Hornsea Project Four: Environmental Statement (ES)

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APFP Regulation 5(2)(a)

Volume A6, Annex 3.8 – Bat Static Detector Survey Report Part A

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Accepted Thomas Watts, Orsted, August 2021
Approved Julian Carolan, Orsted, September 2021

A6.3.8
Version A

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Glossary

Term	Definition
Commitment	A term used interchangeably with mitigation and enhancement measures. The purpose of Commitments is to reduce and/or eliminate Likely Significant Effects (LSEs), in EIA terms. Primary (Design) or Tertiary (Inherent) are both embedded within the assessment at the relevant point in the EIA (e.g. at Scoping, Preliminary Environmental Information Report (PEIR) or ES). Secondary commitments are incorporated to reduce LSE to environmentally acceptable levels following initial assessment i.e. so that residual effects are acceptable.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIP).
EIA Directive	European Union Directive 85/337/EEC, as amended by Directives 97/11/EC, 2003/35/EC and 2009/31/EC and then codified by Directive 2011/92/EU of 13 December 2011 (as amended in 2014 by Directive 2014/52/EU).
EIA Regulations	Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.
Energy balancing infrastructure (EBI)	The onshore substation includes energy balancing Infrastructure. These provide valuable services to the electrical grid, such as storing energy to meet periods of peak demand and improving overall reliability.
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 Directive and EIA Regulations, including the publication of an Environmental Statement (ES).
Environmental Statement (ES)	A document reporting the findings of the EIA and produced in accordance with the EIA Directive as transposed into UK law by the EIA Regulations
Export cable corridor (ECC)	The specific corridor of seabed (seaward of Mean High Water Springs (MHWS)) and land (landward of MHWS) from the Hornsea Project Four array area to the Creyke Beck National Grid substation, within which the export cables will be located.
High Voltage Alternating Current (HVAC)	High voltage alternating current is the bulk transmission of electricity by alternating current (AC), whereby the flow of electric charge periodically reverses direction.
High Voltage Direct Current (HVDC)	High voltage direct current is the bulk transmission of electricity by direct current (DC), whereby the flow of electric charge is in one direction.
Hornsea Project Four Offshore Wind Farm	The term covers all elements of the project (i.e. both the offshore and onshore). Hornsea Four infrastructure will include offshore generating stations (wind turbines), electrical export cables to landfall, and connection to the electricity transmission network.. Hereafter referred to as Hornsea Four.
Landfall	The generic term applied to the entire landfall area between Mean Low Water Spring (MLWS) tide and the Transition Joint Bay (TJB) inclusive of all construction works, including the offshore and onshore ECC, intertidal working area and landfall compound. Where the offshore cables come ashore east of Fraisthorpe.

Term	Definition
National Grid Electricity Transmission (NGET) substation	The grid connection location for Hornsea Four at Creyke Beck.
Onshore substation (OnSS)	Comprises a compound containing the electrical components for transforming the power supplied from Hornsea Project Four to 400 kV and to adjust the power quality and power factor, as required to meet the UK Grid Code for supply to the National Grid. If a HVDC system is used the OnSS will also house equipment to convert the power from HVDC to HVAC.
Order Limits	The limits within which Hornsea Project Four (the 'authorised project') may be carried out.
Orsted Hornsea Project Four Ltd.	The Applicant for the proposed Hornsea Project Four Offshore Wind Farm Development Consent Order (DCO).
Planning Inspectorate (PINS)	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).

Acronyms

Acronym	Definition
ACIEEM	Associate Member of the Chartered Institute of Ecology and Environmental Management
BCT	Bat Conservation Trust
CIEEM	Chartered Institute of Ecology and Environmental Management
CIWEM	Chartered Institute of Water and Environmental Management
C.WEM	Chartered Water and Environmental Manager
DCO	Development Consent Order
EBI	Energy Balancing Infrastructure
ECC	Export cable corridor
EECW	Environmental and Ecological Clerk of Works
EIA	Environmental Impact Assessment
EP1HS	Extended Phase 1 Habitat Survey
ERYC	East Riding Yorkshire Council
ES	Environmental Statement
EPS	European Protected Species
ERYC	East Riding Yorkshire Council
FRGS	Fellow of the Royal Geographical Society
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
LWS	Local Wildlife Site
MCIWEM	Member of Chartered Institute for Water and Environmental Management
MEECW	Member of the Ecological and Environmental Clerk of Works
MHWS	Mean High Water Spring
NE	Natural England
NERC	Natural Environment and Rural Communities

Acronym	Definition
NEYEDC	North and East Yorkshire Ecological Data Centre
NGET	National Grid Electricity Transmission
OnSS	Onshore substation
OS	Ordnance Survey
PRoW	Public Right of Way
SoS	Secretary of State
SSSI	Site of Special Scientific Interest
UK BAP	United Kingdom Biodiversity Action Plan
WCA	Wildlife and Countryside Act

Units

Unit	Definition
cm	centimetre
km	kilometre
kV	kilovolt
m	metre

1 Introduction

1.1 Project background

1.1.1.1 Orsted Hornsea Project Four Limited (the 'Applicant') is proposing to develop the Hornsea Project Four Offshore Wind Farm (hereafter 'Hornsea Four'). Hornsea Four will be located approximately 69 km offshore the East Riding of Yorkshire in the Southern North Sea and will be the fourth project to be developed in the former Hornsea Zone. Hornsea Four will include both offshore and onshore infrastructure including an offshore generating station (wind farm), export cables to landfall, and on to an onshore substation (OnSS) with energy balancing infrastructure (EBI), and connection to the electricity transmission network.

1.1.1.2 Royal HaskoningDHV was commissioned to undertake a suite of static bat detector surveys of all linear features (i.e. hedgerows, woodland edges and watercourses) that had been assessed as providing moderate or high potential for commuting and/or foraging bats within and up to a 50 m buffer of the onshore Hornsea Four Order Limits (i.e. the landfall, onshore export cable corridor (ECC), the OnSS and EBI, and 400 kV National Grid Electricity Transmission (NGET) connection area.

1.1.1.3 This technical annex has been produced to characterise the baseline environment to inform and support the ecological impact assessment set out in **Volume A3, Chapter 3: Ecology and Nature Conservation** of the Hornsea Four Environmental Statement (ES).

1.1.1.4 Due to the amount and size of the data collated during the suite of static bat detector surveys, this technical report has been split into two parts:

- **Annex 3.8: Bat Static Detector Survey Report Part A** (this document) – outlines the methodology, survey results, conclusions and mitigations; and
- **Annex 3.9: Bat Static Detector Survey Report Part B** –presents the full survey results from the Hornsea Four static bat detector surveys as well as the supporting information relating to the habitats and features within each survey location where a static bat detector was deployed.

1.1.1.5 Bat static detector and bat emergence and re-entry surveys have also been undertaken for Hornsea Four, and these can be found in **Annex 3.10: Bat Activity Transect Survey Report Part A**; **Annex 3.11: Bat Activity Transect Survey Report Part B**; **Annex 3.12: Bat Emergence and Re-entry Survey Report Part A** and **Annex 3.13: Bat Emergence and Re-entry Survey Report Part B**, respectively. For a full understanding of the results of the bat survey programme all of the bat survey reports require consideration

1.2 Aims

1.2.1.1 The aim of the static bat detector survey was to determine the presence or likely absence of bat species utilising habitats and linear features for commuting and/or foraging purposes within and up to 50 m of the onshore Hornsea Four Order Limits.

1.2.1.2 The purpose of this report is to present the findings of the Hornsea Four bat static detector survey and to provide an initial understanding of the presence of commuting and/or foraging bat species within and up to 50 m of the onshore Hornsea Four Order Limits.

1.2.1.3 This report has been prepared following the guidelines as set out in the Chartered Institute of Ecology and Environmental Management's (CIEEM) Guidelines on Ecological Report Writing (CIEEM 2017), and the survey reporting guidelines in the Bat Conservation Trust's (BCT) Bat Surveys for Professional Ecologists (Collins 2016) and Bat Surveys: Good Practice Guidelines (2nd Edition) (Hundt 2012).

