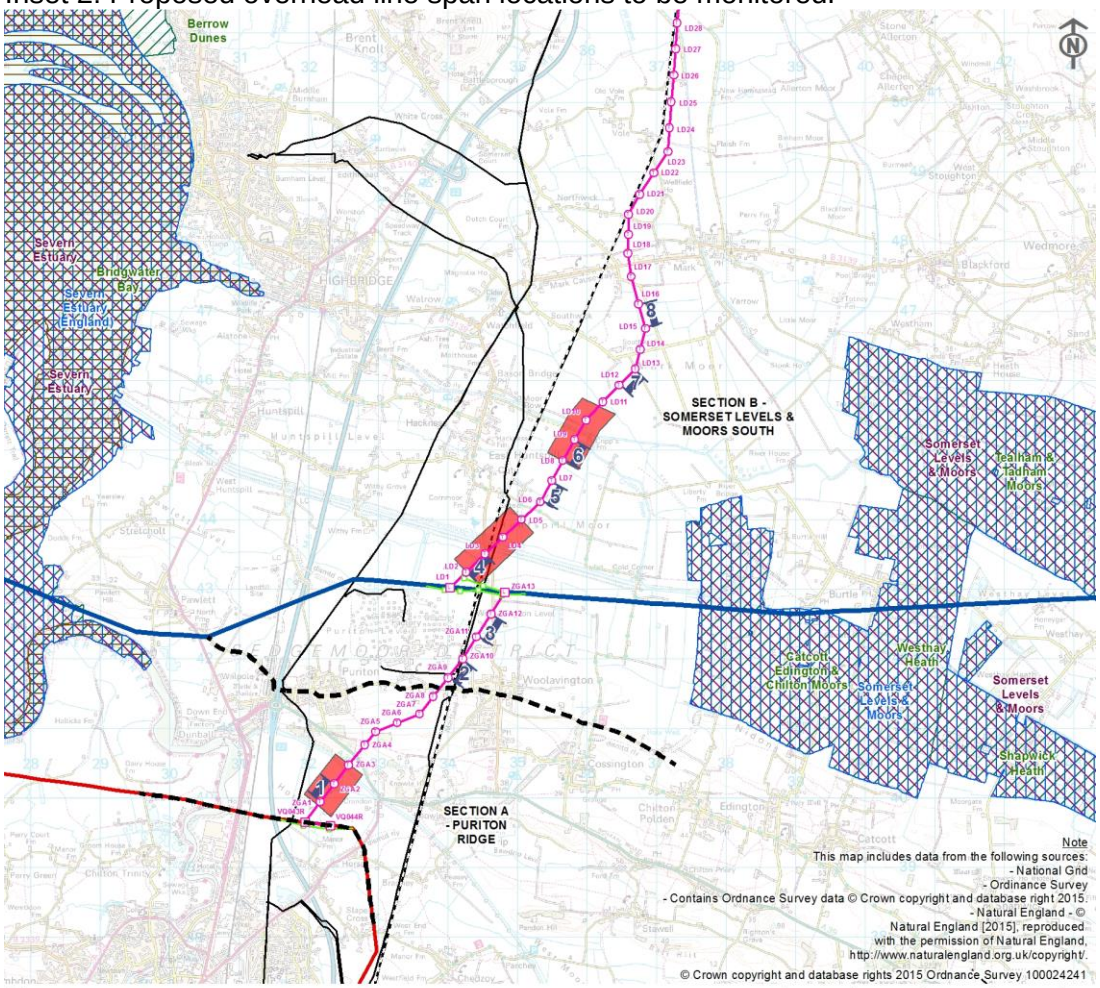
Mitigation Sections
- Proposed Locations to Install Bird Flight Diverters

Somerset Radar Average Speed
- Recorded Track

Average Flight Speed of All Birds (Metres/Second)
- 16.1 - 17
- 17.1 - 18
- 18.1 - 19
- 20.1 - 25

Ecological Designations
- Ramsar
- Special Area of Conservation
- Special Protection Area
- Site of Special Scientific Interest

Inset 2: Proposed overhead line span locations to be monitored.



Key

Section Boundary
- Section Boundary

Proposed Infrastructure
- Proposed 400kV Standard Lattice Pylon Position
- Proposed 400kV T-Pylon Position
- Proposed Temporary Pylon Position
- Proposed Route for 400kV Overhead Line
- Proposed Route for Temporary Overhead Line

Existing Infrastructure
- Existing 400kV Overhead Line
- Existing 275kV Overhead Line
- Existing Western Power Distribution 132kV Overhead Line To Be Removed
- Existing 132kV or Lower Voltage including Western Power Distribution Overhead Line on Pylons

Mitigation and Monitoring
- Monitoring Study Sections
- Proposed Locations to Install Bird Flight Diverters

Ecological Designations
- Ramsar
- Special Area of Conservation
- Special Protection Area
- Site of Special Scientific Interest

Survey method

2.8 During each winter period where monitoring is undertaken, the monitoring survey will commence at the beginning of October and will continue until the end of March, as this is the non-breeding period for which populations of those species of concern (from either the Somerset Levels and Moors SPA or the Severn Estuary SPA) are classified.

