

Environmental Statement

Chapter 21 Onshore Ecology Volume 3 Appendices

Appendix 21.4 Preliminary Roost

Surveys for Bats

Part 1: Report and Figures

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Volume 3, Appendix 21.4: Bat Surveys

Outer Dowsing Offshore Wind Environmental Statement

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Acronyms and Definitions

Acronym	Definition
BAP	Biodiversity Action Plan
ВСТ	Bat Conservation Trust
DCO	Development Consent Order
ECC	Export Cable Corridor
EIA	Environmental Impact Assessment
ES	Environmental Statement
GLNP	Greater Lincolnshire Nature Partnership
GPS	Global Positioning System
LWT	Lincolnshire Wildlife Trust
MAGIC	Multi-Agency Geographic Information for the Countryside
NERC	Natural Environment and Rural Communities
NGSS	National Grid Onshore Substation
NSIP	Nationally Significant Infrastructure Project
NTM	National Tree Map
ODOW	Outer Dowsing Offshore Wind (the Project)
ODOW	Outer Dowsing Wind
OnSS	Onshore Substation
PEIR	Preliminary Environmental Information Report
PRA	Preliminary Roost Assessment
PRF	Preliminary Roost Feature
UK	United Kingdom

Term	Definition
400kV cables	High voltage cables linking the OnSS to the NGSS.
400kV cable corridor	The 400kV cable corridor is the area within which the 400kV cables connecting the onshore substation to the NGSS will be situated.
The Applicant	GT R4 Ltd. The Applicant making the application for a DCO.
	The Applicant is GT R4 Limited (a joint venture between Corio Generation, Total Energies and Gulf Energy Development (GULF)), trading as Outer Dowsing Offshore Wind. The Project is being developed by Corio Generation (a wholly owned Green Investment Group portfolio company), Total Energies and GULF.
Baseline	The status of the environment at the time of assessment without the development in place.
Connection Area	An indicative search area for the NGSS.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for a Nationally Significant Infrastructure Project (NSIP).



Term	Definition
Environmental Impact Assessment (EIA)	A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Regulations, including the publication of an Environmental Statement (ES).
Environmental Statement (ES)	The suite of documents that detail the processes and results of the EIA.
Export cables	High voltage cables which transmit power from the Offshore Substations (OSS) to the Onshore Substation (OnSS) via an Offshore Reactive Compensation Platform (ORCP) if required, which may include one or more auxiliary cables (normally fibre optic cables).
Impact	An impact to the receiving environment is defined as any change to its baseline condition, either adverse or beneficial.
Landfall	The location at the land-sea interface where the offshore export cables and fibre optic cables will come ashore.
Mitigation	Mitigation measures are commitments made by the Project to reduce and/or eliminate the potential for significant effects to arise as a result of the Project. Mitigation measures can be embedded (part of the project design) or secondarily added to reduce impacts in the case of potentially significant effects.
Onshore Export Cable Corridor (ECC)	The Onshore Export Cable Corridor (Onshore ECC) is the area within which, the export cables running from the landfall to the onshore substation will be situated.
Onshore Infrastructure	The combined name for all onshore infrastructure associated with the Project from landfall to grid connection.
Onshore substation (OnSS)	The Project's onshore HVAC substation, containing electrical equipment, control buildings, lightning protection masts, communications masts, access, fencing and other associated equipment, structures or buildings; to enable connection to the National Grid.
Outer Dowsing Offshore Wind (ODOW)	The Project.
Order Limits	The area subject to the application for development consent, the limits shown on the works plans within which the Project may be carried out.
The Project	Outer Dowsing Offshore Wind, an offshore wind generating station together with associated onshore and offshore infrastructure.
Receptor	A distinct part of the environment on which effects could occur and can be the subject of specific assessments. Examples of receptors include species (or groups) of animals or plants, people (often categorised further such as 'residential' or those using areas for amenity or recreation), watercourses etc.
Study Area	Area(s) within which environmental impact may occur – to be defined on a receptor-by-receptor basis by the relevant technical specialist.



21.0 Bat Surveys

21.1 Introduction

- Outer Dowsing Wind (ODOW) is a Nationally Significant Infrastructure Project (NSIP). An
 Environmental Impact Assessment (EIA) has been undertaken, the findings of which are
 presented within an Environmental Statement (ES), which accompanies a Development
 Consent Order (DCO) application under the Planning Act, 2008.
- 2. SLR Consulting was commissioned by GoBe Consultants Ltd, whom has been instructed by GT R4 Limited (trading as Outer Dowsing Offshore Wind) on behalf of ODOW, to undertake a suite of ecological surveys of those relevant parts of the project site that may be affected by the construction and operation of the onshore aspects of the Project (see Volume 1, Chapter 3: Project Description (document reference 6.1.3).
- 3. This report presents the findings of the bat surveys undertaken in 2022 and 2023 and is presented as an appendix to support Volume 1, Chapter 21: Onshore Ecology (document reference 6.1.21) of the ES.

21.2 The Project

- 4. The Project will include both offshore and onshore infrastructure including an offshore generating station (windfarm) located approximately 54km from the Lincolnshire coastline, export cables to landfall, onshore cables, an onshore substation, connection to the electricity transmission network, and ancillary and associated development (see Volume 1, Chapter 3 (document reference 6.1.3) for full details).
- 5. The ES references the Project's 'Order Limits' which comprises the extent of the land for which the DCO application has been made. Onshore it reflects the landfall, the Onshore Export Cable Corridor (a typically 80m wide corridor around a centre line totalling approximately 70km in length)the Onshore substation (OnSS), a 400kV cable corridor connecting the OnSS to the Connection Area (an indicative search zone for the National Grid substation (NGSS) in to which the project will ultimately connect.
- 6. Due to the linear footprint of the Project the Survey Area for some receptors is relatively large-scale, therefore, to assist with the interpretation and explanation of associated data, the Order Limits has been split into segments. The extent of these segments has been



aligned with key geographical features such as roads or rivers which cross the Order Limits.