2 Legislation

2.1.1.1 **Table 1** summarises the relevant information regarding the legal protection afforded to bats. It should be noted that this is for information only and is not intended to be comprehensive or to replace specialised legal advice.

Table 1: Summary of key legislation and policy relevant to bats.

Legislation	Relevance
Wildlife and Countryside Act 1981 (as amended) (WCA 1981)	This Act makes it an offence to intentionally disturb, kill, injure or take any animal listed in schedule 5 of the Act. All bat species are listed on Schedule 5.
Natural Environment and Rural Communities Act 2006 (NERC 2006)	Section 41 of the Act requires the Secretary of State (SoS) to compile a list of habitats and species of principal importance for the conservation of biodiversity in England. Decision makers of public bodies, in the execution of their duties, must have regard to the conservation of biodiversity in England, and the list is intended to guide them. Natural England has compiled a list of species of Principal Importance. Several bat species are on this list: • Barbastelle *Barbastella barbastellus;* • Bechstein's *Myotis bechsteinii;* • Noctule *Nyctalus noctule;* • Soprano pipistrelle *Pipistrellus pygmaeus;* • Brown long-eared *Plecotus auratus;* • Greater horseshoe *Rhinolophus ferrumequinum;* and • Lesser horseshoe *Rhinolophus hipposideros.*
Conservation of Habitats and Species Regulations 2017 (as amended) (Conservation of Habitats and Species Regulations 2017)	Codifies the EU Directive 92/43/EEC (The Habitats Directive) into UK law, and provides legal protection for European Protected Species (EPS) and designated sites. All bat species are EPS.

Legislation	Relevance
Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019,	Makes changes to the Conservation of Habitats and Species Regulations 2017 following the UK's exit from the European Union (EU).
Policy	**Relevance**
UK Post-2010 Biodiversity Framework (JNCC 2012)	Supersedes the UK Biodiversity Action Plan (UK BAP), which fulfilled legal obligation under the Convention on Biological Diversity to identify and produce action plans for priority habitats and species.

3 Methodology

3.1 Survey Area

3.1.1.1 The Hornsea Four static bat detector survey area consisted of the Hornsea Four Order Limits, plus an additional 50 m buffer (see **Figure 1**). The 50 m buffer was implemented to include any associated habitat and/or features immediately adjacent to the Order Limits, in line with industry standard survey guidance.

3.2 Survey Methodology

3.2.1 Desk study

3.2.1.1 Biological data received from the North and East Yorkshire Data Centre (NEYEDC) initially obtained during the scoping stages of the project (NEYEDC 2018) and more recently updated in April 2020 was reviewed for information on the presence of commuting and/or foraging bat species within the Hornsea Four static bat detector study area. There is no specific data for determining that desk study records of a certain age are no longer valid, and therefore each record has been considered on its own merits. As the biological records data was updated in April 2020 it is therefore considered to remain valid.

3.2.1.2 During the updated Extended Phase 1 Habitat Survey (EP1HS) (**Annex 3.1: Extended Phase 1 Habitat Survey Report** and **Annex 3.2: Extended Phase 1 Target Note Tables**) undertaken in February 2019, all linear habitats and/or features present within areas where landowner access had been granted (approximately 50% of the Hornsea Four Order Limits) were identified and assessed from the ground for their suitability to support commuting and/or foraging bats. For the remaining 50% and where landowner access had not been granted, a review of high-resolution (~3 cm) aerial imagery was undertaken and a precautionary approach was undertaken to identify potential bat commuting/foraging habitats (see **Section 3.3** for further details).

3.2.1.3 This approach was agreed with stakeholders (East Riding Yorkshire Council (ERYC), Natural England, Environment Agency (EA) and Yorkshire Wildlife Trust (YWT)) as part of the Hornsea

Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8 April 2019 (ON-ECO-1.7).

3.2.1.4 Subsequent to the updated EP1HS undertaken in February 2019, further land access was granted and a further EP1HS was undertaken in areas not previously subject to survey. This total survey effort resulted in 95% EP1HS coverage of the Hornsea Four Order Limits at the time of the 2019 bat survey effort. See **Annex 3.1: Extended Phase 1 Habitat Survey Report** and **Annex 3.2: Extended Phase 1 Target Note Tables**) for further details.

3.2.1.5 Ongoing consultation with landowners has been undertaken by The Applicant's land agents since 2019 and consequently access to the remaining 5 % unsurveyed in 2019 was granted in 2021. See **Annex 3.1: Extended Phase 1 Habitat Survey Report – 2021 Survey Addendum** and **Annex 3.2: Extended Phase 1 Target Note Tables – 2021 Survey Addendum**) for further details.

3.2.1.6 At the time of the 2019 bat survey effort, a precautionary approach was undertaken when identifying any potential features from the aerial imagery whereby any potential linear habitats and/or features identified from the aerial mapping review were assessed as having a high potential for supporting commuting/foraging bats for the purposes of including them within the Hornsea Four static bat detector survey effort. However, where landowner access was subsequently obtained, each of these linear habitats and/or features was subject to a preliminary daytime assessment. This preliminary daytime assessment either confirmed that the bat foraging/commuting potential initially assigned was correct, or that the bat foraging/commuting potential was reassigned to either moderate, low or negligible potential, as appropriate.

3.2.1.7 No changes or additional areas were identified from the 2021 survey effort to those identified and surveyed in 2019.

500000

520000

460000

440000

N

GRID
NORTH

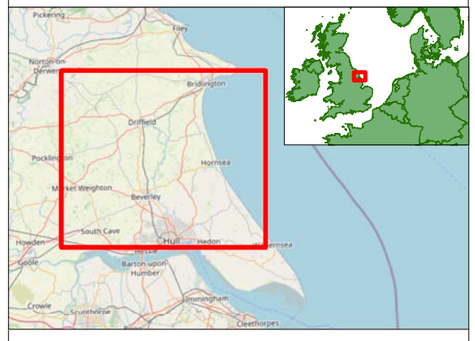
Hornsea Four

Figure 1

Survey Area

Order Limits

Bat Survey Area



Coordinate system: British National Grid

Scale@A3: 1:160,000

0 2 4 8 Kilometres

0 1 2 4 Miles

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Title: Survey Area
Document no: HOW04RH0108
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Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Date: 18/06/2021 Author: 303273 Name: HOW04RH0108_SurveyArea

500000

520000

3.2.2 Field survey

3.2.2.1 The Hornsea Four static bat detector survey was designed in accordance with BCT guidelines (Collins 2016 and Hundt 2012) and included all linear habitats and/or features assessed during the updated Extended Phase 1 Habitat Survey (EP1HS) (Orsted 2019) see **Annex 3.1: Extended Phase 1 Habitat Survey Report** and **Annex 3.2: Extended Phase 1 Target Note Tables**) as providing moderate or high suitability for supporting commuting and/or foraging bats.

3.2.2.2 All features assessed as providing low suitability for supporting commuting and/or foraging bats have still been considered as potentially supporting small numbers of bats. However, no further surveys have been undertaken. Mitigation measures for those features assessed as low are provided in **Volume F2, Chapter 3: Outline Ecological Management Plan**. This approach to features offering low suitability for commuting and/or foraging bats was presented to and agreed by, stakeholders (EA, ERYC, Natural England and YWT) at the third onshore Ecology Evidence Plan Technical Panel meeting, held on 8 April 2019 (ON-ECO-1.7).

3.2.2.3 In accordance with the BCT guidelines (Collins 2016), those features assessed as providing moderate or high suitability for commuting and/or foraging bats were subject to one static detector survey each month during the active bat season (which is typically between April and October, inclusive). The months of April and October are outside the optimal survey period, due to potentially changeable weather conditions, but nonetheless should be included unless determined otherwise by a suitably qualified ecologist. However, due to a lack of landowner access agreements, no surveys were undertaken during April 2019. Therefore the 2019 Hornsea Four bat static detector surveys commenced in May 2019 and continued through to October 2019 (inclusive).