2.9 The monitoring study will use a corpse searching method. A surveyor will thoroughly search all land within a 300m wide corridor (150m either side of the overhead line) adjacent to each of the eight spans identified for inclusion within the survey area (spans 1 to 8, illustrated at Inset 2). Dependent upon seasonal variation in vegetation height within respective monitoring study spans, all localities within the 300m wide section should be visited.

2.10 This is a wide search corridor (300m), being double that used by Heijnis, 1976. This search corridor takes into account the high flight speed exhibited by target species such as teal and wigeon.

2.11 This wide search corridor would also reduce any crippling loss bias. This bias occurs when birds strike the overhead line but fall outside the survey area, or are injured but able to move far enough outside of the survey area before they die to be not detected by surveyors. Smaller birds are likely to have higher crippling loss bias than larger birds (APLIC, 2012). The sizes of target species for this study are moderate to large and therefore crippling loss bias is not likely to be a significant issue

Observer bias and searcher efficiency

2.12 In order to determine the amount of human error involved in carcass detection (i.e. the % of carcasses recovered), and how this might differ between individuals employed to carry out monitoring work, trials would be conducted. Trials would involve searching for carcasses placed at randomly selected locations unknown to the searcher. The search method used during these trials would match the method proposed for the main period of post-construction monitoring, to ensure consistent levels of effort between both.

Scavenger Removal Study

2.13 To accurately determine the number of bird collisions taking place, a scavenger removal rate would also need to be determined (the rate at which carcasses of bird collision victims are removed from the search area by scavengers). Scavenger removal bias is site-specific and needs to be determined for the location of the mortality study within the appropriate season, rather than extrapolating it from other locations, seasons or studies (Bevanger, 1999; Duffy & Steward 2008).

2.14 A scavenger removal study would therefore be undertaken at the monitored area during the monitoring period. The specific details of this study will be worked up and agreed with Natural England prior to it being undertaken, but might be required in each of the eight monitoring areas owing to the length of the monitoring section.

2.15 Based on the rate of site specific scavenger removal it may be necessary to adjust the frequency of site visits to be undertaken during the monitoring survey. The findings and conclusions will be discussed with the Working.

2.16 The scavenger removal bias, observer bias and searcher efficiency calculated from the control study will then be used to determine the actual mortality rate from the carcasses recovered during post-construction monitoring. The mortality rate calculated from the control will also be compared with those found within the literature.

Survey frequency

2.17 Ponce *et al.,* 2009 found that the accumulated number of birds removed by scavengers each day increases logarithmically, with 32% removed over the first two day period, but only 1.5% removed on a daily basis by day 28. They suggested that fortnightly to monthly searches were sufficient to detect larger bird corpses, but not smaller birds. Erickson et al. 2005 (In APLIC, 2012) cites a number of case studies with average carcass persistence times ranging from less than one to 28 days. In other cases it can be longer (Brown and Drewien 1995).

2.18 The primary target species for this study are duck species associated with the Somerset Levels and Moors SPA and/or the Severn Estuary SPA. The smallest of these species is teal for which the mean weight is 330g (BTO, 2013). On the basis that fortnightly to monthly checks for large birds are sufficient and teal (the smallest of our target species) is a medium sized bird, weekly checks are a reasonable search frequency. This survey frequency may be revised following the findings of the scavenger removal study.

2.19 All survey visits will commence within 1 hour after dawn. The visits will cover a range of weather conditions, to take into account the effect that this may have on bird collision. A locally based surveyor will be used so that they can respond quickly to differing weather conditions. At least one of the survey visits each month would aim to carry out the search following a night time where poor visibility weather conditions have occurred (e.g. fog).

2.20 The methods set out to determine surveyor bias and survey frequency would be revisited, should dogs be considered for carcass retrieval.

Information recorded

2.21 During every site visit the following information will be recorded:

- Visibility;
- Wind speed;
- Wind direction;
- Weather conditions during night time prior to survey;
- Bird species and abundance within the study area.

2.22 During the study, for any bird carcass encountered, the following information will be noted (in line with guidance provided in APLIC, 2012):

- GPS location of the carcass in proximity to the power line;
- Species;
- Sex;
- Age: adult or juvenile;
- Date;Physical injuries and conditions (e.g. broken bones, lacerations, abrasions, blood, discolorations, gunshot wounds, decomposition, feather spots,). This will include photographic evidence.