7. The segments for the onshore Order Limits are shown in Table 21.1 below.

Table 21.1: Onshore Segment Names

Segment Name
ECC 1: Landfall to A52 – Hogsthorpe
ECC 2: A52 – Hogsthorpe to Marsh Lane
ECC 3: Marsh Lane to A158 - Skegness Road
ECC 4: A158 – Skegness Road to Low Road
ECC 5: Low Road to Steeping River
ECC 6: Steeping River to Fodder Dike Bank/Fen Bank
ECC 7: Fodder Dike Bank/Fen Bank to Broadgate
ECC 8: Broadgate to Ings Drove
ECC 9: Ings Drove to Church End Lane
ECC 10: Church End Lane to The Haven
ECC 11: The Haven to Marsh Road
ECC 12: Marsh Road to Fosdyke Bridge
ECC 13: Fosdyke to Surfleet Marsh OnSS/Marsh Drove
ECC 14: Surfleet Marsh OnSS/Marsh Drove to the Connection Area



21.3 Purpose of This Report

- 8. This appendix presents the findings of the bat surveys for the Project. The main objectives of the surveys were to gather baseline information in respect to bats, and in particular the following:
 - Assess the suitability of trees, buildings and habitats for roosting, foraging and commuting bats;
 - Determine the presence/likely absence of bat roosts and characterise any roosts that are present within the Survey Area; and
 - Assess the use of the site by bats for foraging and commuting, and if possible, to determine relative activity levels across the site to inform avoidance and/or mitigation measures;

21.4 Legislation and Policy

- 9. All bats are protected under the Conservation of Habitats and Species Regulations 2017 and are afforded additional protection under the Wildlife and Countryside Act 1981 (as amended). Taken together these make it an offence to:
 - Deliberately capture, injure or kill a bat;
 - Damage or destroy a breeding site or resting place of a bat;
 - Deliberately disturb a bat in such a way as to be likely:
 - To impair its ability to survive, to breed or reproduce, or to rear or nurture its young;
 - o To impair its ability to hibernate or migrate; or,
 - To significantly affect the local distribution or abundance of the species to which it belongs.
- 10. Of the seven species recorded in the Onshore Ecology Desk Based Assessment (Document Reference: 6.3.21.1), four are listed as Species of Principal Importance for the purpose of conserving biodiversity in England under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. These comprise barbastelle (*Barbastella barbastellus*), brown long-eared (*Plecotus auritus*), noctule (*Nyctalus noctula*) and soprano pipistrelle (*Pipistrellus pygmaeus*) species. As such, they require consideration by the competent public authorities in the exercise of their duties. Additionally, all seven bat species are listed as priority species in the Lincolnshire Biodiversity Action Plan (BAP) as



well as Internal Drainage Board BAPS for Back Sluice, Welland and Deeping, Internal Drainage Board BAP and Witham Fourth.

11. The barbastelle is included in Annex II of the European Community Directive of the Conservation of Natural Habitats and of Wild Fauna and Flora, referred to as the Habitats Directive. The Habitats Directive is transposed into UK law by the Conservation of Habitats and Species Regulations 2017 (as amended). This legislation requires that areas are designated as Special Areas of Conservation to protect populations of this species should it be roosting on site or nearby where the population could be impacted.



21.5 Methodology

21.5.1 Desk Study

- 12. The desk study data obtained for submission of the Preliminary Environmental Information Report (PEIR) in May 2023, was updated in August 2023 to reflect the Order Limits. The desk study involved a review of the following sources of information for bats:
 - The MAGIC website for information relating to European Protected Species Licences for bats that have been issued within a 5km radius of the Order Limits; and,
 - Greater Lincolnshire Nature Partnership (GLNP) for:
 - o Records of bat presence within a 2km radius of the Order Limits; and,
 - Records of bat roosts within a 5km radius of the Order Limits.

21.5.2 Field Surveys

- 13. All site survey results were recorded on a tablet, using a bespoke application running within the ArcGIS Field Maps application¹. This application recorded the surveyors' locations, field notations, and observations of local weather conditions to confirm survey validity.
- 14. The methods used during each survey type were in accordance with the Bat Conservation Trust (2016) Bat Survey for Professional Ecologists Good Practice Guidelines (3rd Edition), unless stated otherwise. The 4th Edition of the Guidelines were published after the bat surveys were underway and so for continuity of both data sets and methodologies, the 3rd Edition approach has been adhered to throughout the survey period for all survey types. Details for each survey type are summarised in the relevant sections.
- 15. The Survey Area for presence/absence surveys and for activity surveys is defined as the land within the Order Limits. The Survey Area for Preliminary Roost Assessment is extended to include an additional 25m buffer zone around the Order Limits. This buffer zone includes potential receptors that may be indirectly affected by the project and has been set at 25m primarily to take account of noise and vibration disturbance to roosting bats.

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¹ Esri Suite ArcGIS Field Maps v100.11

21.5.2.1 Preliminary Roost Assessment

16. All features that could support roosting bats within the Order Limits were subject to a Preliminary Roost Assessment (PRA) to identify features that may support bat roosts and assign a roost suitability rating to inform further investigative surveys if appropriate. The Project has been refined to avoid significant features likely to support bat roosts, including buildings, structures, and woodland blocks. Consequently, no buildings, structures or woodland blocks were identified within the Order Limits during the field surveys. Accessible buildings and trees are given a roost suitability categorisation of confirmed roost, high, moderate, low, or negligible. Detailed survey approaches are summarised below.

21.5.2.2 Buildings and Structures

17. Preliminary Roost Assessments (PRA) of buildings were undertaken between November 2022 and October 2023. The PRAs of buildings focussed on external inspection only to identify features that could be used for access and egress by bats and signs of use by bats to ascertain the potential presence of bats. The Order Limits have undergone significant refinement during the same period to ensure that buildings and structures are avoided, therefore no buildings will be lost as a result of the Project. Consequently, the results obtained from building inspections conducted at the beginning of the survey period will not be directly affected by the Project. This data will instead be referred to when assessing impacts in relation to disturbance through noise and lighting.

