

# Norfolk Vanguard Offshore Wind Farm

# Appendix 22.5

## Bat Emergence / Re-entry Survey Report

### Environmental Statement

### Volume 3 - Appendices

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*Photo: Kentish Flats Offshore Wind Farm*



# Environmental Impact Assessment Environmental Statement

Document Reference: PB4476-005-0225

June 2018

For and on behalf of Norfolk Vanguard Limited

Approved by: Ruari Lean, Rebecca Sherwood

Signed: 

Date: 8<sup>th</sup> June 2018



## **Norfolk Vanguard Bat emergence / re-entry surveys**

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Report prepared by Norfolk Wildlife Services Ltd.  
on behalf of Royal HaskoningDHV  
November 2017

Reference: 2016/131.3

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## 2. Executive Summary

2.1. The Extended Phase 1 Habitat Survey undertaken by Royal HaskoningDHV in February 2017 (Royal HaskoningDHV, 2017a) identified 53 potential roost features as providing “moderate” or “high” suitability for supporting roosting bats.

2.2. The purpose of the surveys was to ascertain whether roosting bats are present within these potential roost features.

2.3. The following guidance document was used to inform development of the survey methodology: Bat surveys for professional ecologists: good practice guidelines. Bat Conservation Trust. (Collins (Ed), 2016).

2.4. Surveys were not carried out at the following 13 sites due to access or surveying difficulties: BER006, 018, 096, 100, 114, 116, 117, 133, 229, 276, 318, 323 and 345. Access was withdrawn after the first survey at 5 sites: BER26, 56, 320, 344 and 349.

2.5. A total of 75 surveys were therefore carried out on 40 features.

2.6. Bats were observed emerging/re-entering from seven of the BER sites: 020, 022, 044, 166, 210, 287 and 306 and roosting bats are concluded as present within those potential roost features.

2.7. No bats were observed at those sites with single surveys, but the results should be regarded with caution.

2.8. For the 13 sites where no bat surveys took place no conclusions can be drawn as to the presence or absence of roosting bats.

### **3. Introduction**

#### **3.1. Project background**

3.1.1. Norfolk Vanguard is a proposed offshore wind farm being developed by Vattenfall Wind Power Limited (or an affiliate company), with a capacity of 1800MW, enough to power 1.3 million UK households. The offshore wind farm comprises two distinct areas, Norfolk Vanguard East (NV East) and Norfolk Vanguard West (NV West) and will be connected to the shore by offshore export cables installed within the provisional offshore cable corridor. The project will also require onshore infrastructure in order to connect the offshore wind farm to the National Grid at the existing National Grid substation at Necton, which in summary will comprise the following:

- Landfall;
- Cable relay station (if required);
- Underground cables;
- Onshore substation; and
- Extension to the existing Necton National Grid substation.

3.1.2. The location of the onshore electrical infrastructure is shown on Figure 1, Appendix A: of the Extended Phase 1 Habitat Survey Report (Royal HaskoningDHV, 2017a). Collectively the onshore electrical infrastructure is herein referred to as the 'onshore project area'.

3.1.3. During the development of the project, the onshore Scoping Area that was initially defined has been refined, to include three landfall options, associated cable relay search zones, as well as an onshore substation search zone in proximity to the Necton National Grid substation. A 200m wide cable corridor has been identified within which the buried cable will be located, and Horizontal Directional Drilling (HDD) zones and mobilisation zones have been identified along the cable corridor.

3.1.4. The surveys described within this report were designed and based on the onshore project area which was in use when the project Extended Phase 1 Habitat Survey was undertaken (February 2017). As the project design is further refined, these search zones will decrease in size, and the final options for the siting of infrastructure (i.e. one cable relay station, one landfall, one onshore substation) will be taken forward for the final Development Consent Order (DCO) application in June 2018.

#### **3.2. Aim of report**

3.2.1. As Norfolk Vanguard is a Nationally Significant Infrastructure Project (NSIP) an Environmental Impact Assessment (EIA) is required as part of a DCO application under the Planning Act 2008.

3.2.2. Norfolk Wildlife Services were appointed in late April 2017 to undertake additional ecological surveys to support this application as set out within the Survey Scope (Royal HaskoningDHV, 2017b).

3.2.3. The Extended Phase 1 Habitat Survey (Royal HaskoningDHV, 2017a) identified the potential for legally protected species located within the project area plus a 50m buffer surrounding the project area, and provided recommendations for further surveys required to characterise the ecological baseline for the project area.

### **3.3. Survey objective**

3.3.1. To ascertain whether roosting bats are present within those potential roost features identified by the Extended Phase 1 Habitat Survey (Royal HaskoningDHV, 2017a) as providing “moderate” or “high” suitability for supporting roosting bats.

### **3.4. Survey scope**

#### **3.4.1. Development of survey scope**

3.4.1.1. A Scoping Report for the EIA (Royal HaskoningDHV, 2016) was submitted to the Secretary of State on 3 October 2016 and the response in the form of a Scoping Opinion (PINS, 2016) published on 11 November 2016. That Scoping Opinion included the consultation responses of Natural England and Norfolk County Council.

3.4.1.2. An Extended Phase 1 Habitat Survey of the onshore project area was undertaken during February 2017 (Royal HaskoningDHV, 2017a). The Extended Phase 1 Habitat Survey identified the potential for legally protected species located within the project area plus a 50m buffer surrounding the project area, and provided recommendations for further surveys required to characterise the ecological baseline for the project area. These recommendations were issued to stakeholders on 17 March 2017 for comment, as part of the project Evidence Plan Process. Feedback was received from Norfolk County Council and Natural England on the 23 March 2017 and 3 April 2017 respectively that the methodologies were appropriate and acceptable.

3.4.1.3. A Survey Scope detailing the surveys required in order to deliver the Extended Phase 1 Habitat Survey Report recommendations (Royal HaskoningDHV, 2017b) was produced in March 2017. The Survey Scope (set out in Section 3.4.2) was used to tender for delivery of ecological surveys required for the project. Norfolk Wildlife Services based the methodology on this Survey Scope in consultation with the client.

#### **3.4.2. Survey Scope**

##### *Survey areas*

3.4.2.1. Following the Bat Conservation Trust's (BCT) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Ed.) (2016), all trees and structures assessed as providing moderate or high suitability to support roosting bats would require additional surveys (i.e. emergence / re-entry surveys) in order to confirm the likely presence and/or absence of a bat roost.

3.4.2.2. The Extended Phase 1 Habitat Survey identified a total of 53 separate features as being within this category. All 53 of these features will be subject to emergence / re-entry surveys.

3.4.2.3. The location of the trees and structures described above are shown in Appendix 2 of this report.

##### *Methodology*

3.4.2.4. The emergence / re-entry surveys would be undertaken in accordance with the methodology outlined in the BCT's Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Ed.) (2016). For each tree/structure, two survey visits (i.e. one dusk emergence survey and one dawn re-entry survey) would be required. Each dusk emergence survey will commence 15 minutes before sunset, and cease 1.5-2 hours after sunset; whereas the dawn re-entry survey will commence 1.5-2 hours before sunrise, and cease 15 minutes after sunrise. The surveys will be at least two weeks apart, and will be undertaken between May and September with one survey visit between May and August.