3.2.2.4 The static bat detectors were placed in the same locations within the Hornsea Four bat static detector study area for a total of five nights. The same type of detector (Song Meter 2, full spectrum hired from a specialist company) was used throughout the Hornsea Four static bat detector survey. Recording was programmed to begin 15 minutes prior to sunset and continue through to 15 minutes after sunrise. A summary of the survey dates where static bat detectors were deployed is presented in **Table 2**.

3.2.2.5 Each static detector deployment was designed to include those linear habitats and/or features assessed as providing moderate or high suitability for commuting and/or foraging bats that were situated within the Hornsea Four bat static detector study area. A total of 44 linear habitats and/or features were assessed as providing moderate or high potential for supporting commuting and/or foraging bats and therefore formed the basis of the Hornsea Four bat static detector survey effort. Of those 44 features, 43 were assessed as providing moderate suitability for commuting/foraging bats and one feature was assessed as providing high suitability for commuting/foraging bats.

3.2.2.6 As the Hornsea Four bat static detector survey was undertaken concurrently with the Hornsea Four bat activity transect survey effort, the 44 linear habitats and/or features assessed for commuting and/or foraging bats were grouped into 10 walkable survey

transects. Most of the static detectors were deployed within these 10 transects, however several features were located within more remote locations and therefore in these instances only static detectors were deployed. This approach was agreed with stakeholders (i.e. Natural England, EA and YWT) as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8th April 2019 (ON-ECO-1.7). The locations of all static detectors deployed are shown on **Figure 2** to **Figure 15**.

3.2.2.7 A maximum of 18 static detectors were deployed each month between May and October 2019 (inclusive) but were dependent on landowner access agreements. The static detectors have been numbered from landfall to the OnSS and a full summary of each static detector deployment per month is presented in **Annex 3.9: Bat Static Detector Survey Report Part B**.

3.2.3 Data analysis

3.2.3.1 Once the static bat detectors had been collected each month, the data was downloaded and reviewed using the Wildlife Acoustics Kaleidoscope software in order to identify the bat species and number of individual passes recorded. The Kaleidoscope software is an integrated suite of bat data tools that has been designed to convert bat recording files quickly, sort and categorise the bat data by species, verify survey findings as well as visually presenting the recorded data. It is the widely accepted software to use when analysing bat recordings. A full summary of recordings from each static bat detector deployed throughout the Hornsea Four bat static detector survey is presented in **Annex 3.9: Bat Static Detector Survey Part B**.

3.2.3.2 The data analysis undertaken each month included the use of Kaleidoscope software's inbuilt function of automatic bat species recognition, followed by a manual audit.

3.2.3.3 Due to the overlap in call characteristics, and inherent limitations using software for species identification, bats in the *Myotis* and long eared species groups (*Plecotus spp.*) have been identified to genus only.

3.2.3.4 For *Pipistrellus* species, the following criteria based on measurements of peak frequency have been used to identify calls:

- Nathusias' pipistrelle *Pipistrellus nathusii* (NP) < 40 KHz;
- Nathusias' pipistrelle / Common pipistrelle *Pipistrellus pipistrellus* (NP / CP) ≥ 40 KHz and < 42 KHz;
- Common pipistrelle (CP) ≥ 42 KHz and < 49 KHz;
- Common pipistrelle / Soprano pipistrelle *Pipistrellus pygmaeus* (CP /SP) ≥ 49 KHz and < 51 KHz; and
- Soprano pipistrelle (SP) ≥ 51 KHz.

3.2.4 Surveyors

3.2.4.1 The Hornsea Four bat static detector survey was designed and led by Charlotte Clements, a Royal HaskoningDHV ecologist with 5 years' experience of undertaking bat surveys. Charlotte is an associate member of the Chartered Institute of Ecology and Environmental Management (ACIEEM). Charlotte also undertook all the analysis of the data collected throughout the Hornsea Project Four bat survey effort.

3.2.4.2 Charlotte was supported in the deployment and collection of static detectors throughout the Hornsea Four bat static detector survey by:

- Paul Hiscocks, BSC (Hons) MCIEEM, MEECW (Natural England CL18 Bat Class Licence Level 2 Licence (Licence No 2015-10145-CLS-CLS); and
- Ella Moseley, BSc (Hons), MCIWEM, CWEM, C.Env, FRGS (Fellow of the Royal Geographical Society).

3.3 Limitations

3.3.1.1 Prior to the commencement of the Hornsea Four bat static detector survey, a total of 39 potential locations suitable for deploying static detectors had been identified. These 39 locations were determined based on their proximity to the 44 linear features that had been assessed as providing moderate or high potential to commuting/foraging bats, as well as their suitability for detectors to be safe and secure during the survey period.

3.3.1.2 However, since the initial identification of these locations, refinements have been made to the Hornsea Four Order Limits and consequently some of the linear habitats and/or features previously identified as being suitable for foraging/commuting bats, are now located outwith the Hornsea Four Order limits. As such, a number of locations that had previously been identified to deploy static detectors are now outside the Hornsea Four bat static detector survey area. These static detectors are shown on **Figure 2** to **Figure 15** within this report as 'no longer within the study area' for completeness.

3.3.1.3 Prior to the deployment of the static bat detectors, the lead surveyor reviewed all proposed locations and for 11 of the proposed locations, it was determined that there was no secure location in which to deploy certain detectors. Therefore, a total of 18 static detectors were deployed across the Hornsea Four static bat detector study area each month between May and October 2019 (inclusive). The location of these 18 static detectors is shown on **Figure 2** to **Figure 15**.

3.3.1.4 The number of detectors deployed is considered sufficient as they were located within areas of habitat that is representative of the area. Furthermore, the findings of the static bat detector surveys are used in combination with the findings of the bat activity surveys to understand the usage of the habitats within the Hornsea Four Order Limits by foraging and/or commuting bats. The bat static detector survey effort and findings has been

discussed and agreed with Natural England as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 1st April 2020 (ON-ECO-1.16).

3.3.1.5 As presented in **Paragraph 3.2.2.3**, due to a lack of signed landowner access agreements, no survey was undertaken during April 2019.

3.3.1.6 The weather conditions during most of the survey period are considered optimal for undertaking bat surveys although a period of colder than average temperature was experienced in during September 2019. Despite this period of colder weather, there was no adverse effect on survey results, as bat activity was still recorded, albeit at lower levels. This reduction does not adversely affect the impact assessment as the assessment is based on presence/absence of bats rather than the numbers recorded.

3.3.1.7 Additionally, throughout the Hornsea Four static bat detector survey period, a total of six static detectors returned nil results in certain months due to a technical malfunction or interference with the equipment (**Table 3**). A complete account of detectors deployed alongside the total bat passes recorded each month is presented in **Table 3**. The static detectors highlighted in red in **Table 3** were either not deployed for a particular month(s) during the six month survey period, or returned nil results due to a technical malfunction or interference. It would be inaccurate to rely solely on the data collected from the Hornsea Four bat static detector survey with regard to bat activity within these areas, however all those static detectors highlighted in red were deployed within a walked transect as part of the Hornsea Four bat activity survey, which was undertaken concurrently with the Hornsea Four static bat detector survey effort and therefore sufficient data is available to inform the baseline.

3.3.1.8 This technical annex should be read in conjunction with the following technical annexes for a full understanding of bat activity within the Hornsea Four bat study area:

- **Annex 3.10: Bat Activity Transect Survey Report Part A**; and
- **Annex 3.11: Bat Activity Transect Survey Report Part B**.

3.3.1.9 The survey team made the utmost effort to determine the species and numbers of commuting and/or foraging bats recorded by each static detector. The data analysis undertaken each month included the use of Kaleidoscope software's inbuilt function of automatic bat species recognition, followed by a manual audit. Therefore, due to human error and amount of data collected it is possible that some recordings may have been missed or overlooked.

3.3.1.10 However, despite the above limitations, the data presented in this report provides an accurate and robust baseline dataset with respect to commuting and/or foraging bats recorded during the surveys. The findings of this survey effort have been used to inform and support the ecological impact assessment set out in **Volume A3, Chapter 3: Ecology and Nature Conservation** of the Hornsea Four ES.