21.5.2.3 External Survey

- 18. Systematic external inspections were undertaken during daylight hours from ground level using binoculars and a high-powered torch.
- 19. The following evidence was sought:
 - The presence of potential access and egress points for bats into the building;
 - The presence of potential crevice roosting location on the external of the building;
 - Evidence of the use of such potential access points or crevice roosts by bats such as scattered droppings, fur-oil staining, urine staining and squeaking noises; and,
 - Any other signs of use by bats, including the presence of bats themselves.



- 20. The search particularly focussed on looking for evidence of bats in the following places:
 - Windowsills;
 - Walls;
 - Window frames;
 - · Peeling paint;
 - Lifted render;
 - Hanging tiles;
 - Weatherboarding/wooden sarking;
 - Eaves;
 - Soffit boxes;
 - Fascia's;
 - Under tiles and slates;
 - Lead flashing; and,
 - Gaps in brickwork and stonework.
- 21. This list is not exhaustive, and any accessible areas deemed suitable for roosting bats were inspected.
- 22. Following inspection of all accessible external features, a building was then categorised as having either negligible, low, moderate, high bat roost potential, or confirmed as a bat roost where positive evidence was found. The categories are based on the observations and information set out in Table 21.2 which was based on best practice guidelines (Collins, J., 2016).



Table 21.2: Categorisation of bat roosting potential of buildings²

Level of bat roosting potential	Rationale
Negligible	Building with no or very limited roosting opportunities for bats, no evidence of use by bats and where the structure is isolated from foraging habits
Low	Building with a low number of roosting opportunities and with limited connectivity to foraging habitat.
	Building has no evidence of current use by bats.
	Examples of features include gaps under fascia boards, under lifted roof tiles, or under lifted lead flashing in an urban setting.
Moderate	Building with features present that are suitable for roosting bats and with connectivity to foraging habitat.
	Building has no evidence of current use by bats.
	Examples of features include cracks in walls and presence of a wooden soffit box with access points in a suburban/rural setting.
High	Building with features that are highly suitable for roosting bats and with good connectivity to quality foraging habitat such as woodland or lakes. Building has no evidence of current use by bats.
	Examples include large uncluttered, draft-free loft spaces with access points or gaps under hanging tiles in a rural setting.
Confirmed roost	Presence of bats or evidence of use by bats.

21.5.2.4 Trees

Ground Level Tree Roost Assessment

- 23. Ground level inspection of the trees was designed to identify potential roost features and assess the trees suitability to support roosting bats, including hibernation suitability. All trees were initially identified from National Tree Map (NTM) data³. This provided preliminary information on trees located within the survey area. The dataset was supplemented with site visits to assess trees not covered by the NTM as well as undertake ground level tree assessments of all trees to determine bat roost potential. Each tree was given a unique identification number. These numbers are sequential along the Project due to changes in the survey boundary over the course of the survey season and the availability of land access.
- 24. All trees within the Order Limits and a 25-metre buffer were subject to a PRA by an experienced ecologist working under the supervision of a licensed bat worker. Surveys were undertaken between 16th November 2022 and 10th October 2023, with the majority



² Adapted from Collins J., (2016) Table 4.1, page 35.

³ National Tree Map™ - Bluesky Mapshop

of the surveys undertaken in winter months (November 2022 to February 2023) when leaves are absent from the trees and roosting features can be more easily seen from ground level. The inspection involved using binoculars and torches to seek Potential Roost Features (PRF's) including:

- Crevices, holes, and cavities;
- Woodpecker holes;
- Loose bark, splits, and cracks;
- Presence of dense ivy or dense epicormic growth; and,
- Bat and bird boxes.
- 25. In accordance with BCT guidelines (Collins J 2016), trees were then assessed as having either negligible, low, moderate, or high potential to support roosting bats based on the criteria detailed in Table 21.3.

Table 21.3: Categorisation of bat roosting potential of trees4

Level of bat roosting potential	Rationale
Negligible	Negligible habitat features likely to be used by roosting bats.
Low	A tree of sufficient size and age to contain PRFs but with none seen or features seen with only very limited roosting potential. Habitat connectivity from the tree to the wider landscape is poor and disturbance levels and light pollution may be high.
Moderate	A tree with one or more PRFs that could be used by bats due to their size, shelter, protection conditions and surrounding habitat but unlikely to support a roost of high conservation status. Connectivity from the tree to the wider landscape is generally moderate, with moderate levels of disturbance and light pollution.
High	A tree with one or more PRFs that are obviously suitable for use by larger numbers of bats, on a more regular basis, and potentially for longer periods of time due to their size, shelter, protection, conditions, and surrounding habitat. Connectivity with surrounding good quality foraging and commuting habitats would be high.

26. Those trees with negligible potential to support roosting bats were not mapped or described.



⁴ Adapted from Collins (2016) Table 4.1, page 35.

21.5.2.5 Aerial Inspections

- 27. Aerial inspections were undertaken by Thompson Ecology on the trees in the wider site, however due to alterations to the cable route, none of the trees inspected at height now fall within the current Order Limit boundary.
- 28. Presence/absence surveys on the trees have been undertaken as alternative to aerial tree climbing in line with (Collins J., 2016).

21.5.3 Presence/Absence Surveys

- 29. In line with best practice guidance, current at the time of survey (Collin, J.,2016) presence/absence surveys were undertaken on structures or trees which had bat roosting potential. The survey frequency required to confirm the absence of a bat roost is determined by the results of the PRA and is detailed in Sections 21.4.2.3 and 21.4.2.4.
- 30. A programme of dusk emergence and dawn re-entry surveys for both buildings and trees was undertaken between May and August 2023. These surveys were undertaken for the PEIR Boundary which has since been refined to the Order Limits presented with this application. Data beyond the current Survey Area (Order Limits + 25m) has been excluded from this report as it is no longer within the extent of survey scope.

21.5.3.1 Buildings and Structures

- 31. There are no buildings or other built structures that could be utilised by roosting bats within the Order Limits.
- 32. Buildings located within 25 metres of the Order limits are identified below, beyond this it is considered that no appreciable indirect impacts will be experienced on bat roosts.