3.4.2.5. Bat detectors (any type) and recording equipment to record any echolocation calls will be used for each survey. Laboratory sound-analysis will be used to identify the calls of any bat species picked up using the bat detectors. Species, timing, and activity will be noted for each bat picked up during the survey.

3.4.2.6. Weather conditions including temperature, wind speed and precipitation, will be recorded at the start and end of each survey visit. Surveys will not be carried out when the temperature is below 10°C at sunset, or during heavy rain or strong wind unless justified by the surveying ecologist.

3.4.2.7. All surveyors will hold BCT Professional Training Standard Level One, as set out in the BCT's Professional Training Standards for Ecological Consultants (2012). All surveyors will also adhere to the CIEEM's Professional Code of Conduct.

### ***3.5. Scoping of survey locations***

3.5.1. There were 53 potential roost sites identified in the Extended Phase 1 Habitat Survey (Royal HaskoningDHV, 2017a).

3.5.2. The locations of these potential roost sites are shown within Maps 1-25 within the Extended Phase 1 Habitat Survey Report (Royal HaskoningDHV, 2017a).

## 4. Methodology

4.1. Section 4.1 sets out the proposed survey protocol as agreed between Royal HaskoningDHV and Norfolk Wildlife Services prior to any field work commencing, and Section 4.2 sets out how the surveys were delivered in relation to the protocol and identifies any deviations or modifications that took place during the delivery phase.

### 4.1. Survey protocol

4.1.1. This Section details the proposed survey protocol as agreed between Royal HaskoningDHV and Norfolk Wildlife Services prior to any field work commencing.

#### *Relevant guidance*

4.1.2. The following guidance document was used to inform development of the survey methodology: Collins, J. (Ed.). (2016). Bat surveys for professional ecologists: good practice guidelines. Bat Conservation Trust.

#### *Survey locations*

4.1.3. Survey locations are described in the table in Appendix 1 and are presented on maps in Appendix 2.

#### *Survey methodology*

4.1.4. For each tree or structure identified as providing 'moderate' potential, two survey visits will be carried out, consisting of one dusk emergence survey and one dawn re-entry survey.

4.1.5. For a single tree feature<sup>1</sup> identified within Royal HaskoningDHV (2017a) as of 'high' potential, a third survey visit will be conducted. This third visit can be a dawn or dusk survey.

4.1.6. For each dusk emergence, the survey will commence 15 minutes before sunset, and cease 1.5-2 hours after sunset; the dawn re-entry survey will commence 1.5-2 hours before sunrise, and cease 15 minutes after sunrise.

4.1.7. Species, timing, and activity will be noted for each bat identified as emerging, potentially emerging or re-entering from any potential roost feature. Weather conditions including temperature, wind speed and precipitation, will be recorded at the start and end of each survey visit.

4.1.8. Field observation will be relied upon as the primary method for species identification. Surveyors will record the behavior of emerging or returning to roost bats at sites, and note the certainty with which any bats were seen to be roosting as "possible", "probable" or "certain". Expert judgement will be used in the field to determine the certainty that the bats observed are emerging or roosting. The identification of any bats emerging, potentially emerging or re-entering will subsequently be confirmed based on recordings (where this is applicable and possible). Many bats do not echolocate on emergence, so identification may sometimes rely on flight pattern or circumstantial evidence.

4.1.9. The surveys will focus on surveying bats roosting within the identified tree or structure and as such, although other records of bats may be collected, these will be incidental to the surveys.

4.1.10. Where a surveyor is significantly limited in their ability to see the surveyed tree or structure, this limitation will be noted.

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<sup>1</sup> See tree Ref 323 within maps of that report

4.1.11. A record of any relevant records of emerging bats will be saved within a compressed ZCA (Zero-Crossings Analysis) format, which makes the data visible as sonograms.

4.1.12. For the structures additional survey coverage is required therefore additional surveyors will be involved at these sites.

#### *Survey timing and weather conditions*

4.1.13. The surveys will be at least two weeks apart, and will be undertaken between May and September with one survey visit between May and August.

4.1.14. Surveys will not be carried out when the temperature is below 10°C at sunset/sunrise, or during heavy rain or strong wind unless justified by the surveying ecologist.

#### *Equipment*

4.1.15. For each survey, suitable bat detectors will be used as well as recording equipment to record any echolocation calls of emerging or potentially emerging bats.

4.1.16. A record will be kept of the model of detector used by each surveyor.

#### *Personnel*

4.1.17. All surveys will be undertaken by suitably experienced bat surveyors, who will either be members of CIEEM or act according to its code of conduct.

4.1.18. Each tree will generally have a single surveyor. An additional safety worker will be present, but will only assist the surveyor (e.g. by note taking) and will not take part in the survey.

4.1.19. For the structures where additional coverage is required, additional surveyors will be involved at the site.

## **4.2. Survey delivery**

4.2.1. The following section details how the work was delivered in relation to the protocol and identifies any deviations or modifications that took place during the delivery phase. The protocol was followed for the emergence surveys as far as possible or reasonable. Variations from this are noted in Table 3, Survey Limitations.

### **4.2.1. Survey methodology as delivered**

#### *Access to survey sites*

4.2.1.1. It was not possible to survey all 53 of the sites as landowner access permission was not granted to all sites.

4.2.1.2. Access was not granted for 11 “moderate” sites: BER18, 96, 100, 114, 116, 117, 133, 229, 276, 318 and 345.

4.2.1.3. Access was not granted for 1 “high” site: BER323.

4.2.1.4. BER006 could not be found at the specified location and therefore was not surveyed.

4.2.1.5. Surveys were therefore only commenced at 40 sites.

#### *Survey effort*

4.2.1.6. Access permission was withdrawn after the first survey on 5 sites: BER26, 56, 320, 344 and 349.

4.2.1.7. A total of 75 surveys were therefore carried out on 40 features.

### *Timing and weather conditions*

4.2.1.8. The weather conditions and timings during the surveys are given in the following table. An assessment of any related limitations for each survey can be found in 4.2.2. Limitations.

4.2.1.9. Wind strength was recorded using the Beaufort Wind Scale (BWS) an empirical measure for describing wind intensity based on observed conditions.