3.4 Weather Conditions

3.4.1.1 Table 2 summarises the weather conditions encountered during the Hornsea Four static bat detector survey period.

Table 2: Weather conditions during the Hornsea Four bat static detector survey effort.

Survey month	Static bat detector deployment dates	Weather conditions
May 2019	22nd May – 26th May	Moderate breeze, dry, overnight temperature between 8°C and 11°C
June 2019	25th June – 29th June	Moderate breeze, occasional showers, overnight temperature between 11°C and 13°C
July 2019	18th July – 22nd July	Light breeze, dry, overnight temperature between 10°C and 17°C
August 2019	13th August – 17th August	Moderate breeze, occasional showers, overnight temperature between 8°C and 17°C
September 2019	17th September – 21st September	Light breeze, dry, overnight temperatures between 5°C and 13°C
October 2019	10th October – 14th October	Light breeze, occasional showers, overnight temperatures between 8°C and 13°C.

Hornsea Four

Figure 2

Bat Survey Static Detector Locations

Sheet 1 of 14

515000 516000 517000 518000

462000 461000 460000

N

GRID NORTH

Static_S01

Static_S02

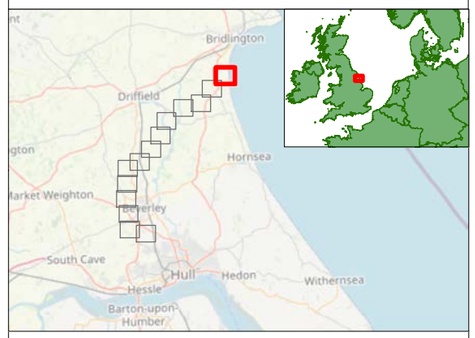
Order Limits

Bat Survey Area

Bat Static Detector

Deployed

No longer within survey area



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0 100 200 400 Metres

0 100 200 400 Yards

REV	REMARK	DATE
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Title: Bat Survey Static
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Approved by: CS

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Date: 18/06/2021 Author: 303273 Name: HOW04RH0107_BatSurveyStatic

513000
514000
515000
460000
459000
458000
N
GRID NORTH
Static_S02
Static_S03
Barmston
Licenses:
Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Date: 18/06/2021
Author: 303273
Name: HOW04RH0107_BatSurveyStatic

Hornsea Four

Figure 3

Bat Survey Static Detector Locations

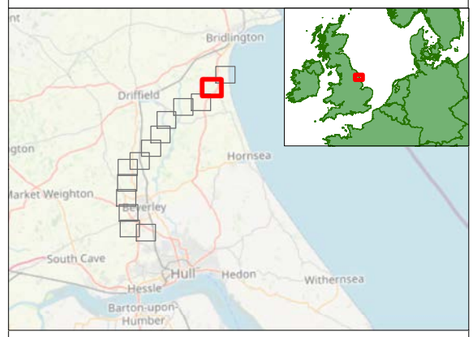
Sheet 2 of 14

Order Limits

Bat Survey Area

Bat Static Detector

No longer within survey area



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0 100 200 400 Metres

0 100 200 400 Yards

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511000 512000 513000 514000

457000

456000

N
GRID NORTH

Lissett

Static_S04

Static_S05

Static_S06

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Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Date: 18/06/2021 Author: 303273 Name: HOW04RH0107_BatSurveyStatic

Hornsea Four

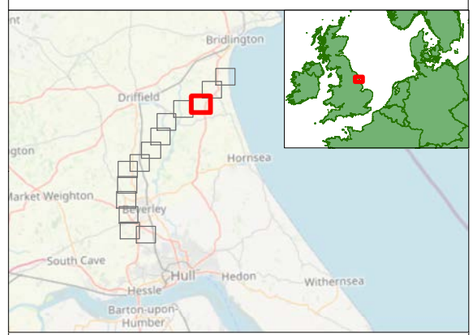
Figure 4

Bat Survey Static Detector Locations
Sheet 3 of 14

- Order Limits
- Bat Survey Area

Bat Static Detector

- Deployed
- No longer within survey area



Coordinate system: British National Grid
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0 100 200 400 Metres

0 100 200 400 Yards

REV	REMARK	DATE
	First Issue for DCO	18/06/2021

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Approved by: CS

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Hornsea Four

Figure 5

Bat Survey Static Detector Locations

Sheet 4 of 14

509000 510000 511000

457000 456000 455000

N

GRID NORTH

Static_S07

Static_S08

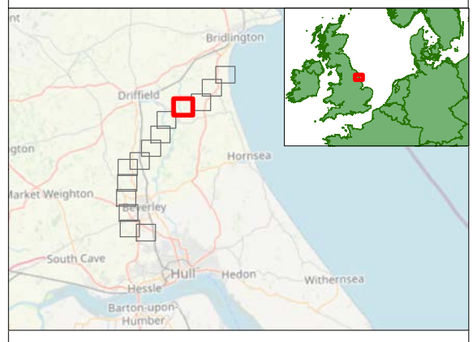
Foston on the Wolds

Order Limits

Bat Survey Area

Bat Static Detector

Deployed



Coordinate system: British National Grid

Scale@A3: 1:10,000

0 100 200 400 Metres

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REV	REMARK	DATE
	First Issue for DCO	18/06/2021

Title: Bat Survey Static
Document no: HOW04RH0107
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Date: 18/06/2021 Author: 303273 Name: HOW04RH0107_BatSurveyStatic

Hornsea Four

Figure 6

Bat Survey Static Detector Locations

Sheet 5 of 14

506000 507000 508000

455000 454000 453000

N

GRID NORTH

Static_S09

Static_S10

Static_S11

Brigham

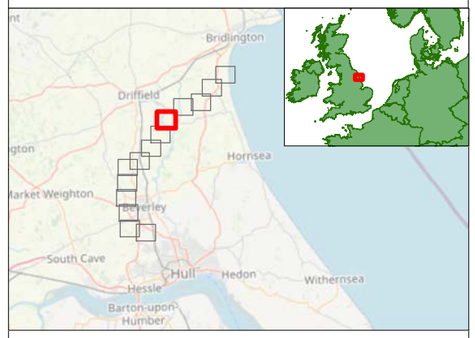
Order Limits

Bat Survey Area

Bat Static Detector

Deployed

No longer within survey area



Coordinate system: British National Grid

Scale@A3: 1:10,000

0 100 200 400 Metres

0 100 200 400 Yards

REV	REMARK	DATE
	First Issue for DCO	18/06/2021

Title: Bat Survey Static
Document no: HOW04RH0107
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Date: 18/06/2021 Author: 303273 Name: HOW04RH0107_BatSurveyStatic

Hornsea Four

Figure 7

Bat Survey Static Detector Locations

Sheet 6 of 14

505000 506000 507000

452000

451000

450000

N

GRID NORTH

Static_S12

Static_S13

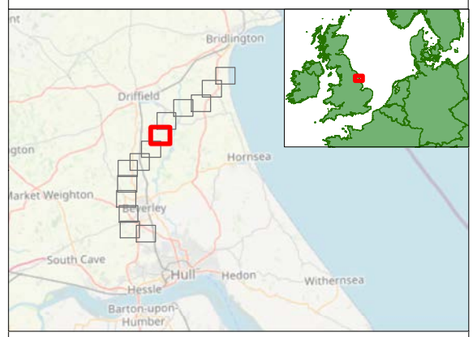
Rotsea

Order Limits

Bat Survey Area

Bat Static Detector

Not Deployed



Coordinate system: British National Grid

Scale@A3: 1:10,000

0 100 200 400 Metres

0 100 200 400 Yards

REV	REMARK	DATE
	First Issue for DCO	18/06/2021

Title: Bat Survey Static
Document no: HOW04RH0107
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Royal HaskoningDHV