21.5.3.2 Trees

33. In line with best practice guidelines, presence/absence surveys have focussed on those trees within the Order Limits with either moderate or high potential to support roosting bats. Moderate suitability trees were subject to two dusk emergence or dawn re-entry surveys and high suitability trees were subject to three. At height inspections undertaken during the peak bat survey season are considered a suitable substitute for one of the required survey visits. All survey visits were separated by a minimum of two weeks, a specified in the BCT guidelines.



21.5.4 Bat Activity Surveys

- 34. Bat activity surveys employed both walked transects and static bat detector deployments. The findings of 11 transects and 45 statics deployed within the Order Limits are provided within this appendix.
- 35. However, in May 2023, activity surveys commenced using the larger PEIR Boundary to define the extent of survey and included a total of 15 transects and 66 static detector locations. The large number of static detectors were deployed in response to Natural England asking whether activity surveys will consider the migration period for bats, particularly Nathusius pipistrelle (6th February 2023, Expert Topic Group minutes). The schedules for both transect and static detection surveys were planned to include the months of May, September, and October.
- 36. Since the PEIR Boundary was refined to the Order Limits, some of the static detector and transect locations now lie outside the survey scope. Where this has occurred, the data has been excluded from this report but is available upon request. See Section 21.6: Limitations for further explanation.

21.5.4.1 Determination of Habitat Value within the PEIR Boundary

- 37. The scope of activity surveys was determined based on the categorisation of foraging habitats using data from the UK Habitat Classification survey (Appendix 21.1.2) and the categorisation of commuting and foraging habitat outlined in Table 21.4. Habitats were categorised as having either low, moderate, or high suitability for foraging and commuting bats.
- 38. Initially, the categorisation of habitats was undertaken when only the Lincolnshire Node and a single route to the Weston Marsh Substation Zone were identified as route options. Habitats were noted to consist of large extents of cropland and improved grassland interlinked by hedgerows and dykes. According to the UK Habitat data, cropland accounted for 86% of the habitats within the PEIR Boundary, while suitable bat habitats (including woodland, trees, and dense scrub) made up only 0.014% of the total habitats. Due to the scarcity of suitable habitats for bats, the foraging habitat was classified as having low suitability, and a total of three surveys (one in spring, one in summer, and one in autumn) were planned, with one deployment per season using static and transect methods.



39. Walkover surveys, which included the UK Habitat Classification and preliminary roost assessments for a second route option to Weston Marsh Substation Zone (included in the PEIR Boundary) began on 19th June 2023, as soon as land access was granted. During the first week of surveys for the alternative route option, there were concerns that the habitat had higher suitability for bats than initial habitat mapping indicated. This was due to the presence of smaller fields and consequently, a higher number of field margins and larger hedgerows. Taking precautionary measures and aiming to optimise the 2023 survey season, the deployment of static and transect methods was increased in line with the Bat Conservation Trust's guidelines for habitats of moderate suitability (Table 21.4). Consequently, we were able to capture bat activity data for the months of May, June, July, August, September, and October.

21.5.4.2 Determination of Habitat Value within the Order Limits

- 40. The UK Habitat Classification dataset was analysed again on receipt of the Order Limits and 100m buffer zone. Within this final survey area, 88% of habitats consist of cropland; grassland represented 6.5%, while woodland, hedgerow, and dense scrub make up 1.14% of the habitats present. Figure 21.4.5 illustrates the habitat types within the Order Limits landscape that are potentially important to the bat population.
- 41. A slight increase of the presence of 1.126% of suitable habitat for bats (woodland, hedgerow, and dense scrub) categorises the overall habitat within the Order Limits as still having low suitability for bats.
- 42. The habitats in the wider settings exhibit a homogenous nature, with some localised areas of woodland and hedgerows being present and representing small pockets of better-quality habitat for bats. A representation of the habitat suitability is shown in Figure 21.2.1.
- 43. In summary, despite the low suitability of the habitats within the Order Limits overall, there are some potential functional linkages with small amounts of higher quality woodland habitat in the wider landscape. As a precaution, the survey effort continued from May 2023 following the guidance for assessing moderate suitability habitats as defined in Table 21.3.



21.5.4.3 Weather Conditions

44. Weather conditions were documented during bat activity surveys, ensuring that all surveys were carried out in suitable weather conditions, with temperature parameters favourable for bats in flight.

Table 21.4: Categorisation of Commuting and Foraging Habitat

Suitability	Rationale
Negligible	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	Habitat that could be used by small numbers of commuting bats (such as a gappy hedgerow or un-vegetated stream), but isolated, i.e., not very well connected to the surrounding landscape by another habitat.
	Suitable, but isolated habitat that could be used by small numbers of foraging bats, such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland, or water.
High	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river, valleys, streams, hedgerows, lines of trees and woodland edge.
	High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree lined watercourses and grazed parkland. And is close to and connected to known roosts.

21.5.4.4 Manual Bat Activity Surveys

- 45. Bat activity transect survey design was based on the PEIR Boundary, rather than the Order Limits. In May 2023, surveys began on 15 transects along the PEIR Boundary. The Order Limits were refined during the bat transect survey season and, in response, the number of surveyed transects was reduced to a total of 11. Transects 1, 4 to 6, and 9 to 15 bisect the current Order Limits and the results of these transects are presented within this report. The remaining transects now lie outside the Order Limits and have been excluded from this data set. (see Section 21.6.4 for additional information).
- 46. The transects were designed to follow hedgerows, drainage ditches and field edges that would be of greatest value to foraging and commuting bats. These routes were ground-truthed by the surveying ecologist during daylight hours, and where necessary, the route was refined to ensure the transect was deliverable and access remained available.



47. A team of two bat ecologists walked each transect route, starting at sunset and taking 2-3 hours to complete. The survey team were each equipped with a full spectrum bat detector (Batlogger M, Anabat Swift, Echo Meter Touch 2 Pro) which recorded bat calls, times, and location. In addition, surveyors made notes of bats observed during the survey, including behaviours seen and direction of flight. Data from the detectors was later subject to analysis to determine species using sound analysis software (Kaleidoscope Pro), refer also to Section 21.7.4.