### *Dates of surveys*

4.2.1.10. Please see the following Table for dates of surveys at the sites.

*Table 1 : Dates, personnel and weather for bat emergence surveys*

Site	Survey date	Main surveyor	Sunrise/sunset	Survey time	Temperature (°C)	Weather conditions
BER004	15/05/17	Karl Charters	20:45	20:30 - 22:35	16°C	BWS4, Overcast 100% cloud cover
BER004	14/07/17	Ben Christie	04:48	02:45 - 05:15	17 °C	BWS1, 25% cloud cover
BER010	12/05/17	Carolyn Smith	20:40	20:30 - 22:15	15°C to 8°C	BWS0, 60% cloud cover
BER010	19/07/17	Carolyn Smith	04:45	03:00 - 04:55	18°C	BWS 3, 75% cloud cover
BER016	12/05/17	Karl Charters	20:40	20:30 - 22:35	c. 15°C	BWS2, 50% cloud cover, sunny, dry
BER016	19/07/17	Ben Christie	04:45	03:00 - 04:50	18°C to 15°C	BWS 3, 75% cloud cover
BER020	24/08/17	Sally McColl	20:07	19:45 - 21:32	18°C to 14°C	BWS 0, 10% cloud cover
BER020	06/09/17	Sally McColl	06:14	04:51 - 06:30	11.5°C	BWS 2, 25% cloud cover, clear
BER021	26/07/17	Sally McColl	20:56	20:45 - 22:45	18°C	BWS 3-4, 100% cloud cover, dry
BER021	22/08/17	Sally McColl	05:48	04:20 - 05:50	18°C to 17°C	BWS 0, 100% cloud cover
BER022	25/07/17	Sue Traer	20:58	20:46 - 22:31	17.8°C to 14°C	BWS0, dry, clear
BER022	30/08/17	Sue Traer	06:00	04:26 - 06:18	14.6°C	BWS0 100% cloud cover
BER023	25/08/17	Carolyn Smith	19:58	19:43 - 22:00	17°C to 16°C	BWS1, 40% cloud cover, dry
BER023	25/09/17	Carolyn Smith	06:45	04:45 - 07:00	14°C to 13°C	BWS1, 80% cloud cover, dry
BER025	16/05/17	James Goldsmith	20:46	20:37 - 22:32	20°C	BWS2. 100% cloud cover
BER025	01/08/17	Carolyn Smith	05:14	03:20 - 05:30	14°C	BWS 2, 80% cloud cover, dry
BER026	16/05/17	Abi Gray	20:46	20:33 - 22:48	18°C	BWS1, 100% cloud cover
BER032	08/06/17	James Allitt	21:15	21:15 - 23:15	15°C	BWS 4, 10% cloud cover, damp
BER032	26/07/17	Carolyn Smith	05:05	03:05 - 05:25	16°C	BWS 2, 60% cloud cover, dry
BER038	19/05/17	Karl Charters	20:51	20:45 - 22:33	c. 10°C	BWS1, 100% cloud cover, dry
BER038	11/08/17	Carolyn Smith	05:30	03:35 - 05:55	13°C	BWS1, 60% cloud cover, dry, BWS1
BER043	03/08/17	James Allitt	20:43	20:23 - 22:15	19°C to 17°C	BWS4 to 5, 60% cloud cover, dry
BER043	24/08/17	Ben Christie	05:52	04:00 - 06:05	16°C to 15°C	BWS0, 10% cloud cover, dry
BER044	31/07/17	Sue Traer	20:48	20:34 - 22:21	18.9°C to 15.6°C	BWS1, 85% to 95% cloud cover.
BER044	03/08/17	Carolyn Smith	05:45	04:15 - 06:00	c. 19°C	BWS 2, 70% cloud cover, dry
BER047	21/06/17	Ben Christie	21:22	20:56 - 22:52	c. 20°C	BW1, 10% cloud cover, dry

Site	Survey date	Main surveyor	Sunrise/sunset	Survey time	Temperature (°C)	Weather conditions
BER047	15/08/17	Ben Christie	05:37	03:40 - 05:40	15°C	BWS1, 60% cloud cover, light rain from 05.25
BER050	26/09/17	James Allitt	18:43	18:30 - 20:09	13°C	BWS0, 50% light cloud cover, dry
BER050	05/10/17	James Allitt	07:03	05:05 - 07:20	14°C	BWS2, 75% cloud cover, dry
BER056	11/05/17	Abi Gray	20:45	20:40 - 22:41	12°C	BWS1, 50% cloud cover, sunny, dry
BER078	03/08/17	James Allitt	20:30	20:45 - 21:36	c. 19°C	BWS1, Light rain at start becoming consistent
BER078	05/09/17	Ben Christie	06:00	04:00 - 06:10	c.15°C	BWS0, 75% cloud cover, dry
BER087	19/06/17	James Allitt	21:18	21:22 - 23:00	19°C	BWS2, good clear
BER087	17/08/17	James Allitt	05:30	03:30 - 05:15	10°C	BWS1, good clear
BER138	22/05/17	Sue Traer	20:55	20:40 - 22:25	16°C	BWS0, 15% high cloud cover, warm
BER138	08/08/17	Sue Traer	05:25	03:50 - 05:37	16°C - 14°C	BWS0, 50% cloud cover
BER166	30/06/17	Sally McColl	21:21	21:07 - 22:52	15°C	BWS2, 100% cloud cover at start
BER166	14/07/17	Carolyn Smith	04:48	02:50 - 05:10	13°C	BWS1 to 2, 60% cloud cover at start
BER174	19/06/17	Sue Traer	21:21	21:07 - 22:55	23.4°C - 22.1°C	BWS0, 40% high cloud cover
BER174	15/08/17	Sue Traer	05:32	03:58 - 05:45	15.3°C - 14.6°C	BWS0, 40% cloud cover at start
BER175	19/06/17	Carolyn Smith	21:18	21:02 - 23:00	23°C	BWS0, 40% cloud cover ,dry
BER175	15/08/17	Carolyn Smith	05:35	03:55 - 05:45	15°C	BWS0 40% to 100% cloud cover
BER179	19/06/17	Carolyn Smith	21:21	21:05 - 22:52	23°C	BWS0, 50% cloud cover, humid, dry
BER179	21/08/17	Sally McColl	05:45	03:45 - 06:00	14.6°C - 13.5°C	BWS2, 60% high cloud cover, dry
BER201	12/07/17	Sally McColl Becky Banks	21:15	21:00 - 22:45	16°C - 14°C	BWS0, 25% cloud cover, dry
BER201	30/08/17	Sally McColl	05:58	04:30 - 06:00	15°C	BWS0 to 2, 100% cloud cover, dry
BER210	22/09/17	Ben Christie / John Worthington- Hill Chris Bawler	18:53	18:37 - 20:46	15°C	BWS0, 0% cloud cover, dry
BER210	02/10/17	Ben Christie /John Worthington Hill Carolyn Smith	06:57	05:10 - 07:12	15°C - 13°C	BWS3 to 4, 100% cloud cover dry
BER214	24/05/17	Carolyn Smith	20:58	20:50 - 22:35	17°C	BWS0, 40% cloud cover, dry
BER214	05/09/17	Sue Traer	06:12	04:12 - 06:30	15°C	BWS0, 70% cloud cover, dry
BER232	10/07/17	Sally McColl	21:17	21:02 - 22:47	17.3°C - 15.9°C	30% cloud cover
BER232	31/08/17	Sue Traer	06:04	04:05 - 06:20	16°C - 14.5°C	BWS1, 30% cloud cover, dry
BER271	19/07/17	Ben Christie	21:06	20:42 - 23:00	19°C - 18°C	BWS2, 75% cloud cover
BER271	31/08/17	Ben Christie	06:03	04:00 - 06:03	12°C	BWS0, 50% cloud cover, Dry, mist forming
BER287	05/07/2017	James Allitt Chris Bawler	21:19	21:05 - 22:50	15°C	BWS0, 60% cloud cover, dry
BER287	26/09/17	Sally McColl Lisa Treadwell	06:47	05:20 - 07:05	14°C	BWS1, 50% cloud cover
BER288	05/07/17	Sue Traer	21:19	21:04 - 22:05	17°C	BWS1, 25 cloud cover, dry
BER288	06/10/17	James Allitt	07:04	05:28 - 07:10	10.8°C - 10.4°C	BWS2, 70% cloud cover