Ørsted

Date: 18/06/2021 Author: 303273 Name: HOW04RH0107_BatSurveyStatic

503000
504000
505000

N
GRID NORTH

450000
449000
448000

Static_S14
Static_S15

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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Date: 18/06/2021 Author: 303273 Name: HOW04RH0107_BatSurveyStatic

Hornsea Four

Figure 8

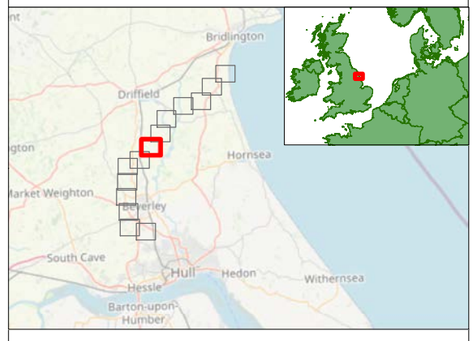
Bat Survey Static Detector Locations

Sheet 7 of 14

- Order Limits
- Bat Survey Area

Bat Static Detector

- Deployed



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Scale@A3: 1:10,000

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REV	REMARK	DATE
	First Issue for DCO	18/06/2021

Title: Bat Survey Static
Document no: HOW04RH0107
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Royal HaskoningDHV

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Hornsea Four

Figure 9

Bat Survey Static Detector Locations

Sheet 8 of 14

501000 502000 503000 504000

448000

447000

446000

N

GRID NORTH

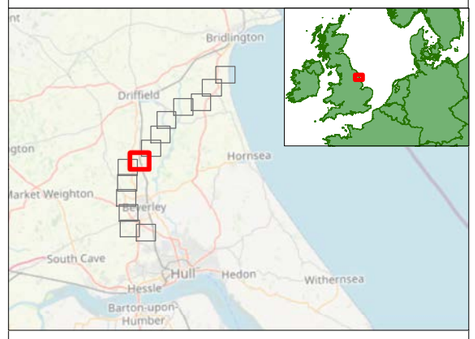
Static_S16

Order Limits

Bat Survey Area

Bat Static Detector

Deployed



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REV	REMARK	DATE
	First Issue for DCO	18/06/2021

Title: Bat Survey Static

Document no: HOW04RH0107

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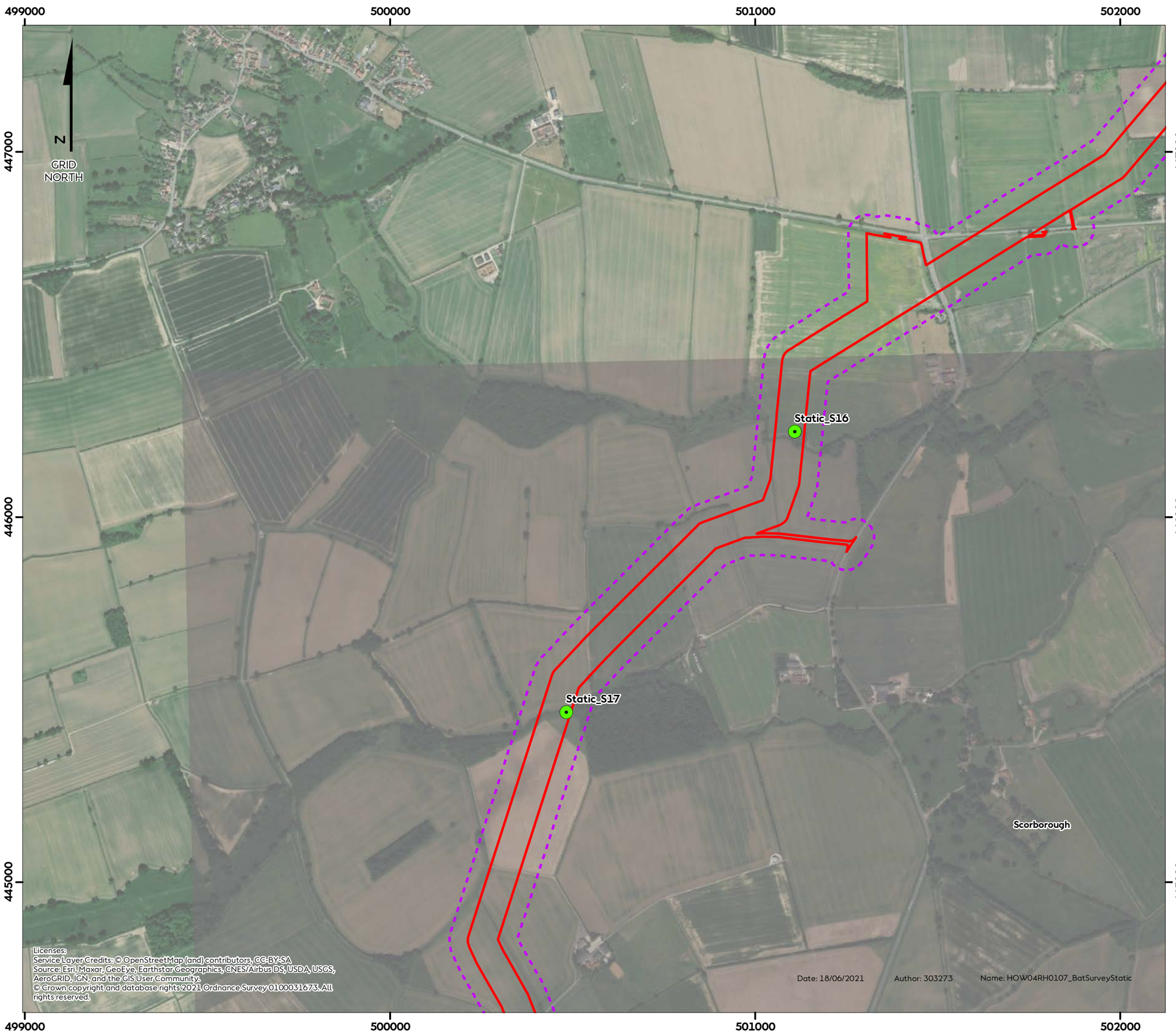
Date: 18/06/2021 Author: 303273 Name: HOW04RH0107_BatSurveyStatic



Hornsea Four

Figure 10

Bat Survey Static Detector Locations

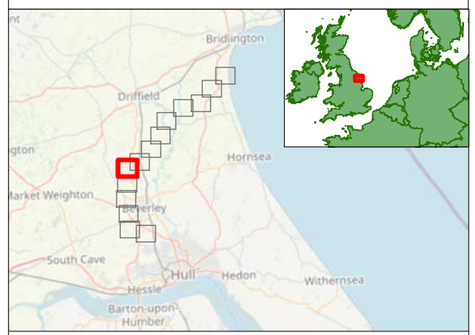
Sheet 9 of 14

Order Limits

Bat Survey Area

Bat Static Detector

Deployed



Coordinate system: British National Grid

Scale@A3: 1:10,000

0 100 200 400 Metres

0 100 200 400 Yards

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Title: Bat Survey Static
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499000 500000 501000 502000

444000

443000

N
GRID NORTH

Leconfield

Static_S18

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Date: 18/06/2021 Author: 303273 Name: HOW04RH0107_BatSurveyStatic

Hornsea Four

Figure 11

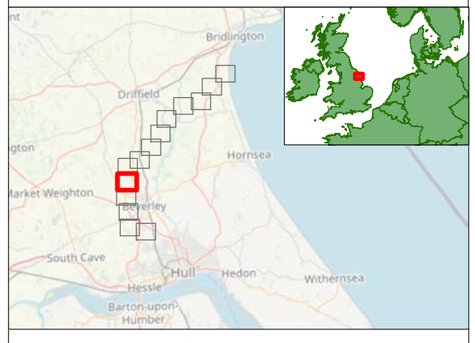
Bat Survey Static Detector Locations
Sheet 10 of 14

Order Limits

Bat Survey Area

Bat Static Detector

Not Deployed



Coordinate system: British National Grid
Scale@A3: 1:10,000

0 100 200 400 Metres

0 100 200 400 Yards

REV	REMARK	DATE
	First Issue for DCO	18/06/2021

Title: Bat Survey Static
Document no: HOW04RH0107
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Hornsea Four