21.5.4.5 Automated Bat Activity Surveys

- 48. To ensure accurate data collection and maximise efficiency, the ecologists selected static locations based on both aerial imagery and on-site inspections. A total of 66 static detectors, including Song meter Mini, SM4, and Anabat Swift, were strategically deployed within the PEIR Boundary, with careful consideration given to each deployment (subject to access permission). However, as the project evolved and the optimal cable route was chosen and refined, some of these detector points became obsolete. Consequently, the number of static detectors has been reduced to 45, aligning with the current stage of the Project. This report represents the findings of these 45 static deployments only. The location of all the static detectors is shown in Figure 21.4.4.
- 49. Static data was collected for a minimum of five nights per month for May, June, July August, September, and October at each pre-determined static location.

21.6 Data Analysis

- 50. Sound recordings were analysed using Kaleidoscope Pro (K-Pro) software using the bats of Europe filter 5.4.0, set to the region of the United Kingdom, then manually verified, where necessary, by ecologists experienced in bat sonogram analysis. Russ, J. (2021) was used as the main reference text for the above process, in addition to Marckman, U. and Pfeiffer, B. (2020) and Middleton, N., Froud, A. and French, K. (2014).
- 51. For analysis purposes, the term 'bat pass' has been used. A bat pass is a series of two or more calls which can be attributed to a bat species, and represents a single bat flying towards, or away from the detector's microphone. In some instances, a bat pass is a clear series of up to 40 calls, while for others, just two bat calls may be registered. Each is considered a single bat pass (of the microphone). This is why the bat pass count can be used as a general measure of bat activity, but not an indicator of species abundance.



21.6.1 Species Identification

- 52. K-Pro attempts to filter bat data for *Myotis* species, however for the purposes of this report, data have been collectively assigned to the *Myotis* genus due to the inherent difficulty of species differentiation of *Myotis* bats.
- 53. Due to their being an overlap between the call frequencies of the pipistrelle species, calls from the pipistrelle genus that were not accurately classified by K-Pro have been classified as "pipistrelle species".
- 54. *Nyctalus* and *Eptesicus* calls can easily be misclassified; particularly those of noctule bat (*Nyctalus noctula*), Leisler's bat (*Nyctalus leisleri*) and serotine (*Eptesicus serotinus*). Due to the similarity of the calls, it is not always possible to accurately differentiate between the three species and in such cases, they have been labelled as "big bat" in the analysis.
- 55. In cases where the bat species could not be determined, the record was left simply as "No ID" where it was clearly a bat, and "noise" where it was not.

21.6.2 Data Validation Checks

- 56. All locally rare/previously unrecorded species including greater horseshoe (*Rhinolophus ferrumequinum*), lesser horseshoe (*Rhinolophus hipposideros*), serotine, Leisler's, barbastelle, Bechstein (*Myotis bechsteinii*) and Nathusius' pipistrelle (*Pipistrellus nathusii*) auto-ids were checked, and if incorrect, these were manually altered.
- 57. A total of 5% of the auto-id results for noctule, brown long-eared bat, and NoID calls were checked as well as 2% of myotid calls and 1% percent of common pipistrelle (*Pipistrellus* pipistrellus) and soprano pipistrelle calls.
- 58. The percentage checks were verified by an experienced bat ecologist to confirm the assessment results, and the resulting percentages were then scaled to the quantity of NoID records.



21.7 Limitations

- 59. The bat surveys provide a snapshot of bat presence at the time of their undertaking. Tree roosting bats in particular are known to be dynamic in the occupation of a roost, moving between roost sites on a regular basis. Consequently, the bat survey does not seek to pinpoint every small roost, but instead aims to provide sufficient survey effort to understand the bat population present, and inform the impact assessment.
- 60. During the surveys, access to most land parcels was available. However, there were some exceptions where certain parcels remained unreachable or had restricted access during the survey. Some additional land parcels were also included within the Order Limits following completion of field survey work. These areas are largely attributed to the addition of access tracks, visual splays, OnSS and the 400kV cable corridor connecting it with the NGSS. The resulting data set is incomplete due to these limitations. Nevertheless, it is important to note that these occurrences were infrequent and, given the monotony of the habitats within the Order Limits, did not significantly affect the overall findings of the survey.

21.7.1 Preliminary Roost Assessment of Trees

- 61. The National Tree Map data is not considered a complete dataset and has some inherent limitations. The data is based on aerial imagery which can mean trees are identified, that in reality are large bushes and remnants of hedgerows. It is similarly acknowledged that there are trees within the site that are not included within this dataset. Site investigation work was undertaken to address this limitation, although not all trees were accessed. As a percentage of total number of trees within the site, this is considered a minor constraint on the accuracy of the data, which will be rectified during pre-construction surveys.
- 62. Access constraints meant that a PRA could not be undertaken for tree numbers 4407, 4409, 4015 in ECC 12: Marsh Road to Fosdyke Bridge and 5870, 5875, 5876, 5880, 5881, 5883, 5887, 5888 and 5890 in ECC 14: Surfleet Marsh OnSS/Marsh Drove to Weston Marsh NG Substation.

21.7.2 Presence/Absence Surveys

63. Presence/absence surveys were conducted within the Order Limits under appropriate weather conditions conducive to bat activity. Despite encountering short periods of drizzle during several survey sessions, diligent efforts were made to record bats in flight. While it is worth noting that the presence of drizzle may have influenced the observed bat numbers,



it is important to highlight that bats in flight were consistently observed throughout all survey instances. No other limitations to survey as a result of the weather were experienced.

21.7.3 Bat Activity Surveys

64. As outlined in Section 21.1.4 of this appendix, the activity survey effort was increased in June 2023 to account for better quality habitats present within the additional land parcels along the additional route option (referred to as Rev 1a in the PEIR). Activity survey data was therefore not collected for April and June 2023, but was collected for May, July, August, September, and October.