Site	Survey date	Main surveyor	Sunrise/sunset	Survey time	Temperature (°C)	Weather conditions
BER289	05/07/17	Sally McColl	21:19	21:05 - 22:50	15°C	BWS0, 60% cloud cover, dry
BER289	06/10/17	Sally McColl	07:04	05:25 - 07:05	10.6°C	BWS4, 30% cloud cover
BER292	03/07/17	Sue Traer	21:20	21:05 - 22:50	17.9°C - 14.9°C	BWS1, 60% cloud cover to 20%
BER292	12/09/17	Sue Traer	06:24	04:50 - 06:30	11°C - 10.1°C	BWS1, 5% cloud cover, dry
BER306	07/06/17	Sally McColl	21:15	21:00 - 22:45	17.1°C - 15.7°C	BWS2, 20% cloud cover
BER306	25/09/17	Sally McColl	06:45	05:20 - 06:50	14°C	BWS1, 100% cloud cover, dry with low mist
BER308	17/07/17	Sally McColl	21:08	20:55 - 22:40	14°C	BWS1, 5% cloud cover, dry
BER308	25/09/17	Sally McColl	06:45	05:15 - 06:50	14°C	BWS 1, 100% cloud cover, mist over grassland
BER311	25/07/17	Sally McColl	20:59	20:42 - 22:32	14°C	BWS 0, 10% cloud cover
BER311	22/09/17	Sally McColl	06:40	05:12 - 06:50	13°C	BWS 3, 100% cloud cover
BER314	24/07/17	Carolyn Smith	20:59	20:40 - 22:30	15°C to 13°C	BWS 1, 30% cloud cover, dry
BER314	11/09/17	James Allitt	06:22	04:20 - 06:35	14°C	BWS 3, 100% cloud cover
BER315	24/07/17	James Allitt	20:59	20:43 - 22:30	15°C - 13°C	BWS 1, 40% cloud cover
BER315	22/09/17	James Allitt	06:40	04:40 - 06:55	15.5°C - 13°C	BWS 2, 60% cloud cover
BER320	01/08/17	Ben Christie	20:46	20:30 - 22:20	17°C - 16°C	BWS0, 50% cloud cover, dry
BER344	26/06/17	Sue Traer	21:22	21:07 - 22:54	16°C - 11.1°C	BWS1, 70% cloud cover, dry
BER349	03/07/17	Ben Christie	21:20	21:05 - 22:50	18°C	BWS0, 60% cloud cover, dry

## Personnel and Equipment

4.2.1.11. All surveys were undertaken by experienced bat surveyors, who are listed below in Table 2 below. Surveyors were accompanied by a safety worker on all surveys.

4.2.1.12. Bat surveys were undertaken using a handheld Batbox detector and Edirol recording device or an Echo Meter Touch Pro bat detector.

4.2.1.13. BER210 and BER287 had multiple main surveyors as these were buildings requiring more than one experienced surveyor.

Table 2 : Surveyor experience

Team member	Experience	Memberships	Equipment used
James Allitt	14 years' experience of ecological surveying, including bats		Batbox Duet
Karl Charters	20 years' experience in ecological surveying, including bats. Holds a level 1 bat licence <sup>2</sup>		Batbox Duet
Ben Christie	5 years' experience in ecological surveying, including bats. Holds a level 1 bat licence	GradCIEEM	Batbox Duet
James Goldsmith	8 years' experience in ecological surveying, including bats. Holds a level 1, 3 and 4 bat licence		Echo Meter Touch
Abi Gray	6 years' experience in ecological surveying, including bats. Holds a level 2 bat licence	ACIEEM	Echo Meter EM3
Ben Moore	2 years' experience of ecological surveying, including bats	GradCIEEM	Batbox Duet
Sally McColl	10 years' experience of ecological surveying, including bats		Batbox Duet
Carolyn Smith	4 years' experience of ecological surveying, including bats	GradCIEEM	Batbox Duet
Sue Traer	15 years' experience in ecological surveying, including bats. Holds a level 1 bat licence	MCIEEM	Echo Meter Touch
John Worthington-Hill	6 years' experience in ecological surveying, including bats.		Batbox Duet
Lisa Treadwell	8 years' experience of ecological surveying, including bats		Batbox Duet
Chris Bawler	2 years' experience of ecological surveying, including bats.		Batbox Duet

## 4.2.2. Limitations

4.2.2.1. The information provided for each tree or structure was, in some instances, found to not correspond to the tree or structure found at the location provided. For example, on occasion tree species information or tree location was found to not correspond with the photos provided to NWS. Where this discrepancy occurred, this was recorded in Appendix 1: Site descriptions.

4.2.2.2. Table 3 : Survey limitations assesses the limitations to the surveys by site, and the significance of the impact. Features with access restrictions have been highlighted.

<sup>2</sup> All licences are issued by Natural England.

Level 1 allows holders to disturb bats using torches when doing surveys, research or conservation work

Level 2 allows holders to disturb bats using torches, endoscopes and nets when doing surveys, research or conservation work

Level 3 allows holders to use mist nets and acoustic lures when doing surveys, research or conservation work

Level 4 allows holders to use harp traps and acoustic lures when doing surveys, research or conservation work

Table 3 : Survey limitations

Survey Location	Access limitations, including any visibility issues	Weather and time limitations	Survey effort	Limitation to survey results
BER004	None	None		-
BER006	Tree not found	Not applicable	Not applicable	<b>Unclear</b> : Potential duplicate record
BER010	None	12.05.17 heavy rain and thunderstorm before start of dusk survey - survey start postponed until 10 minutes after sunset.	Two surveys, dawn and dusk	<b>No impact.</b> No bat activity was recorded on either survey.
BER016	None	12.05.17 started 10 minutes before sunset. 19.07.17 Heavy rain (thunderstorm) before start, survey ended 5 minutes after sunrise due to heavy rain	Two surveys, dawn and dusk	<b>No impact.</b> 12.05.17 - First bat recorded 30 minutes after start of survey. 19.07.17- No bat activity observed within last 40 minutes.
BER018	Access permission not granted	Not applicable	No nocturnal surveys	<b>Significant impact.</b> Unable to assess any potential roost status.
BER020	None	None	Two surveys, dawn and dusk	None
BER021	None	26.07.17 started 10 minutes before sunset. Windy (BWS3-4). 22.08.17 finished 2 minutes after sunrise due to bat inactivity and bright daylight.	Two surveys, dawn and dusk	<b>No impact.</b> 26.07.17 - First bat recorded 20 minutes after start of survey. Bat activity levels similar to observed on second survey. 22.08.17 – No bat activity observed within last 25 minutes.
BER022	None	None	Two surveys, dawn and dusk	None
BER023	None	None	Two surveys, dawn and dusk	None
BER025	None	16.05.17 started 9 minutes before sunset due to slight rain at start of survey time.	Two surveys, dawn and dusk	<b>No impact.</b> First activity recorded 1 hour after start of survey.
BER026	Access permission withdrawn after 1 <sup>st</sup> survey	16.05.17 light rain until 21:10 on survey	Single dusk survey; no dawn	<b>Moderate impact.</b> Unable to carry out second survey. Dusk survey recorded low activity and no emergence.
BER032	None	08.06.17 started at sunset to allow for windy conditions to die down (BWS4).	Two surveys, dawn and dusk	<b>No impact.</b> First activity recorded 30 minutes after start of survey.
BER038	None	19.05.17 started 6 minutes before sunset. Temperature ~10°C	Two surveys, dawn and dusk	<b>No impact.</b> First activity recorded 20 minutes after start of survey.