- Probable cause of death;

Timing and duration of monitoring

2.23 The monitoring is expected to be carried out over three complete winter (October to March) periods (i.e. three rounds of monitoring), but, in line with post-construction monitoring of wind-farm sites, may have to be extended beyond this period, as informed by initial results.

2.24 The first winter period of monitoring will commence immediately following completion of construction of the southern section of overhead line (south of the undergrounded section of line at the Mendip Hills).

2.25 The timing of the commencement of the second period of monitoring will be determined upon the findings of the first year. If the first year of monitoring indicates that potentially significant numbers of collisions are occurring i.e. at numbers that are close to or exceeding trigger levels, then the second year of monitoring would be undertaken the following winter. This would enable relatively rapid confirmation of the significance of the impact to be determined and, then subsequently, for any contingency measures to then be implemented.

2.26 If however, there is no indication that bird collision mortality is occurring at predicted levels or approaching defined trigger levels, the second winter period of monitoring could be postponed for a further winter period and be carried out during the third winter period after the completion of construction of the southern section of overhead line. If there is considered to be a valid reason why the second winter period of monitoring should be postponed further (such as any known future habitat creation works) then the timing of this final year of monitoring will be discussed and agreed with the Working Group.

2.27 If after two consecutive winter periods of monitoring there remains significant uncertainty as to level of collision mortality in the context of agreed thresholds, the third winter season of monitoring work would immediately follow the second winter season. This would provide three winter periods of monitoring. As above, in the situation where the second period revealed that collision losses were not significant, the third period of monitoring could also be postponed until a later period.

2.28 The need for extension to the monitoring programme would be determined by the Working Group using the data from the initial three rounds of monitoring. It is anticipated that this need would only be considered should uncertainties regarding the significance of any determined collision mortality still be apparent. For consistency with regard to dealing with potential collision mortality for overhead powerlines, any additional monitoring requirement would be instigated by the Working Group and implemented via the NGET protocol (the protocol is provided at Appendix 1 and paragraphs 21 to 23 are relevant to this situation). However, it should be noted that the criteria via which the monitoring requirement would be determined as part of the protocol would remain those as set out in this monitoring and thresholds document.

3.0 THRESHOLDS

3.1 It is highly likely that qualifying bird species of the Somerset Levels SPA/Ramsar and the Severn Estuary SPA/Ramsar undertake movements between these protected sites, although the size and frequency of such movements remains unclear. The evidence for this is discussed at Paras 4.6.103 – 4.6.128 of the HRA (Volume 5.20 of ES). Certainly, movements of birds across the proposed HPCC project overhead line occur, which may result in a potential collision risk to designated populations.

3.2 For some species associated with these protected sites, an increase in mortality could occur, as a result of collision, yet without a long-term population level effect being experienced. However, should mortality exceed a certain threshold, and be sustained on an annual basis, a significant population effect could arise.

3.3 The bird collision mortality rate for the proposed HPCC overhead line will be determined post-construction through the monitoring strategy detailed in Section 2.0. The bird mortality rate will need to be determined for the entire stretch south of Mark. This will be extrapolated from the numbers of bird carcasses retrieved from the survey locations. Threshold levels need to be determined which, if reached, will trigger further action to be taken to reduce collision mortality to an acceptable level.

Background to threshold calculations

3.4 UK waterbird populations are monitored on an annual basis through the Wetland Bird Survey (WeBS). The annual monitoring is used to determine a 5-year peak mean for each waterbird species at wetland sites around the UK. This 5-year peak mean is updated each year using the most recent data.

3.5 Collision mortality thresholds have been calculated for the HPCC project for all species that occur at either the Somerset Levels and Moors SPA/Ramsar or the Severn Estuary SPA/Ramsar based on the most up-to-date 5-yr peak mean published for each of these sites (08/09 – 12/13). On commencement of monitoring, these figures would be re-calculated using the most up to date 5-yr peak means.

3.6 The species listed in Table 1 are qualifying features of either the Somerset Levels and Moors or Severn Estuary, on account of their populations exceeding thresholds for national and international importance at the time of site designation. .

3.7 Throughout the monitoring period monthly updates will be provided to Natural England to ensure that they are kept up-to-date with collision mortality data from the monitoring works. It is proposed that two key values for each species listed in Table 1 are used in providing context to the potential significance of the predicted collision rates. These are:

- The Primary Threshold
- The Secondary Threshold

3.8 The process through which thresholds are exceeded, triggering mitigation, is illustrated at Inset 3. These processes are also described in more detail below.

Governance / Implementation

3.9 A Working Group will be formed prior to the monitoring work being undertaken. The Working Group will determine what actions are necessary, based on monitoring results, and will ensure they are implemented. The core Working Group will contain an ornithologist representing National Grid as well as an ornithologist or advisor from Natural England and representatives of Somerset County Council and Sedgemoor District Council. The RSPB would also be invited to attend.