21.7.3.1 Manual Bat Activity Surveys

- 65. Bat activity transect survey design was based on the PEIR Boundary, rather than the Order Limits. In May 2023, surveys began on 15 transects along the PEIR Boundary. The Order Limits were refined during the bat transect survey season and, in response, the number of surveyed transects was reduced to a total of 11 (with Transects 2, 3, 7 and 8 removed). Data for the removed transects can be made available upon request.
- 66. In a small number of cases, minor changes to the transect route were required where land access availability differed between survey months (for example, where bulls were moved into a field). Consequential changes to transect routes were minimal, for example, walking along the opposite edge of the same field. These minor changes are not considered to significantly affect the validity of the transect data. and will not significantly affect the overall reporting of bat activity.
- 67. During some of the transect surveys, the bat detectors lost GPS signal and therefore were not able to geo-reference every bat call. Where possible, this was rectified through the use GPS data gathered in the ArcGIS Field Maps application on tablets also utilised during the transects. It does however limit the ability to display activity maps along the transect.

21.7.3.2 Automated Bat Activity Surveys

68. Bat activity transect survey design was based on the PEIR Boundary, rather than the Order Limits. In May 2023, statics were deployed at 66 locations inside PEIR Boundary. The Order Limits was later refined during the static survey to exclude the Lincolnshire Node route and an alternative cable route option to Weston Marsh. In response, Statics 3-9 and 26-39 were excluded from the survey schedule, as they were deemed outliers.



Specifically, Static 3 returned within the Order Limits, but deployment of that static was discontinued, resulting in an incomplete data set. However, if requested, the data sets pertaining to these statics can be provided. The remaining 45 statics all fall within a 500m radius of the Order Limits, and comprehensive data sets were successfully obtained for these locations.

- 69. Some static detector deployment occurred at the end of September to October resulting in the data collected originating from the end of September rather than October. However, due to how close to September this survey data was collected, bat behaviour is not expected to vary significantly.
- 70. All Static detectors used were georeferenced to ensure repeat deployment of the detectors was possible. In some situations, the detectors were repositioned to address unforeseen circumstances such as cropping of the fields or an absence of suitable anchor points. In such instances the locations selected were as close to the original as possible to maintain consistency.
- 71. Several static detectors were stolen during the automated bat activity survey, this is considered an unavoidable constraint.
- 72. One detector malfunctioned, which compromised the recoding of survey data at one location; however, due to the elevated survey effort employed on the Project overall, this is not considered to be a significant constraint.

21.7.4 Data Analysis

- 73. After the publication of the interim guidance note by the BCT (2022). Night vision arrays (NVA's) were not readily available at the quantities required on a national level due to the rapid surge in demand. This limitation was partially addressed through the use of dawn surveys which while not perfect does address some of the limitations with visual identification of roost sites, particularly in trees.
- 74. Kaleidoscope Pro only attribute one species label to a sound file, even if more than one bat species was recorded on that file. During manual verification checks on 2% of the unidentified bat calls, where multiple bat species were recorded on a single recording the records were manually updated. This is not considered to affect the conclusions of this



report; the number of bat passes does not relate to the number of bats present in any one location.



21.8 Results

21.8.1 Summary of Desk Study Data

- 75. The GLNP returned one record of a brown long-eared roost and one record of an unidentified pipistrelle bat species within 5km of the Project. No records of roosts were returned inside the Order Limits.
- 76. There are other (non-roost) records for brown long-eared, common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle (*Pipistrellus nathusii*) Pipistrellus sp., Daubenton's (*Myotis daubentonii*), Myotis sp., noctule, Nyctalus sp. and Western barbastelle (*Barbastellus barbastellus*).
- 77. An assessment of the data held on magic map in relation to European protected species licence within 5km of the cable route identified in Table 21.4.

Table 21.5: EPS Licences Identified Within 5km of the Order Limits

Segment	EPS Licence Ref	Distance from Order limits (m)	Species	Roost Type
ECC 4	2015-14162-EPS-MIT	2115	Common pipistrelle, Soprano pipistrelle	Day
ECC 11	2016-19343-EPS-BDX	3361	Common pipistrelle	Materni ty
ECC 9	2016-26600-EPS-MIT	4141	Common pipistrelle	Day
ECC 5	EPSM2010-1758	2753	Common pipistrelle, Brown long eared bat	Day and Materni ty ⁵
ECC 9	EPSM2012-5243	1597	Nathusius pipistrelle	Day

78. These records relate to licences issued between 2010 and 2016 and relate to the destruction of both day and maternity roosts.

21.8.2 Roost Assessment of Buildings and Structures

79. There are no buildings or other structures considered suitable for roosting bats within the Order Limits (Figure 21.4.1).

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⁵ Data on magic does not differentiate roost type by species, so it is not possible to determine if this is a maternity roost for pipistrelle or for brown long eared bats.

21.8.2.1 Buildings within 25m of the Order Limits.

- 80. Within 25 m of the Order Limits there are a total of nine buildings with low suitability for roosting bats (Structures 11, 28, 29, 31, 137, 139, 142, 156 and 157), and five buildings with Moderate suitability (Structures 35, 89, 113, 135 and 138) see Table 21.6. The results of all the building inspections are shown in Figure 21.4.2 with summary details provided within Annex A.
- 81. Table 21.6shows the buildings assessed as having bat roost potential within 25 m of the Order Limits boundary. It states the suitability of those buildings for roosting bats and the distance from the Order Limits boundary.

Table 21.6: Buildings located within 25 m of the Order Limits

Building Number	Distance from Order Limits	Roost Potential
89	20m	Moderate
		(pers. comm. bat roost present from owner)
35	Adjacent	Moderate
113	15m	Moderate
11	20m	Low
28	20m	Low
29	20m	Low
31	20m	Low
142	15m	Low
156	10m	Low
157	20m	Low

21.8.3 Roost Assessment of Trees

- 82. The results of the ground level tree roost assessments are shown in Figure 21.4.2.
- 83. A total of 146 trees were assessed for bat roost potential within the Order Limits. These trees were assessed using ground level assessments only, with none being inspected by an aerial inspection team. Of the trees surveyed, 117 of these had negligible potential, 14 had low potential, one moderate, and two high potential trees. Twelve trees could not be assessed due to access limitations.
- 84. Table 21.7 summarises the trees identification numbers, their roost suitability, and their segment locations.