Survey Location	Access limitations, including any visibility issues	Weather and time limitations	Survey effort	Limitation to survey results
BER043	None	03.08.17 windy (BWS4)	Two surveys, dawn and dusk	<b>No Impact.</b> Bat activity observed was of similar levels to second survey at BER043.
BER044	None	31.07.17 rain showers throughout survey	Two surveys, dawn and dusk	<b>No Impact.</b> 31.07.17 – Bat activity observed was of similar levels to second survey at BER044.
BER047	None	15.08.17 stopped 3 minutes after sunrise due to bat inactivity and bright daylight.	Two surveys, dawn and dusk	<b>No impact.</b> 15.08.17 – No bat activity observed within last hour.
BER050	None	None	Two surveys, dawn and dusk	<b>None</b>
BER056	Access permission withdrawn after 1 <sup>st</sup> survey	11.05.17 started 5 minutes before sunset	Single dusk survey; no dawn	<b>Moderate impact.</b> First bat activity recorded 50 minutes after start of survey.
BER078	None	03.08.17 finished 1 hour after sunset. Light rain at start becoming consistent.	Two surveys, dawn and dusk	<b>No impact.</b> 03.08.17 - Bat activity ceased 20 minutes before end of survey.
BER087	None	17.08.17 stopped 15 minutes before sunrise due to bat inactivity and bright daylight.	Two surveys, dawn and dusk	<b>No impact.</b> No bat activity was recorded on the survey.
BER096	Access permission not granted	Not applicable	No nocturnal surveys	<b>Significant impact.</b> Unable to assess any potential roost status.
BER100	Access permission not granted	Not applicable	No nocturnal surveys	<b>Significant impact.</b> Unable to assess any potential roost status.
BER114	Access permission not granted	Not applicable	No nocturnal surveys	<b>Significant impact.</b> Unable to assess any potential roost status.
BER116	Access permission not granted	Not applicable	No nocturnal surveys	<b>Significant impact.</b> Unable to assess any potential roost status.
BER117	Access permission not granted	Not applicable	No nocturnal surveys	<b>Significant impact.</b> Unable to assess any potential roost status.
BER133	Access permission not granted	Not applicable	No nocturnal surveys	<b>Significant impact.</b> Unable to assess any potential roost status.
BER138	None	08.08.17 rain preceding survey	Two surveys, dawn and dusk	<b>No impact.</b> 08.08.17 – Bat activity observed was of similar levels to first survey at BER138.
BER166	None	30.06.17 intermittent periods of light drizzle towards end of survey	Two surveys, dawn and dusk	<b>No impact.</b> Bat activity continued through rain showers.
BER174	None	15.08.17 Survey ended with a light shower increasing to heavy shower	Two surveys, dawn and dusk	<b>No impact.</b> Bat activity observed was of similar levels to first survey at BER174.
BER175	None	None	Two surveys, dawn and dusk	<b>None</b>
BER179	None	None	Two surveys, dawn and dusk	<b>None</b>

Survey Location	Access limitations, including any visibility issues	Weather and time limitations	Survey effort	Limitation to survey results
BER201	None	30.08.17 stopped 2 minutes after sunrise due to bat inactivity and bright daylight.	Two surveys, dawn and dusk	<b>No impact.</b> No bat activity observed within last 20 minutes.
BER210	None	02.10.17 windy (BWS3-4) on dawn survey	Two surveys, dawn and dusk	<b>No impact.</b> No bat activity recorded on this survey but emergence and constant foraging had been observed on the first survey.
BER214	None	24.05.17 started 8 minutes before sunset due to difficulties in finding the tree.	Two surveys, dawn and dusk	<b>None</b>
BER229	No access permission	Not applicable	No nocturnal surveys	<b>Significant impact.</b> Unable to assess any potential roost status.
BER232	None	10.07.17 light rain increasing to end of survey	Two surveys, dawn and dusk	<b>No impact.</b> Activity continued through rain and activity of similar levels to second survey at BER232.
BER271	None	31.08.17 stopped at sunrise due to bat inactivity and bright daylight.	Two surveys, dawn and dusk	<b>No impact.</b> No bat activity observed within last 50 minutes.
BER276	Access permission not granted	Not applicable	No nocturnal surveys	<b>Significant impact.</b> Unable to assess any potential roost status.
BER287	None	None	Two surveys, dawn and dusk	<b>None</b>
BER288	None	06.10.17 stopped 6 minutes after sunrise due to bat inactivity and bright daylight.	Two surveys, dawn and dusk	<b>No impact.</b> No bat activity observed within last 20 minutes.
BER289	None	06.10.17 stopped 2 minutes after sunrise due to bat inactivity and bright daylight.	Two surveys, dawn and dusk	<b>No impact.</b> No bat activity observed within last 25 minutes.
BER292	None	12.09.17 stopped 6 minutes after sunrise due to bat inactivity and bright daylight.	Two surveys, dawn and dusk	<b>No Impact.</b> No bat activity was observed throughout the survey.
BER306	None	07.06.17 rain for last 20 minutes of survey 29.09.17 stopped 5 minutes after sunrise due to bat inactivity and bright daylight.	Two surveys, dawn and dusk	<b>No Impact.</b> 07.06.17 – Bat activity continued throughout the rain. 29.09.17 – No bat activity observed within last 30 minutes.
BER308	None	None	Two surveys, dawn and dusk	<b>None</b>
BER311	None	22.09.17 stopped 10 minutes after sunrise due to bat inactivity and bright daylight.	Two surveys, dawn and dusk	<b>No impact.</b> No bat activity observed within last 25 minutes.

Survey Location	Access limitations, including any visibility issues	Weather and time limitations	Survey effort	Limitation to survey results
BER314	None	None	Two surveys, dawn and dusk	<b>None</b>
BER315	None	None	Two surveys, dawn and dusk	<b>None</b>
BER318	Access permission not granted	Not applicable	No nocturnal surveys	<b>Significant impact.</b> Unable to assess any potential roost status.
BER320	Access permission withdrawn after 1 <sup>st</sup> survey	None	Single dusk survey; no dawn	<b>Moderate impact.</b> Unable to carry out a dawn survey. Dusk survey recorded low activity and no emergence.
BER323	Access permission not granted	None	Single dusk survey; no dawn	<b>Significant impact.</b> Unable to assess any potential roost status.
BER344	Access permission withdrawn after 1 <sup>st</sup> survey	None	Single dusk survey; no dawn	<b>Moderate impact.</b> Unable to carry out a dawn survey. Dusk survey recorded constant foraging along hedgerow but no emergence.
BER345	Access permission withdrawn before surveys begun	None	Single dusk survey; no dawn	<b>Significant impact.</b> Unable to assess any potential roost status.
BER349	Access permission withdrawn after 1 <sup>st</sup> survey	None	Single dusk survey; no dawn	<b>Moderate impact.</b> Unable to carry out a dawn survey. Dusk survey recorded low activity and no emergence.

## 5. Results

5.1. A description of each site can be found in Appendix 1: Site descriptions.

5.2. The surveys where emergence or re-entry was recorded are shown in Table 4 : Identified roosts with species and type. Expert judgement was used by the surveyors to determine the certainty that the bats observed were emerging or roosting

5.3. Bats were observed emerging/re-entering from 7 of the potential roost features (highlighted in pink Table 5 : Details of emergence results for each site below). 5 of the roosts were identified as individual day roosts<sup>3</sup> and 2 were small group day roosts (2-3 bats observed). No maternity roosts<sup>4</sup> were observed in any of the features, but some of the later surveys would be outside of the optimum period for detection of maternity roosts which is between the beginning of May to the end of August.