Primary Threshold

3.10 The Primary Threshold is the number of fatal collisions of a single species with the HPCC overhead line during a single winter period, determined by extrapolation from the number of recovered carcasses. The Primary Threshold would trigger immediate consultation with Natural England.

3.11 The Primary Threshold will be based on whichever is the greater value of: 0.5% of the nationally significant population threshold (as defined by Musgrove *et al.,* 2011), or the number of birds that would constitute a 1% increase in the baseline mortality of the qualifying SPA population (based upon Ornis Committee[1] Birds Directive hunting guidance. See here for further details.

3.12 For species common to both the Somerset Levels and Moors SPA and the Severn Estuary SPA, the smaller of the site populations has been used in calculating the 1% increase in baseline mortality.

3.13 The Primary Threshold for each species is presented at Table 1.

Secondary Threshold

3.14 The secondary threshold is the level of bird mortality with the HPCC overhead line that, if predicted to occur during a single winter period (extrapolated from carcass retrieval during monitoring works), would cause immediate consultation with Natural England and, additionally, the implementation of appropriate mitigation works to reduce bird collision mortality.

Default Secondary Threshold

3.15 The default secondary threshold for each species is 1% of the most recent 5-year peak mean for the site for which that particular species is a qualifying feature (either Somerset Levels and Moors or Severn Estuary). Where the species is not a qualifying feature of either SPA or Ramsar, but has been included as best practice, the threshold is taken as 1% of the most recent 5-year peak mean for the site whichever site holds nationally and/or internationally numbers of that particular species.

3.16 Where the qualifying population of a species is less than 500 individuals, an alternative default Secondary Threshold of 5 individuals is to be used (noting this relates to extrapolated mortality and not recovered carcasses).

[1] ORNIS Committee for the Adaptation to Technical and Scientific Progress under the Directive, instituted under Article 16 of the Birds Directive

3.17 For the winter bird assemblage, the threshold used will be 1% of the most recent 5-year peak mean for the site, for the lower number of either the Somerset Levels and Moors SPA or the Severn Estuary SPA.

3.18 The 1% threshold will be updated during each year following the publication of updated 5-year peak means by WeBS.

Refined Secondary Threshold

3.19 Should a Primary Threshold be triggered, more involved methods would be employed to determine a Refined Secondary Threshold. Population modelling would be carried out using methods such as Population Viability Analysis (PVA) or Potential Biological Removal (PBR). The particular population model used would be determined at the time by the Working Group, subject to on-going research and data availability.

3.20 It is considered impractical, based upon the total number of qualifying species from both sites combined, to undertake this modelling work for all species at the outset. Nevertheless, should a Primary Threshold be triggered for a particular species, this modelling work should be completed with a high degree of urgency, to ensure that further casualties do not have the potential to exceed a Secondary Threshold prior to its calculation, and that mitigation measures can be delivered before the point of impact.

3.21 Contextual information would be used, where possible, to identify the source of the population from which the collisions were occurring e.g. whether the birds formed part of an SPA population (and which one) or whether birds from the wider (non-SPA) population could be involved in the overall collision numbers.

3.22 The results from the population modelling exercise would then be used to refine the default Secondary Threshold levels (see 3.15). It is recognised that population modelling may be based on a number of assumptions if certain data are not available. Any population model produced would therefore be evaluated to determine the confidence in its predicted outcome. The confidence level would be used to determine how much weight would be given to the modelling findings and whether, based on expert judgement, they offered greater accuracy than the Secondary Threshold default value.

3.23 If a high level of confidence can be given to the population modelling results then these would supersede the default threshold. If there is a degree of uncertainty with the population modelling outcome results then the threshold would be revised to a value between the default threshold and the population modelling result. If only a low degree of confidence can be given to the population modelling result the default threshold would be retained.

3.24 In the unlikely event that agreement on the need for and appropriateness of mitigation options could not be reached within the core Working Group, independent expertise would be sought to obtain a suitable resolution. The individual / organisation selected to fulfil this role, together with their remit, would be agreed between all Working Group members prior to commissioning them. Following the consideration of advice submitted by the independent expert, Natural England would make the final decision.

Mitigation

3.25 Mitigation measures would be put in place should a Secondary Threshold, either the modelled value or the default value (see 3.16), be triggered. Possible mitigation measures to reduce collision would include the fitting of bird flight diverters along additional sections of the overhead line. If collisions were recorded along spans with diverters already in place, mitigation should be considered in other areas at the scale necessary to offset impact.