Table 21.7: Tree Numbers, ECC Segment Reference, and Roost Suitability within Order Limits

High Suitability	Total within Order Limits
ECC 11: The Haven to Marsh Road	0
3767	1
ECC 13: Fosdyke to Surfleet Marsh OnSS/Marsh Drove	0
4954	1
Moderate Suitability	
ECC 5: Low Road to Steeping River	0
1095	1
Low Suitability	
ECC 1: Landfall to A52 – Hogsthorpe	0
215	1
219	1
227	1
435	1
ECC 3: Marsh Lane to A158 – Skegness Road	0
544	1
558	1
ECC 5: Low Road to Steeping River	0
1537	1
1558	1
1559	1
ECC 7: Fodder Dike Bank/Fen Bank to Broadgate	0
2327	1
ECC 8: Broadgate to Ings Drove	0
2622	1
2935	1
ECC 12: Marsh Road to Fosdyke Bridge	0
4212	1
4223	1



85. Tree 3767 (Plate 21.1) is a high roost suitability poplar tree with significant levels of dieback, resulting in most of the tree being a dead monolith. The tree is located in ECC 11: The Haven to Marsh Road. Presence/absence surveys were not possible for this tree as access was continually constrained during the survey season.



Plate 21.1: Tree 3767

86. Tree 4954 (Plate 21.2) is a mature willow, with high roost suitability, located adjacent to a proposed access road. The access road was included within the Project following closure of the presence/absence survey window. Consequently, no presence/absence survey could not be undertaken.



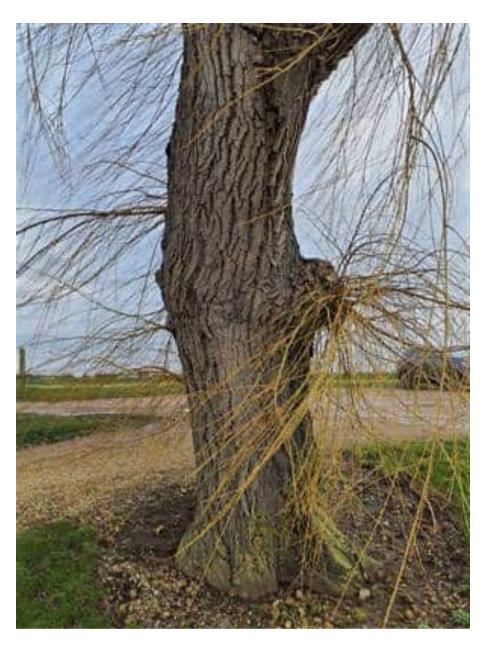


Plate 21.2: Tree 4954

- 87. Trees 1558 and 1559 are both small hawthorns with Low Suitability, located in ECC 5, along a former hedge line. It is possible that these trees will require removal. No photographs of these trees are available.
- 88. Tree 1095 (Plate 21.3) is a Moderate Suitability dead tree (most probably an oak) with extensive ivy cladding. It is located in ECC13: Fosdyke to Surfleet Marsh OnSS/Marsh Drove. A dawn survey on the 18/07/23 confirmed a possible common pipistrelle re-entry on this tree. The tree is located within an trenchless zone with no haul road.





Plate 21.3: Tree 1095

21.8.3.1 Trees within 25 m of the Order Limits.

89. There are a total of 205 trees within the 25 m buffer zone, beyond the Order Limits. Of these 205 trees, three have High Suitability, nine have Moderate Suitability, 31 Low Suitability and 147 Negligible Suitability. A total of 22 trees could not be accessed.

21.8.3.2 Manual Bat Activity Surveys

90. Eleven manual bat activity (transect) surveys, were undertaken each month between May and October 2023. Due to the evolving nature of the cable route design some of the



transects originally surveyed are no longer relevant to the Project. Therefore, the identifying number on the transects are not in sequence.

- 91. Bats have been identified to species level where possible, though in cases of myotid and big bats, or where incomplete calls make species identification difficult, these have been listed either by species group or genus group. Maps showing the ECC segments and the associated transect routes are show in Figure 21.4.3.
- 92. Table 21.8shows the combined count of all registrations for each of the eleven transects. The approach to aggregate the data for each transect route was adopted to address the relatively small number of bat registrations recorded.

Table 21.8: Species Counts Recorded per Transect.

Species	T01	T04	T05	T06	T09	T10	T11	T12	T13	T14	T15
Barbastelle	1	1	0	0	0	0	0	0	0	0	0
Myotis sp.	0	2	0	0	0	11	0	0	0	0	0
Noctule	30	2	0	10	0	11	10	2	1	0	2
Nathusius pipistrelle	1	0	0	1	0	3	0	1	0	3	0
Common pipistrelle	74	116	42	73	67	242	99	31	87	94	25
Soprano pipistrelle	29	60	44	17	39	20	6	11	46	2	1
Brown long eared	0	1	0	0	0	0	0	0	0	0	0

21.8.3.3 Manual Activity Surveys: Species Assemblages and Behaviour

- 93. Bat calls recorded over all the transects are considered to be comparable with only low numbers of bats and species recorded. Peak activity was recorded for common pipistrelle along Transect 10 with 242 passes recorded. The highest levels of species diversity was on Transect 4 with six species (or groups) recorded. Overall, bat activity on the site is considered low with a maximum count over all transects being 1,500 registrations.
- 94. The diversity of the bat populations also showed signs of declining along the cable route with the highest level of species diversity recorded in the northern sections of the cable route, from ECC 1 to ECC 10 and showing a decline after ECC 10 to ECC 15. This observation falls in line with the UK Habitat Classification results which show habitat quality for bats reducing in the south of the Project where fields are generally larger and linear features suitable for use by bats in flight (including hedgerows and tree lines) are less.



95. Bat behaviour consisted of foraging and commuting with bats recorded foraging along hedgerows and the coastline in every transect. Low numbers of social calls were recorded in September and October on Transects 4 and 15.