Figure 12

Bat Survey Static Detector Locations

Sheet 11 of 14

499000 500000 501000

442000 441000 440000

N

GRID NORTH

Cherry Burton

Static_S19

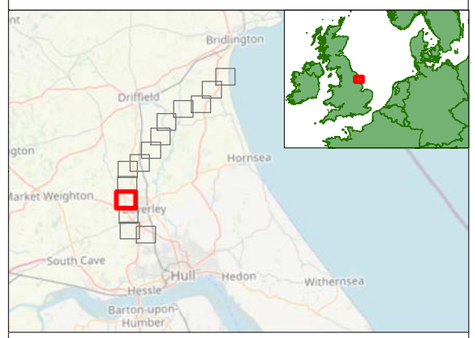
Static_S20

Order Limits

Bat Survey Area

Bat Static Detector

Not Deployed



Coordinate system: British National Grid

Scale@A3: 1:10,000

0 100 200 400 Metres

0 100 200 400 Yards

REV	REMARK	DATE
	First Issue for DCO	18/06/2021

Title: Bat Survey Static
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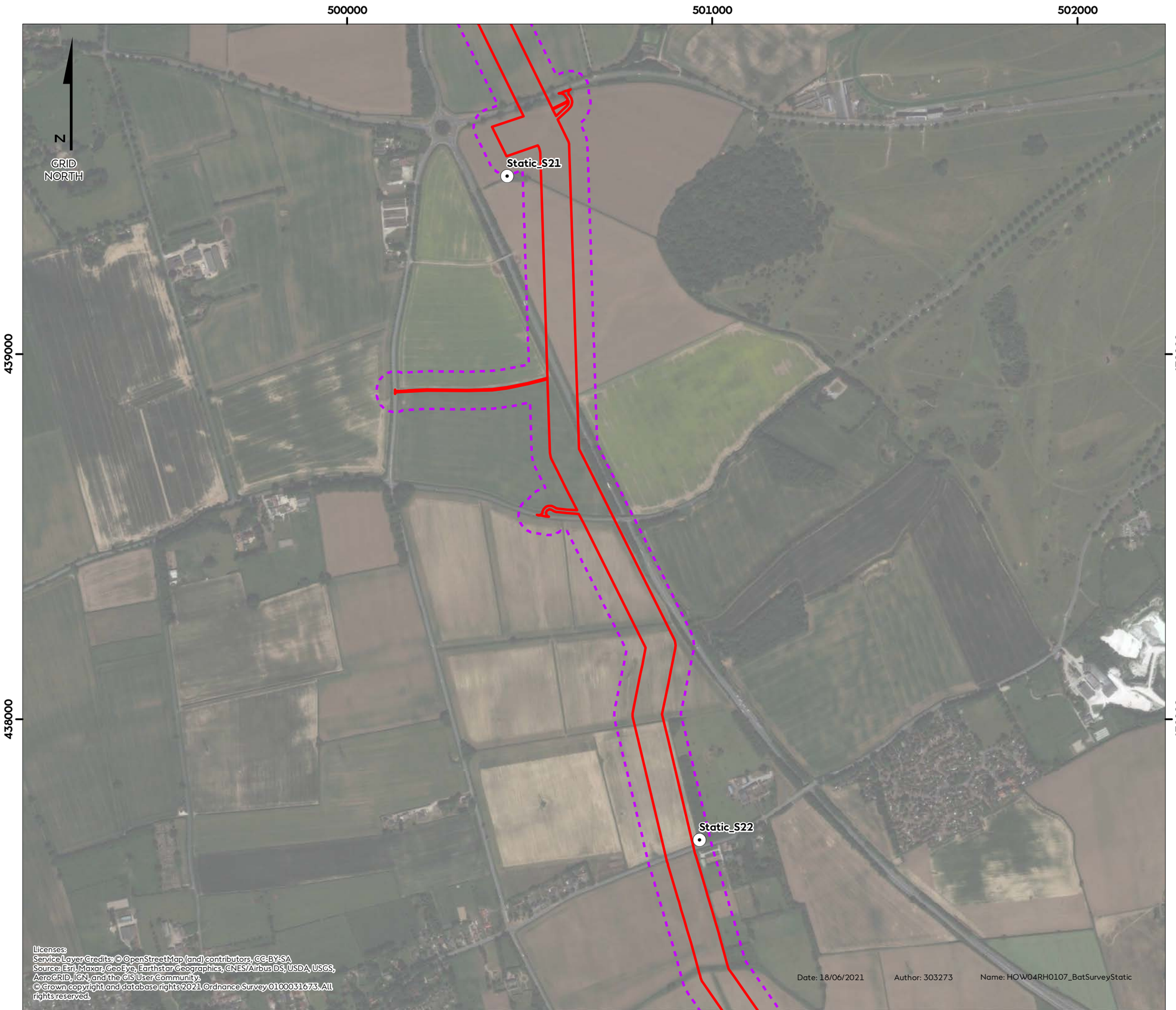
Date: 18/06/2021 Author: 303273 Name: HOW04RH0107_BatSurveyStatic

Hornsea Four

Figure 13

Bat Survey Static Detector Locations

Sheet 12 of 14

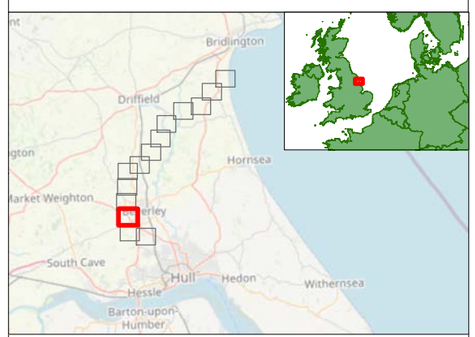


Order Limits

Bat Survey Area

Bat Static Detector

Not Deployed



Coordinate system: British National Grid

Scale@A3: 1:10,000

0 100 200 400 Metres

0 100 200 400 Yards

REV	REMARK	DATE
	First Issue for DCO	18/06/2021

Title: Bat Survey Static
Document no: HOW04RH0107
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