3.26 If an impact had been predicted during the project's assessment, which could not be mitigated through pylon design or the use of diverters, undergrounding would have had to be considered (no such impact was predicted). It is recognised, however, that should a significant collision mortality impact be identified post-construction for the overhead line where diverters have already been fitted, other mitigation options would therefore have to be investigated. Ultimately, mitigation must offset a significant adverse impact, but it is considered that, if required, that such mitigation should be delivered through the most economically viable mechanisms. Any such requirement would be discussed and agreed within the Working Group.

Low Thresholds

3.27 For certain species, the Primary Threshold and default Secondary Threshold are so low that one recovered carcass during monitoring (once extrapolated to take into account scavenger removal and search efficiency) could result in a predicted collision mortality that could, in theory, immediately trigger mitigation. In this situation, the immediate response would be to undertake population modelling work to determine whether the Secondary Threshold should be refined.

3.28 If the predicted collision mortality still exceeds the Refined Secondary Threshold then further diurnal survey work (vantage point surveys) would be undertaken to determine if regular flights of the species in question were occurring over the overhead line, and the detected collision might be representative of movements of this species, or whether it was more likely to have been a stochastic event. If regular movements of the species in question were observed, the detected collision would be deemed representative and mitigation would be implemented to reduce the bird collision risk for this species to an acceptable level.

3.29 If no regular bird movements were observed, monitoring would continue as before. If a further bird collision of this species is recorded, then mitigation would be necessary to reduce the collision risk for this species.

3.30 The process which would be undertaken if one retrieved carcass causes both the Primary and Secondary Thresholds to be exceeded is also detailed below as part of Inset 3.

Inset 3: Triggers and Thresholds Schematic Diagram, illustrating the process for low threshold as well as higher threshold species.