5.4. For BER26, 56, 320, 344 and 349, no bats were observed emerging, but no dawn was carried out at any of the sites and the results must be regarded with caution.

5.5. For all other sites where two surveys took place, there was no observed emergence or return to roost at dawn. This is strong evidence for the absence of bat roosts at these sites.

*Table 4 : Identified roosts with species and type*

Location	Species	Type of roost	Numbers observed	Observations
BER 020	Pipistrelle spp. (probable)	Day roost, non-breeding	1-2	Possible perching and emergence; probable soprano based on bats recorded around this time; Likely re-entry probable pipistrelle based on bats recorded around this time.
BER 022	Soprano pipistrelle (certain)	Day roost, non-breeding	1-2	Certain return to roost
BER 044	Brown Long-eared (certain)	Day roost, non-breeding	1	Certain emergence
BER 166	Soprano pipistrelle (probable)	Day roost, non-breeding	1	Possible emergence; pipistrelle, probably soprano based on bats recorded around this time
BER 210	Soprano pipistrelle (certain)	Day roost, non-breeding	1	Possible emergence
BER 287	Soprano pipistrelle (certain) and Pipistrelle sp. (probable)	Day roost, non-breeding	2	Certain return to roost
BER 306	Common pipistrelle (probable)	Day roost, non-breeding	1	Possible emergence single bat, likely pipistrelle species based on bats recorded around this time

<sup>3</sup> A day roost is where individual bats, or small groups of males, rest or shelter in the day

<sup>4</sup> A maternity roost is where pregnant female bats gather together in warm, safe places to have their young. Some groups of bats return to the same site every year.

Table 5 : Details of emergence results for each site

Survey Location	Emergence / re-entry observed	Species and type of roost	Notes on emergence	Additional notes on related bat activity
BER004	None	N/A	N/A	Potential maternity roost south of location, in woodland.
BER006	NO SURVEY	N/A	N/A	NO SURVEY
BER010	None	N/A	N/A	No bat activity observed.
BER016	None	N/A	N/A	Constant activity around woodland of Common pipistrelle.
BER018	NO SURVEY	N/A	N/A	NO SURVEY
BER020	Yes	Small group day roost of pipistrelle	24.08.17 Dusk survey: 20:05, Possible single bat perching/entering BER 20; no echolocation. Probable Soprano pipistrelle based on survey observations. 20:10, Possible emergence of 1 bat from tree on east side. Ditto. 06.09.17 Dawn survey: 06:10 and 06:15, 2 separate bats circled the tree and flew at the limb. Not observed to come out of tree. No echolocation. Likely pipistrelle based on other bats observed up until this time.	1-2 common and soprano pipistrelle bats constantly foraging along tree line and around canopy of tree and grassland. Well connected to hedgerows/trees/grassland.
BER021	None	N/A	N/A	Well connected to hedgerows/trees/grassland. Pipistrelles (soprano and common) foraging along tree line and around canopy of tree and surrounding grassland and verges.
BER022	Yes	Soprano pipistrelle. Small group day roost.	30.08.17 Dawn survey: 06:13, Soprano pipistrelle (1, possibly 2 bats) returned to roost within a mature ash tree with dense ivy.	Constant foraging by soprano pipistrelle over trees and along road throughout survey period.
BER023	None	N/A	N/A	Mainly foraging over trees.
BER025	None	N/A	N/A	Nothing of note to report.
BER026	None	N/A	N/A	Nothing of note to report
BER032	None	N/A	N/A	Nothing of note to report.
BER038	None	N/A	N/A	Nothing of note to report.
BER043	None	N/A	N/A	Nothing of note to report.
BER044	Yes	Brown Long-eared Individual day roost.	31.07.17 dusk survey: 21:43, Single Brown Long-eared emerged from the tree.	Constant foraging by pipistrelle bats around tree canopy and along adjacent hedgerow throughout survey period. Occasional pass by noctule and serotine during survey period.

Survey Location	Emergence / re-entry observed	Species and type of roost	Notes on emergence	Additional notes on related bat activity
BER047	None	N/A	N/A	Nothing of note to report.
BER050	None	N/A	N/A	Several bats using hedgerow which BER50 is a part of as a foraging and commuting route.
BER056	None	N/A	N/A	Nothing of note to report.
BER078	None	N/A	N/A	Nothing of note to report.
BER087	None	N/A	N/A	Very low bat activity.
BER096	NO SURVEY			NO SURVEY
BER100	NO SURVEY			NO SURVEY
BER114	NO SURVEY			NO SURVEY
BER116	NO SURVEY			NO SURVEY
BER117	NO SURVEY			NO SURVEY
BER133	NO SURVEY			NO SURVEY
BER138	None	N/A	N/A	Well connected to hedgerow and meadow, important foraging and commuting bat habitat.
BER166	Yes	Probable Soprano pipistrelle Individual day roost.	30.06.17 Dusk survey: 21:56, Possible emergence from south side of tree of single pipistrelle sp. No echolocation. Probable soprano pipistrelle based on bats recorded around this time.	Constant foraging along hedge line and under canopy of oak by common and soprano pipistrelles. Maximum of 3 bats seen foraging together.
BER174	None	N/A	N/A	Nothing of note to report.
BER175	None	N/A	N/A	Very little bat activity.
BER179	None	N/A	N/A	Nothing of note to report.
BER201	None	N/A	N/A	Well connected with other trees. Common and soprano pipistrelles constantly foraging along track and around trees most of evening and up to around and past target tree.
BER210	Yes	Soprano pipistrelle Individual day roost.	22.09.17 Dusk survey: 19:33 Likely emergence from barn roof of single soprano pipistrelle.	Constant foraging by Soprano pipistrelle
BER214	None	N/A	N/A	Lots of foraging up and down the green lane.
BER229	NO SURVEY			NO SURVEY

Survey Location	Emergence / re-entry observed	Species and type of roost	Notes on emergence	Additional notes on related bat activity
BER232	None	N/A	N/A	Constant foraging by common pipistrelle over trees and along defunct hedgerow between fields and footpath.
BER271	None	N/A	N/A	Nothing of note to report.
BER276	NO SURVEY			NO SURVEY
BER287	Yes	Soprano pipistrelle and <i>pipistrelle</i> sp. Small group day roost.	26.09.17 Dawn survey: 06:30, Entry of bat into north side of roof single Soprano pipistrelle. 06:37, Entry of bat into north side of roof. No echolocation but likely pipistrelle based on size and bats recorded up until this time.	Constant foraging around tree line to the north east by common and soprano pipistrelles. Noctule, Natterer's and brown long-eared also recorded.
BER288	None	N/A	N/A	Nothing of note to report.
BER289	None	N/A	N/A	Nothing of note to report.
BER292	None	N/A	N/A	Some foraging by common pipistrelle over trees and along hedgerow, generally in grassland area to north of hedgerow/tree.
BER306	Yes	Individual day roost. Probable Common pipistrelle	07.06.17 Dusk survey: 21:37, possible emergence from south of tree trunk of single bat, likely pipistrelle species. No echolocation. Probable Common pipistrelle based on other bats recorded around this time.	Constant foraging along ditch under canopy by pipistrelle bats. Two faint passes by Noctule and one pass by Barbastelle during survey period.
BER308	None	N/A	N/A	Constant foraging around canopy and along tree line by pipistrelle bats.
BER311	None	N/A	N/A	Constant foraging along tree line by pipistrelle bats.
BER314	None	N/A	N/A	Lots of foraging along tree line by common pipistrelle.
BER315	None	N/A	N/A	Nothing of note to report.
BER318	NO SURVEY			NO SURVEY
BER320	None	N/A	N/A	Nothing of note to report.
BER323	NO SURVEY			NO SURVEY
BER344	None	N/A	N/A	Constant foraging and social calling by pipistrelles along hedgerow and adjacent road throughout survey.
BER345	NO SURVEY			NO SURVEY
BER349	None	N/A	N/A	Nothing of note to report.