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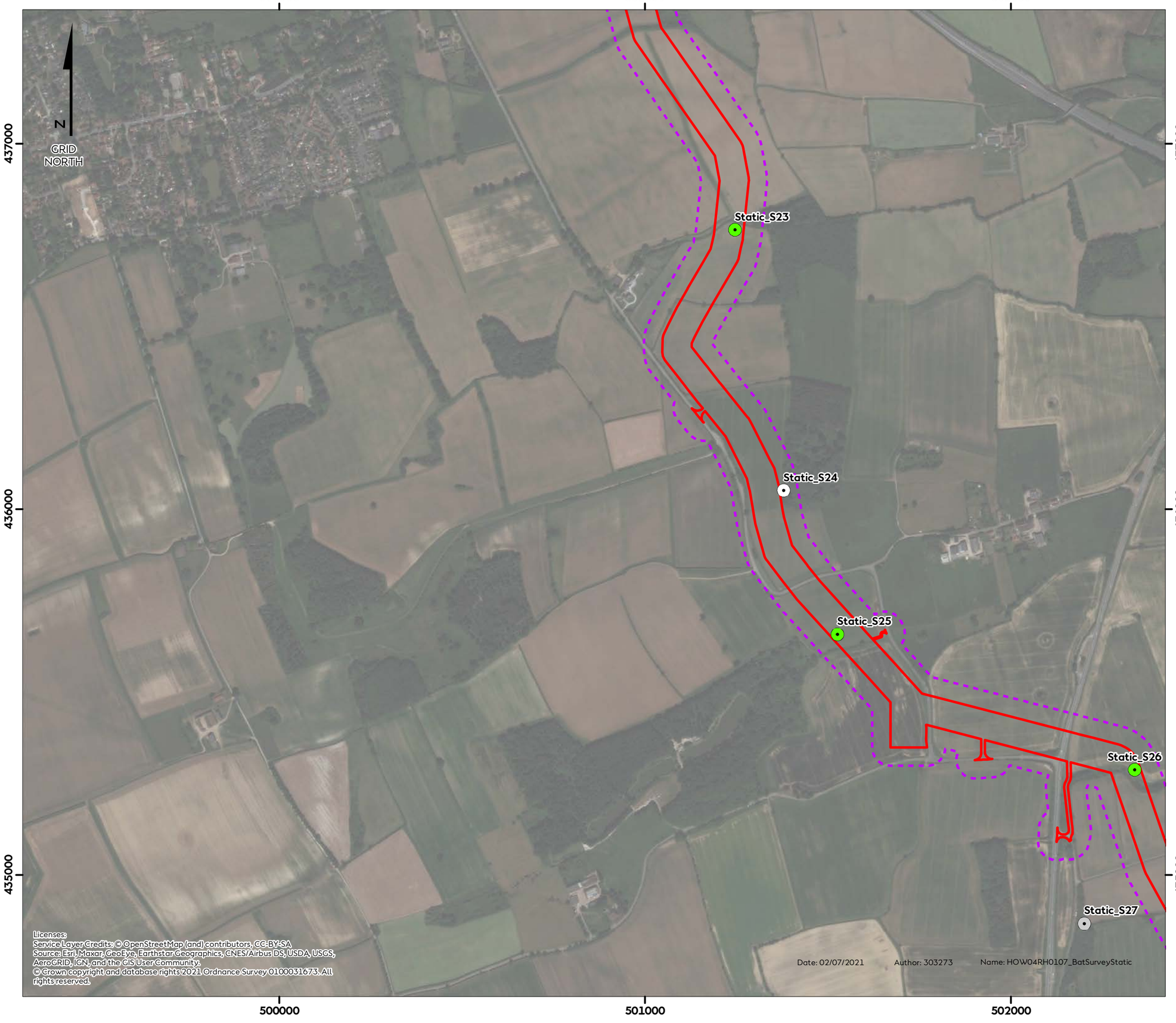
Hornsea Four

Figure 14

Bat Survey Static Detector Locations

Sheet 13 of 14

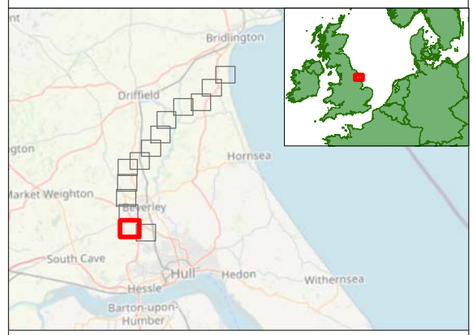


Order Limits

Bat Survey Area

Bat Static Detector

- Deployed
- Not Deployed
- No longer within survey area



Coordinate system: British National Grid

Scale@A3: 1:10,000

0 100 200 400 Metres

0 100 200 400 Yards

REV	REMARK	DATE
	First Issue for DCO	02/07/2021

Title: Bat Survey Static
Document no: HOW04RH0107
Created by: AZ
Checked by: CC
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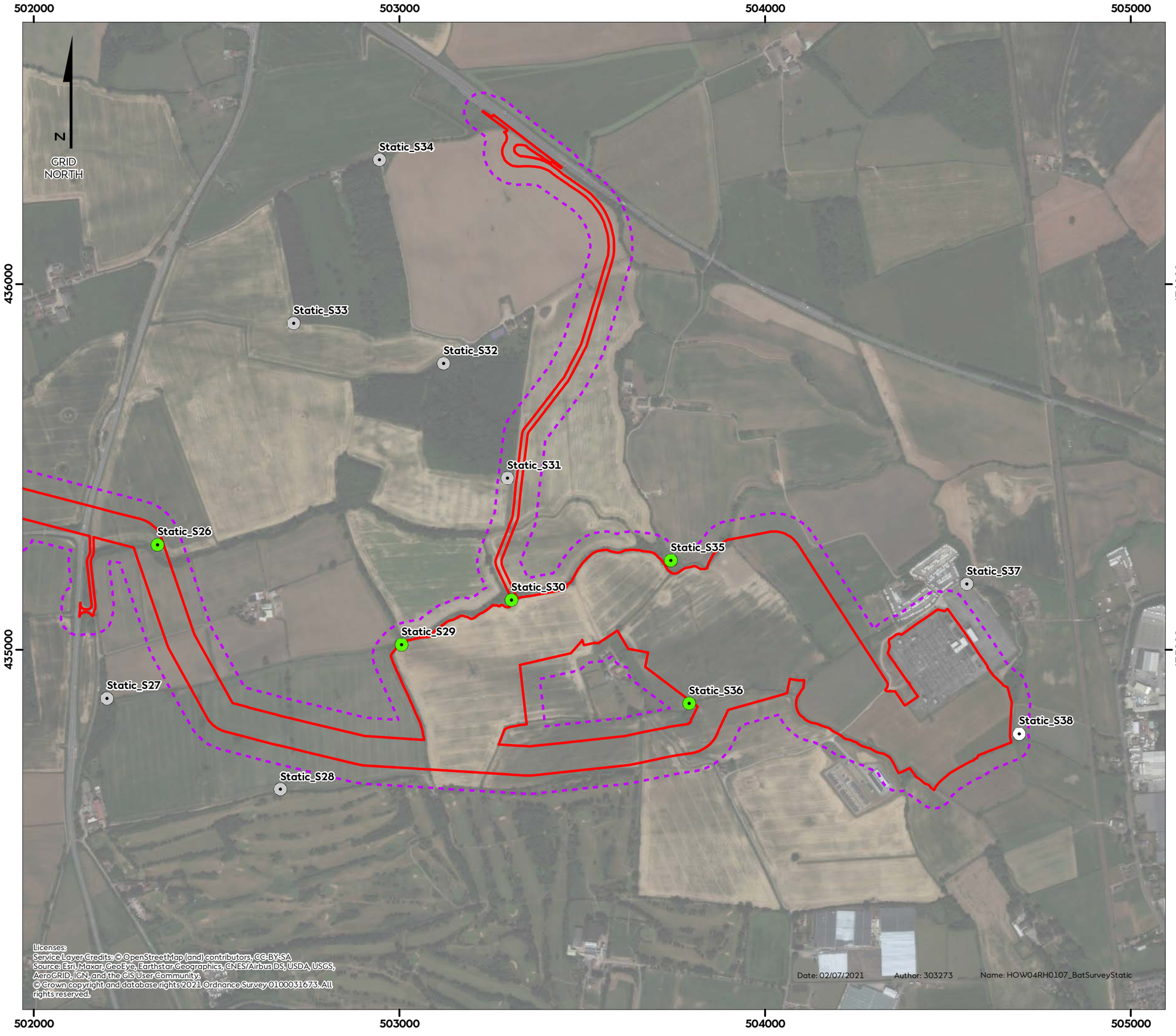
Date: 02/07/2021 Author: 303273 Name: HOW04RH0107_BatSurveyStatic

Hornsea Four

Figure 15

Bat Survey Static Detector Locations

Sheet 14 of 14



Order Limits

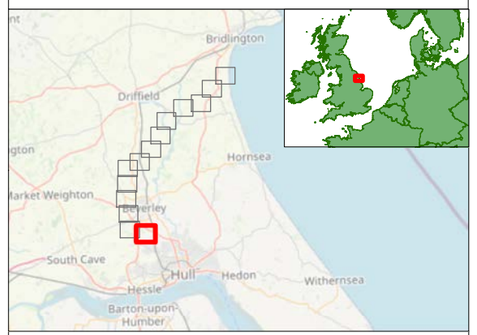
Bat Survey Area

Bat Static Detector

Deployed

Not Deployed

No longer within survey area



Coordinate system: British National Grid

Scale@A3: 1:10,000

0 100 200 400 Metres

0 100 200 400 Yards

REV	REMARK	DATE
	First Issue for DCO	02/07/2021

Title: Bat Survey Static
Document no: HOW04RH0107
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

4 Results

4.1.1.1 The following sections summarises the results obtained following the deployment of each static bat detector alongside an overview of the bat activity recorded throughout the surveying period. Full survey results and habitat descriptions for each area where a static detector had been deployed is presented in **Annex 3.9: Bat Static Detector Survey Report Part B**.