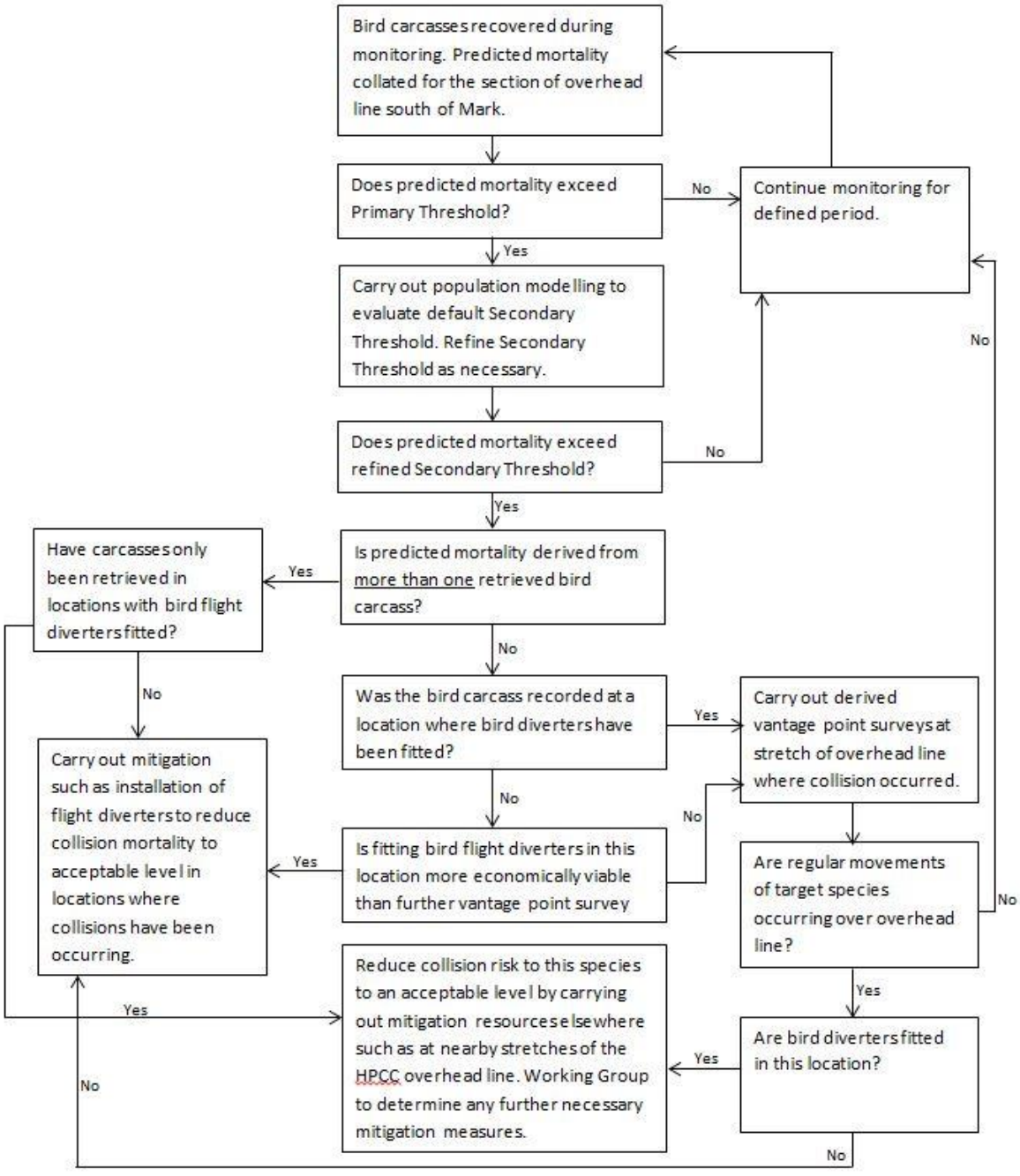


Table 1: Species that occur at the Somerset Levels and Moors and/or the Severn Estuary at numbers exceeding the threshold for national and/or international importance. The Primary Threshold and default Secondary Threshold for each species is shown (rounded to nearest individual).

Species	National Threshold	Int. Threshold	Somerset Levels 5-yr peak mean (08/09-12/13)	Severn Estuary 5-yr peak mean (08/09-12/13)	0.5% of national threshold	Ornis	Primary Threshold (greater value of 0.5% or Ornis)	1% Levels	1% Severn	Default Secondary Threshold (lesser value of 1% Levels or Severn)	Reason for threshold selection
Mute swan	740	320	1,055#$	366	3.7	1.58	4^	10.6	DNQ	11	1% proposed Somerset Levels population
Bewick's swan	70	220	25*#	263*#	0.35	0.04	1^	0.3	2.6	5	Default (qualifying population below 500 indiv.)
European white fronted Goose	50	12,000	2	461*#	0.25	1.25	1^	DNQ	4.6	5	Default (qualifying population below 500 indiv.)
Shelduck	610	3,000	9	4,076*#	3	5	5◈	DNQ	40.8	41	1% Severn Estuary population
Wigeon	4,400	15,000	26,562*#	7,837 *	22	37	37◈	265.6	78.3	78	1% Severn Estuary population
Teal	2,100	5,000	20,812*#	5,302# *	10.5	25	25◈	208.1	53.0	53	1% Severn Estuary population
Gadwall	250	600	472*	207*	1.25	0.47	1^	4.7	2.1	5	Default (qualifying population below 500 indiv.)
Pintail	290	600	483#	508*#	1.45	2	2◈	4.8	5.1	5	Default (qualifying population below 500 indiv.)

Species	National Threshold	Int. Threshold	Somerset Levels 5-yr peak mean (08/09-12/13)	Severn Estuary 5-yr peak mean (08/09-12/13)	0.5% of national threshold	Ornis	Primary Threshold (greater value of 0.5% or Ornis)	1% Levels	1% Severn	Default Secondary Threshold (lesser value of 1% Levels or Severn)	Reason for threshold selection
Pochard	380	3,000	183	569 *	1.9	1.99	2^	DNQ	5.7	6	1% Severn Estuary population
Tufted duck	1,100	12,000	481	786*	5.5	2.28	6^	DNQ	7.9	8	1% Severn Estuary SPA population
Shoveler	180	400	740*#	491$	0.9	3	3◈	7.4	4.9	5	Default (qualifying population below 500 indiv.)
Ringed Plover	340	730	1	1,335*#	1.7	3	3◈	DNQ	13.3	13	1% Severn Estuary SPA population
Grey Plover	430	2,500	0	302*	2.15	0.42	2^	DNQ	3	5	Default (qualifying population below 500 indiv.)
Golden Plover	4,000	9,300	12,040*	2,467	20	33	33◈	DNQ	120.4	120	1% Somerset Levels SPA population
Lapwing	6,200	20,000	36,567*#	10,471$	31	30.9	31^	365.6	104.7	105	1% Severn Estuary SPA population
Dunlin	3,500	13,300	422	26,412*#	17.5	69	69◈	DNQ	264.1	264	1% Severn Estuary SPA population
Curlew	1,400	8,400	32	3,631*#	7	10	10◈	DNQ	36.3	36	1% Severn Estuary SPA population
Whimbrel	50~	6,700	0	224*	0.25	0.25	1^	DNQ	2.2	5	Default (qualifying population below 500 indiv.)
Spotted	50~	850	0	11*	0.25	No	1^	DNQ	0.11	5	Default (qualifying population

Species	National Threshold	Int. Threshold	Somerset Levels 5-yr peak mean (08/09-12/13)	Severn Estuary 5-yr peak mean (08/09-12/13)	0.5% of national threshold	Ornis	Primary Threshold (greater value of 0.5% or Ornis)	1% Levels	1% Severn	Default Secondary Threshold (lesser value of 1% Levels or Severn)	Reason for threshold selection
Redshank						data					below 500 indiv.)
Redshank	1,200	2,400	9	3,067*#	6	8	8◈	DNQ	30.7	31	1% Severn Estuary SPA population
Little Egret	45	1,300	105$	103$	1	0.30	1^	1.1	1.0	5	Default (qualifying population below 500 indiv.)