## 5.1. Incidental records

5.1.1. Other species observed on the surveys are shown in Table 4.

Table 6 : Incidental records of other species recorded at survey sites.

Survey Location	Incidental records
BER010	Green woodpecker heard nearby
BER020	Large rookery nearby
BER021	Large rookery nearby
BER025	3 x tawny owls observed, swallow, roe deer and muntjac deer also observed on site
BER078	Kingfisher, barn owl, otter
BER175	Badger and tawny owl observed in vicinity of tree
BER201	Barn owl flew along field margin and tawny owl was heard calling most of evening
BER308	Tawny owl heard calling and barn owl seen flying
BER311	Tawny owl and oystercatcher heard calling and roe deer seen
BER315	Tawny owl heard close by

## 6. Conclusions

6.1. A total of 75 surveys were carried out on 40 features identified by the Extended Phase 1 Habitat Survey (Royal HaskoningDHV, 2017a) as providing “moderate” or “high” suitability for supporting roosting bats between May and September 2017.

6.2. Bats were observed emerging/re-entering from seven of the BER sites: 020, 022, 044, 166, 210, 287 and 306 and roosting bats are concluded as present within those potential roost features.

6.3. No surveys were carried out at 12 sites due to access restrictions and access was withdrawn after the first survey for 5 sites. One feature did not exist.

6.4. No bats were observed at those sites with single surveys, but the results should be regarded with caution.

6.5. Where no bat surveys took place, no conclusions can be drawn as to the presence or absence of roosting bats.

## 7. Bibliography

Collins, J. (Ed.). (2016). Bat surveys for professional ecologists: good practice guidelines. Bat Conservation Trust.

Royal HaskoningDHV (2016). Norfolk Vanguard Offshore Wind Farm Environmental Impact Assessment Scoping Report. (Doc Ref PB4476-102-001).

Royal HaskoningDHV (2017a). Norfolk Vanguard Offshore Wind Farm Extended Phase 1 Habitat Survey Report (Document ref: PB4476-003-040)

Royal HaskoningDHV (2017b) PB4476.003.041 Environmental Impact Assessment Phase 2 Ecological Surveys Scope April 2017 (Document ref. PB4476.003.041)

## Appendix 1: Site descriptions

Sites in grey had no access granted.

Survey Site	GPS co-ordinates	Habitat Suitability Assessment <sup>5</sup>	Description of site <sup>6</sup>	Surveyor amended/additional description	Discrepancies in location or species
BER004	TF9131209398	Moderate	Mature ivy clad oak tree with multiple splits/cracks and large hole		No
BER006	TF9172409295	Moderate	Group of 2 mature alder trees, 1 ivy clad, crevices visible	Trees were not found at this location. Two visits were made.	Yes
BER010	TF9190909744	Moderate	Group of mature (5) oak trees, splits and cracks visible, good surrounding commuting habitat available		No
BER016	TF9209410271	Moderate	Mature ash, pollarded with holes suitable for roosting	Younger ash, couple of holes, loose bark and tear which could be suitable for roosting.	Yes
BER018	TF9239910338	Moderate	Barns adjacent to arable fields and semi improved grassland, hedgerows nearby for commuting. Buildings have tiled roofs, in generally good condition but with plenty of cracks	N/A	N/A
BER020	TF9703214823	Moderate	Mature ivy clad oak tree. Ivy provides PRFs.		No
BER021	TF9699614830	Moderate	Mature ivy clad oak tree. Ivy provides PRFs.		No
BER022	TF9693414826	Moderate	Mature ivy clad oaks (line of 10). Ivy provides PRFs.	Mature trees covered with dense ivy and appear to have holes/cracks suitable for bats.	No
BER023	TF9689314730	Moderate	Mature ash ivy clad. Ivy provides PRFs. On good commuting feature.		No
BER025	TF9120809557	Moderate	Cluster of mature ivy clad oak/ash, some dead trees; set on edge of small woodland plantation		No
BER026	TF9109709646	Moderate	Group of 2 mature oaks with visible holes and splits		No
BER032	TF9130811046	Moderate	Group of mature trees within woodland with cracks and splits		No
BER038	TF9085310880	Moderate	Group of mature ivy clad oak trees in woodland ; good surrounding habitat consisting of hedgerows and ponds		No

<sup>5</sup> Source: Royal HaskoningDHV (2017b)

<sup>6</sup> Source: Royal HaskoningDHV (2017b)