4.1.1.2 A summary of the total number of all bat passes recorded by each detector is presented in **Table 3** below. The static bat detectors highlighted in red in **Table 3** were either not deployed for a particular month(s) during the six month survey period, or returned nil results in certain months due to a technical malfunction of the equipment or interference (also highlighted in red). Valid data collected from these detectors in other months has been included in the baseline.

Table 3: Summary of recorded total monthly bat passes.

Static Detector Reference	May	June	July	August	September	October
Static_S01	807	117	7	0	27	13
Static_S05	0	103	0	7	103	0
Static_S06	27	0	62	0	139	100
Static_S07	0	352	56	0	21	56
Static_S08	400	357	369	1	0	65
Static_S09	0	0	0	77	0	0
Static_S11	28	0	292	46	89	4
Static_S14	258	381	534	58	128	17
Static_S15	40	402	132	244	0	77
Static_S16	175	0	0	36	165	0
Static_S17	245	0	152	31	39	46
Static_S23	111	718	316	26	0	2
Static_S25	0	0	0	99	0	1
Static_S26	0	0	0	2	0	465
Static_S29	0	263	220	21	0	11
Static_S30	0	0	0	591	0	754
Static_S35	3941	0	987	277	36	201
Static_S36	0	134	237	157	0	37

4.1.1.3 The species and number of passes shown in **Table 4** are those recorded by each static bat detector across the six-month survey period. The following acronyms have been used in **Table 4**:

- NP = Nathusias' pipistrelle;
- NP/CP = Nathusias' pipistrelle or Common pipistrelle;
- CP = Common pipistrelle;
- CP/SP = Common pipistrelle or Soprano pipistrelle; and

- SP = Soprano pipistrelle.

4.1.1.4 For a breakdown of the number of each species recorded per month, by each individual static bat detector during the Hornsea Four bat static detector survey period, please refer to **Annex 3.9: Bat Static Detector Survey Report Part B**.

Table 4: Total passes of all species recorded throughout the 2019 survey period.

Static detector reference	Bat species							
	NP	*NP/CP*	*CP*	*CP/SP*	*SP*	*Myotis spp.,*	*Noctule*	*Plecotus spp.,*
Static_S01	2	62	545	57	11	252	0	0
Static_S05	0	0	33	28	136	16	0	0
Static_S06	5	4	56	30	191	29	7	6
Static_S07	0	0	180	72	213	19	0	1
Static_S08	1	8	321	120	597	145	0	0
Static_S09	0	0	4	2	70	0	1	0
Static_S11	3	6	105	35	204	32	74	0
Static_S14	1	8	499	137	557	170	3	1
Static_S15	0	1	406	86	258	140	3	1
Static_S16	0	1	28	12	193	102	40	0
Static_S17	1	1	69	35	165	164	75	3
Static_S23	1	17	750	111	266	23	4	1
Static_S25	0	0	32	11	42	13	1	0
Static_S26	0	0	8	27	394	38	0	0
Static_S29	0	2	179	78	237	19	0	0
Static_S30	1	1	149	148	1,033	8	1	4
Static_S35	4	21	684	362	2,231	2,126	8	1
Static_S36	1	2	197	92	266	1	6	0

4.1.1.5 The most abundant species of bat recorded across the Hornsea Four bat static detector survey area were Soprano pipistrelle and Common pipistrelle. All 18 static detectors that had been deployed during 2019 recorded both species, with the highest total number of passes recorded at the following static detectors:

- Static_S23 – 1,127 passes (**Figure 14**);
- Static_S30 – 1,339 passes (**Figure 15**); and
- Static_S35 – 3,277 passes (**Figure 15**).

4.1.1.6 Static_S23 was deployed adjacent to Moor Lane Local Wildlife Site (LWS) and Static_S30 and Static_S35 were deployed adjacent to the hedgerow and Public Right of Way (PRoW) that runs along the northern edge of the OnSS.

4.1.1.7 A relatively high number of passes by *Myotis spp* was recorded throughout the Hornsea Four bat static survey effort. This species was recorded on all but one static bat detector deployed throughout the survey period. The highest number of passes of this species was recorded on Static_35 (2,126 total passes) (**Figure 15**).

4.1.1.8 A small number of passes (20 in total) from Nathusias' pipistrelle was recorded on ten of the 18 deployed static bat detectors throughout the survey period. The Nathusias' pipistrelle is a relatively common species of bat that is infrequently recorded in East Yorkshire, as shown by the results of the biological records data relating to bats received from NEYEDEC.

4.1.1.9 A total of 223 passes of noctule bats were recorded across 12 of the 18 deployed static bat detectors throughout the 2019 survey effort, with the highest number of passes recorded on Static_S11 (74 total passes) (**Figure 6**) and Static_S17 (75 total passes) (**Figure 10**). Static_S11 was deployed adjacent to the River Hull Headwaters Site of Special Scientific Interest (SSSI) and Static_S17 was deployed on the edges of the woodland adjacent to Bealey's Beck.

4.1.1.10 Another notable result from the Hornsea Four bat static detector survey was the 18 total passes recorded over eight different static detectors of the long-eared species groups *Plecotus spp.* These bats have been in decline within the UK in recent years and alongside the Soprano pipistrelle and noctule are noted as a species of principal importance (NERC 2006). Static detectors where *Plecotus spp.* have been recorded are as follows:

- Static_S06 (**Figure 4**);
- Static_S07 (**Figure 5**);
- Static_S14 and Static_S15 (**Figure 8**);
- Static_S17 (**Figure 10**);
- Static_S23 (**Figure 14**);
- Static_S30 and Static_S35 (**Figure 15**).

4.1.1.11 The calls recorded during the Hornsea Four bat static detector survey consisted of a both general echolocation calls (i.e. used by commuting bats) as well as social calls. A range of these calls across a range of species is presented within **Annex 3.9: Bat Static Detector Survey Report Part B**. In addition, all static detectors deployed showed a high frequency of feeding bats, indicating some important areas for foraging bats. This was particularly noted at the following static detectors:

- Static_S01 (**Figure 2**);
- Static_S05 and Static_S06 (**Figure 4**);
- Static_S07 and Static_S08 (**Figure 5**);
- Static_S14 and Static_S15 (**Figure 8**);
- Static_S17 (**Figure 10**);
- Static_S23 (**Figure 14**); and
- Static_S35 (**Figure 15**).

4.1.1.12 A full description of the habitat within which each static detector was deployed is presented in **Annex 3.9: Bat Static Detector Survey Report Part B**.

5 Summary and Conclusion

5.1.1.1 A total of 18 static bat detectors were deployed between May and October 2019 (inclusive). Each static bat detector was deployed for a total of five nights each month between May and October 2019 (inclusive).

5.1.1.2 The highest number of bat passes recorded during the Hornsea Four bat static detector survey were Soprano pipistrelle and Common pipistrelle, with both species being recorded by all 18 static detectors. The highest number of passes recorded were Static_S23 (**Figure 14**), Static_S30 (**Figure 15**) and Static_S35 (**Figure 15**). Bats from the *Myotis spp.,* were recorded on all but one of the static detectors deployed, with a total of 3,032 passes across the six-month survey period.

5.1.1.3 Recorded in lower numbers were bats from the *Plecotus spp.,* Nathusias' pipistrelle and noctule. These three species were recorded at a total of eight, ten and 12 different static detectors respectively. *Plecotus spp.,* Nathusias' pipistrelle, noctule and Soprano pipistrelle are all species of principal importance (NERC 2006).

5.1.1.4 Mitigation measures relating to foraging/commuting bats that will be adhered to during the construction works associated with the onshore aspects of Hornsea Four, as agreed with stakeholders through the onshore Evidence Plan Technical Panel meeting process, are presented in **Volume F2, Chapter 3: Outline Ecological Management Plan**.

6 References

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