* = SPA qualifying species (listed on citation as internationally important or nationally important and contributing to assemblage) # = Ramsar species

^ 0.5% national threshold ◈1% ORNIS $ nationally important & component of >20,000 waterbird assemblage, but not listed

~50 Where 1% of the British wintering population is less than 50 birds, 50 is normally used as a minimum qualifying level for national importance.

DNQ = Does not qualify for SPA/Ramsar site.

APPENDIX 1
NGET Protocol

National Grid's Protocol on Bird Diverters
Kings Lynn B Connection DCO

January 2014 v.2

Summary

As part of the King's Lynn B Connection DCO approval the Inspector considered National Grid's Protocol on Bird Diverters. This was submitted as a response to a question from the Inspector on the 22nd May 2013. The issue under examination was the need for monitoring of the line for bird collisions having considered the risk posed. The Secretary of State also considered the approach set out in the Protocol and concluded in light of these established procedures '*that adequate safeguards already exist without the need to impose further requirements'.* Projects should be aware of this Protocol and make reference to it where appropriate in future project development.

Background

1. National Grid operates the national electricity transmission network in accordance with its obligation under Section 38 and Schedule 9 of Electricity Act 1989 to have regard to effects on the environment.

2. National Policy Statement EN-5 refers to the risks posed to birds by overhead lines at paragraphs 2.7.1 – 2.7.8. It notes that large birds such as swans and geese may collide with overhead lines associated with power infrastructure, particularly in poor visibility. The Statement advises that applicants will need to consider whether a proposed line will cause such problems, giving consideration to feeding and hunting grounds, migration corridors and breeding grounds.

3. EN-5 advises that careful siting of a line away from, or parallel to, but not across, known flight paths can reduce the numbers of birds colliding with overhead lines considerably and that diverters which consider the conditions, the characteristics of the line and pylons and the species of birds may also reduce risk of collisions. This statement sets out National Grid's approach to the use of bird diverters on its overhead lines.

Bird Diverters

4. An overhead line comprises conductors which transmit electricity and an earthwire which offers protection from lightning strikes and can also carry a communications cable. The conductors (wires) used to transmit electricity hang from the arms of the pylons via insulators. These are often hung in bundles of two, three or four conductors with spacers between them at intervals. The conductors of high voltage overhead lines are more visible and pose less risk to birds than the much smaller diameter earthwire which on an overhead line constructed using steel lattice pylons is suspended from the peaks of pylons. Bird diverters, also known as deflectors, can be fitted to the earthwire of overhead lines.

5. There are different designs of diverters and some of National Grid's overhead lines have 'orange ball' diverters installed which are visible from a long distance. The much smaller 'spiral' bird diverter is now more commonly used. It is effective in making the line visible to birds but has much less effect on the landscape and in views.

6. It is easier and safer to install diverters on the earthwire of overhead lines when the line is being built. The diverters can be installed as the earthwire is being fixed and before electricity is switched to run through the conductors.

7. It is also possible to install diverters on the earthwire of an existing overhead line. This is undertaken generally by workers in a winch hanging from a helicopter or there may be opportunities to install them when the line is temporarily out of service for maintenance (during an 'outage').

Considering Bird Diverters on New Overhead Lines

8. National Grid's publication 'Our approach to the design and routeing of new transmission lines' explains the matters which it considers when developing a new overhead line route. It seeks to avoid sites designated for

their high nature conservation value, such as sites of Special Scientific Interest, Special Protection Areas and Ramsar sites which may be important to birds.

9. National Grid consults in each case with the statutory nature conservation organisation (SNCO) and interested parties about possible impacts on sites designated for bird interest and on bird species, particularly large birds as advised by EN-5, such as swans and geese, and also other species that may be susceptible to collision risk.

10. National Grid is aware of the potential for distress caused by collisions, including where birds affected are not protected species, and will also consider relevant local factors on a case-by-case basis (for example waterfowl on water bodies visited by the public, racing pigeons).

11. Diverters can reduce the risk of bird collisions, but they also introduce additional landscape and visual impacts because they make the earthwire more visible. Diverters also require additional installation and maintenance activities which can introduce further risk. The installation of diverters will be considered when there is a clear benefit in terms of avoidance of harm to statutory interests or significant local interests.

12. Diverters do not always reduce collisions and their use is most appropriate where an overhead line crosses bird flyways or is near features that attract birds, such as water bodies or feeding areas.