21.8.3.4 Automated Bat Activity Surveys

- 96. The locations of the static detectors are shown on Figure 21.4.4 and are distributed over the cable route at a variable density influenced by a combination of habitat suitability, land accessibility and alterations to the Project Order Limits.
- 97. The results of the static detector surveys are discussed below for each species recorded on site, along with supporting charts included in Annex B. Myotid bats have been included; the big bat aggregation, and unidentified bat species have been excluded.
- 98. Barbastelle bat have been recorded on site at low numbers, with a peak count of 26 passes recorded at Static Location 17 (ECC2: A52 Hogsthorpe to Marsh Lane) in September. Barbastelle registrations were recorded on 26 of the 45 static detectors, although at very lower numbers and limited to individual months. A notable difference to this trend is at Location 19 (ECC 3: Marsh Lane to A158 Skegness Road) where bat activity was recorded consistently over four separate months. This location was located along a mature, tall, hawthorn hedge along Ingoldmells Road, Burgh le Marsh.
- 99. Myotid bats (*Myotis spp.*) were recorded over the site at all the 45 sample locations, though at low levels. The key exceptions to this were at static locations 44, 45, 51 and 56. Locations 44 and 45 are both associated with hedgerows along roads, while 51 is located in an arable field associated with a hedgerow. Static 56 (ECC 14) recorded a total of 433 passes in October along the Wainfleet Relief Channel. As Daubenton's bat prefer open water habitats, this could explain the higher-than-average levels of myotis activity. The peak in activity could be indicative of autumn foraging prior to entering hibernation.
- 100. Leisler's Bat were recorded at 24 of the 45 static detectors at low levels. A peak count of 25 passes was recorded at Static 43, a location in close proximity to The Haven.
- 101. Noctule bat were recorded at 44 of the 45 static locations, with the main areas of activity being in ECC 11: The Haven to Marsh Road. Peak activity for noctule was recorded at Static 44 in the month of September. Static 44 also recorded the highest number of passes for noctule, with over 350 passes in total. Static 44 was situated in an arable field on the banks of Wyberton Branch Drain.



- 102. Nathusius pipistrelle were recorded very rarely over the cable route, with the exception of a spike in registrations recorded at Static 43 (ECC10: Church End Lane to The Haven), where 821 passes were recorded in September. Static 43 was situated close to the Pilgrim Fathers Memorial Site on the banks of the Haven. This increase in registrations could be attributed to a possible autumn migration of Nathusius pipistrelle, although further, bespoke bat surveys would be required to test this theory.
- 103. Common pipistrelle were recorded at all of the 45 static detector locations and were recorded over multiple months. A significant spike in activity was recorded at Static Location 63 (ECC 8: Broadgate to Ings Drove), where a total of 15,253 registrations were recorded. This may be indicative of a maternity roost being located nearby. This static location is associated with a small block of trees near to a farm, located approximately 35 m from the Order Limits boundary.
- 104. Soprano pipistrelle is poorly represented in the static data, with the majority of the statics recording bat passes in the low hundreds over the survey window. This is considered to be a low return for this commonly occurring species. One exception was a high count recorded at Static 51 (ECC 14: Surfleet Marsh OnSS/Marsh Drove to Order Limits Weston Marsh NG Substation), with a total of 3,359 registrations in October. This static is associated with arable fields and a small dyke approximately 500 metres to the east of the Order Limits.
- 105. Brown long eared are recorded at 43 of the 45 static detector locations with the peak number of passes being recorded at Static Location 61 (ECC 7: Fodder Dike Bank/Fen Bank to Broadgate) where 54 passes were recorded. Other peaks in registrations were noted at Static 60 (ECC 6: Steeping River to Fodder Dike Bank/Fen Bank) and static 51 (ECC 14: Surfleet Marsh OnSS/Marsh Drove to Order Limits Weston Marsh NG Substation).



21.9 Conclusion

21.9.1 Overall Site Value for Bats

- 106. Overall, bat activity was found to be very low across the Order Limits. The landscape within the Order Limits and the wider landscape is dominated by large, open agricultural fields, with limited opportunities for roosting. The low levels of bat activity recorded are therefore expected.
- 107. Where fields are divided by well-established hedgerows, commuting and foraging behaviours were recorded for some species of bat, notably common pipistrelle, noctule and myotid bats, but also brown long eared and occasional registrations of barbastelle. Specific areas of interest are highlighted in Section 21.7: Results.
- 108. A peak of registration for *Nathusius pipistrelle*, recorded at static 43 in October (ECC 10) is an indication of potential migratory behaviour. This is a significant observation and needs to be considered in relation to indirect impacts, potentially compromising this species long term behaviour. Further surveys may be considered necessary at this location to ascertain if this is the case and what measures should be employed to minimise any impacts such as control of nighttime lighting and the installation of acoustic fencing to minimise vibration impacts.

21.9.2 Roosting Resources

21.9.2.1 Buildings and Structures

109. No buildings are located within the Order limits. Within the 25m buffer zone, beyond the Order Limits there are nine buildings with bat roost potential. It will be necessary to consider indirect impacts of lighting, noise and vibration within the impact assessment, as well as appropriate timings for any works to minimise the risks of these disturbance impacts.

21.9.2.2 Trees

110. None of the trees surveyed within the Order Limits have been confirmed as supporting a bat roost. The small number of trees assessed as having either moderate or high bat roost potential may require further survey to determine the presence/absence of bats. However, at present these trees are all situated either inside a trenchless zone, or along an access track where no loss of trees is planned.



- 111. Bats roost in trees by their very nature are difficult to identify and are transient in nature. For example, features such as flaking bark (popular as a roosting site for some of our bat species) change in a relatively short period of time. Some of these relatively delicate and short-lived roost types are lost and others appear; hence tree roosting bats move between a number of roosts in the general roosting area. Therefore, repeat presence/absence surveys are recommended through the lifetime of the project to capture any roost formation during the lifetime of the Project, and appropriate measures should be in place to address any impacts should a new roost develop.
- 112. Trees with low suitability require no additional survey work, although precautionary method of working when felling the trees will be required.
- 113. Static detector 63 within ECC 8 displayed a very high level of common pipistrelle activity in August. This may be an indication of a maternity roost in proximity and further assessment of this behaviour may be required.



21.10 References

Bat Conservation Trust (May 2022) Interim Guidance Note Use of Night Vision Aids for bat emergence and further comments on dawn surveys. [Available at

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