13. Installation will be considered on the basis of evidence of collision risk and how efficient diverters would be as a solution.

14. National Grid will carry out appropriate surveys to assess collision risk, considering available information and, where required, specific site surveys.

15. The survey findings will influence the choice of route corridor and alignment for a new overhead line aiming to avoid routes that introduce significant collision risk (embedded mitigation). The advice of the relevant SNCO will be sought.

16. The use of bird diverters will be proposed where it will result in the avoidance of an adverse effect on statutory interests (sites or species). The design and the positions of diverters on the earthwire will be specified taking account of the species concerned and the availability and suitability of different styles of diverter.

17. Where there is little or no risk of collisions affecting statutory interests, diverters will not be proposed.

18. Where available evidence suggests that collisions may occur, but there is uncertainty over whether statutory interests would be affected, National Grid will propose a period of post-construction monitoring of the overhead line leading to a possibility that diverters may need to be retrofitted. A protocol for monitoring will be included in the application so that it is clear that installation of diverters may be an outcome of the consent.

19. National Grid will consider the risk of collisions affecting non-statutory interests on a case-by-case basis, taking account of representations from the SNCO, the relevant local authority and other interested parties. National Grid's consideration may lead to a proposal to install diverters; to a proposal for monitoring prior to taking a decision; or to not install diverters.

Installing Bird Diverters on Existing Overhead Lines

20. National Grid acknowledges that birds may collide with existing overhead lines when the risk was not foreseen at the time of application. The risk of collisions may arise due to changes in behaviour of birds because of alterations in land use or climate over time or may be due to shorter-term incidents such as flooding of fields due to neglect of drainage.

21. Where evidence of a sustained pattern of collisions is brought to its attention, National Grid will take advice from professional ornithologists, the relevant SNCO and if appropriate from other relevant bodies such as the Royal Society for the Protection of Birds and the local planning authority. If statutory interests are potentially affected, National Grid will consider a contribution to the reasonable cost of assembling further evidence.

22. If the problem can be addressed at source, such as amending cropping patterns, improving drainage or moving a feature attracting birds, National Grid will bring this to the attention of the relevant landowner or managing agency (such as Environment Agency or internal drainage board). It will liaise with them to investigate possible change to remove or reduce the source of bird attraction and risk of collision.

23. If the problem cannot be addressed at source, and evidence suggests that installation of diverters would significantly reduce collision risk which affects statutory interests, National Grid will seek to install diverters. It will undertake any environmental assessment and seek to obtain any additional consents or landowner agreements that may be required (installation of diverters is generally 'permitted development' on existing lines). The installation of diverters may be delayed until National Grid's operational arrangements allow safe working.

24. If non-statutory interests are affected, National Grid will seek to install diverters if it considers that the benefits outweigh the risks and costs of installation taking account of its statutory duties.

NATIONAL GRID PROTOCOL ON BIRD DIVERTERS: CASE STUDIES

Case Study: 4ZM Overhead Line near Welney Reserve

This 400 kilovolt overhead line was built in 1966 and crosses the Wildfowl and Wetland Trust's Welney Reserve which has extended and managed over many years to increase its attractiveness to swans, geese and other birds. The reserve is in the Ouse Washes Special Protection Area which was designated for its importance to birds in 1993.

In 1990 National Grid was alerted to bird collisions with the overhead line during a period of foggy weather with greatly reduced visibility it began liaising with the Wildfowl and Wetland Trust. Bird diverters were designed and subsequently installed over 16 spans of overhead line in 1995.

Case Study: Spalding Connection

The connection of the Spalding power station to the national electricity transmission system required a new 400 kilovolt overhead line across the River Welland near Spalding in Lincolnshire to be built in 2002. The risk of swans colliding with the line was recognised and diverters were fitted to the span which crosses the river

Case Study: Second Yorkshire Line

National Grid installed a 400kV overhead line between Lackenby, Picton and Shipton in 1995 after receiving consent and having undertaken studies that indicated no adverse effects on birds were anticipated. After the line was in operation, users of pigeon lofts near one section reported that young birds flew into the earthwire causing distressing casualties. Following investigation, National Grid installed spiral diverters to the earthwire in 2005 which addressed the problem.

Case Study: South Humber Bank

National Grid installed a new 400kV overhead line on the South Humber Bank in Lincolnshire in 1996. An assessment of bird collision risk was undertaken and it was anticipated that there would be low risks of bird collision due to the new line being parallel to the river and avoiding crossing known 'flyways' at a height where collisions may occur. Due to some uncertainty regarding this conclusion, a period of monitoring was undertaken following construction of the line. Bird activity and behaviour in the vicinity of the new line was monitored and demonstrated that there was no evidence of adverse effects on biodiversity arising from collisions with the new line.