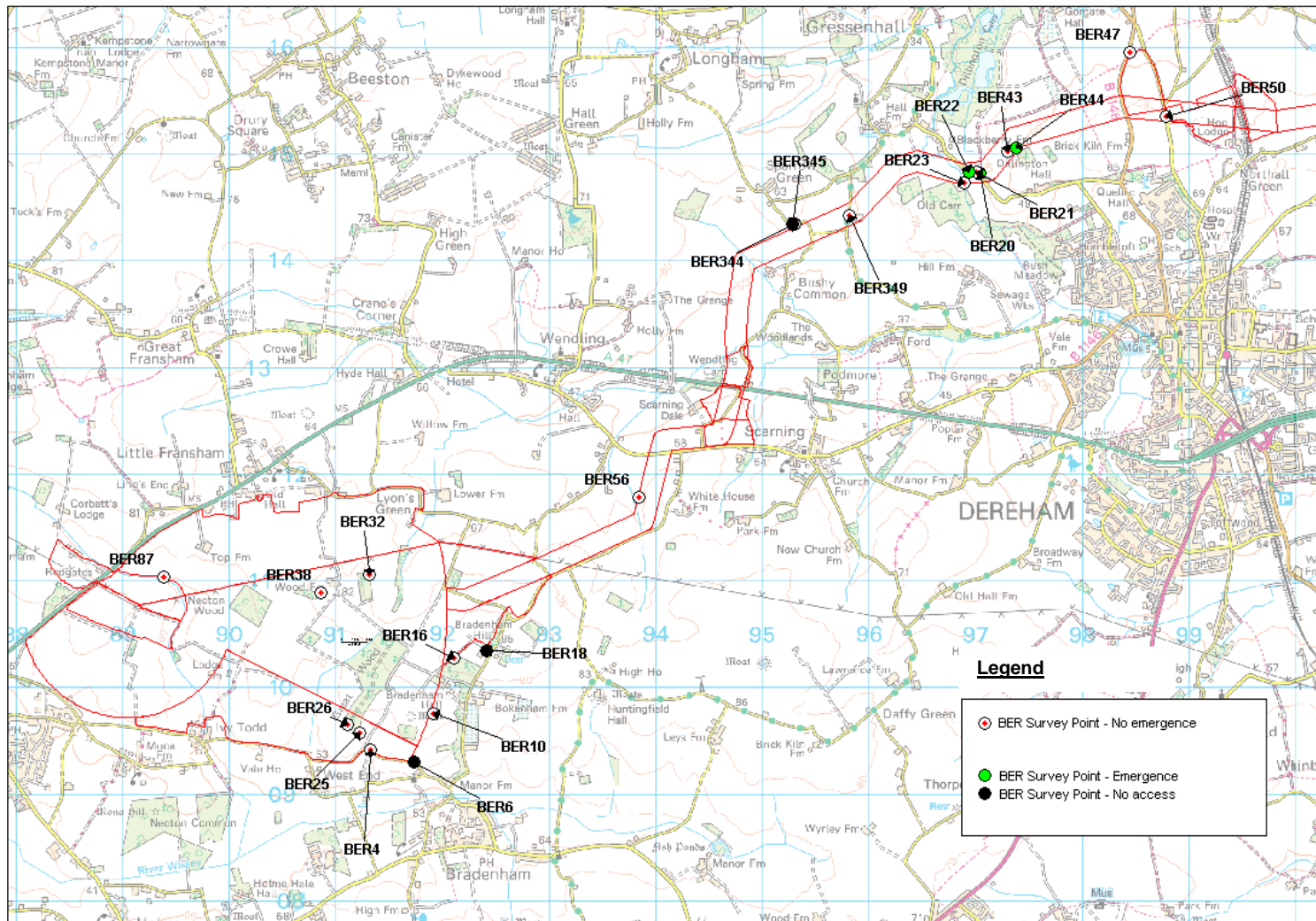
Survey Site	GPS co-ordinates	Habitat Suitability Assessment <sup>5</sup>	Description of site <sup>6</sup>	Surveyor amended/additional description	Discrepancies in location or species
BER043	TF9729115026	Moderate	Over-Mature oak, decayed trunk, suitable for small-moderate roost		No
BER044	TF9737315054	Moderate	Large crack down side of mature oak. 2 bat boxes installed.	Single mature oak at the end of a hedgerow at edge of arable field and at field entrance. Cracks and holes within tree providing suitable roosting potential and two wooden bat boxes on the northern side of the tree.	No
BER047	TF9844315949	Moderate	Mature oak trunk dead, core exposed. Cracks present, suitable for multiple roosting bats.		No
BER050	TF9878315352	Moderate	Mature ivy clad oak. PRFs under ivy and cracks along trunk.		No
BER056	TF9383211779	Moderate	Group of mature ivy clad ash and oak trees within hedgerow, good commuting habitat alongside grassland, ditches and open water	One mature oak tree and one mature ash tree at Northern edge of field. NE of mark on map.	No
BER078	TG0409617528	Moderate	Mature oak, large crack in mostly dead limb. Suitable for summer roost. Other small holes present in other limbs, suitable for opportunistic roosting only.		No
BER087	TF8937211021	Moderate	Mature ash tree, ivy clad with splits and cracks; adjacent to running water with good foraging/commuting habitat		No
BER096	TG2108028776	Moderate	Farm buildings (5no.). Includes barn and farmhouse, good old roof spaces, with foraging habitat in immediate vicinity, although foraging habitat poor beyond this.		N/A
BER100	TG2092729029	Moderate	Common oak with dead trunk, very suitable cracks and holes. Available connecting habitat.		N/A
BER114	TG1994828775	Moderate	Dead, fallen goat willow. Large cracks opened within trunk, suitable for small-medium roost. Cracks recently formed.		N/A
BER116	TG1999229130	Moderate	Veteran oak tree. Hollow, dead trunk with roost opportunities.		N/A
BER117	TG1999629121	Moderate	Veteran common oak tree. Hollow dead trunk, multiple roost spaces.		N/A
BER133	TG2068329189	Moderate	Mature oak, with large hollow area in trunk, and in lowest limb. Potentially large cavity. Potential for small-medium roost.		N/A
BER138	TG2956531828	Moderate	Several mature ivy clad oak trees at edge of LNR woodland; good commuting/foraging habitat, ditch with standing water		No
BER166	TG0547520082	Moderate	Mature oak with splits and cracks, within hedgerow set back from main road, adjacent to woodland; good commuting/foraging habitat nearby		No

Survey Site	GPS co-ordinates	Habitat Suitability Assessment <sup>5</sup>	Description of site <sup>6</sup>	Surveyor amended/additional description	Discrepancies in location or species
BER174	TG0666920769	Moderate	Mature ash with crack in trunk, suitable for small-moderate sized roost. Moderate suitability due to good connecting habitat if woodland and nearby wetland.		No
BER175	TG0684920571	Moderate	Mature ash. Large holes and cracks in trunk. Potential for small-medium sized roost, good connecting habitat.		No
BER179	TG0724021021	Moderate	Mature ivy-clad oak, with hollow trunk. Large, sheltered cavity suitable if supporting small-moderate sized roost. Possible veteran tree.		No
BER201	TG3354331707	Moderate	Large, mature oak with dense ivy-cladding. Dead limbs visible. Likely to be potentially medium-sized, well protected spaces inside, along good commuting habitat.		No
BER210	TG3637030150	Moderate	House and outbuilding c.80 years old, potential roost spaces with roofs once of both buildings. No fields signs observed.		No
BER214	TG3594930073	Moderate	Ash with a series of holes in trunk, roosts spaces inside the bole possible. Good connecting habitat along hedgeline.		No
BER229	TG3835529892	Moderate	Old disused shed and farm buildings with cracks and gaps, adjacent to scrub, some commuting/foraging habitat nearby		N/A
BER232	TG3340630670	Moderate	Mature oaks within hedgerow in between arable land. Several trees with multiple splits and cracks.	Three mature oaks with splits and cracks.	No
BER271	TG2194830486	Moderate	Mature ivy-clad oak, with large crack in one limb and large opening beneath ivy in second limb. Potential for small-medium sized roost in second limb. Good connecting habitat along hedgeline.		No
BER276	TG3394232794	Moderate	Barn buildings with gaps. Some semi mature trees nearby, some commuting and foraging potential.		N/A
BER287	TG2279730303	Moderate	Renovated barn. Lots of gaps under roof tiles and in brick work. Potential for roost in roof space. Good connectivity to east, with foraging habitat.		No
BER288	TG2284030328	Moderate	Mature oak tree with 3 bat boxes (1 fallen, not functioning). Evidence of use (staining) around 1 of the functioning boxes. Possible mitigation for barn conversion at bat feature 16?	A number of cracks/loose bark and broken limbs present within the tree with roosting potential.	No
BER289	TG2286230329	Moderate	Mature elder tree with three bat boxes. No evidence of current use.	Multi stemmed alder with bat boxes on edge of woodland, adjacent to a drainage ditch and meadow	No : Typo
BER292	TG2405830654	Moderate	Mature alder with dead heartwood. Large cavity in centre approx. 3m high, further cracks in upper limbs. May be suitable for small-medium roost, although may be out-competed by nesting birds. Good foraging habitat along hedgeline and to nearby woodland east		No

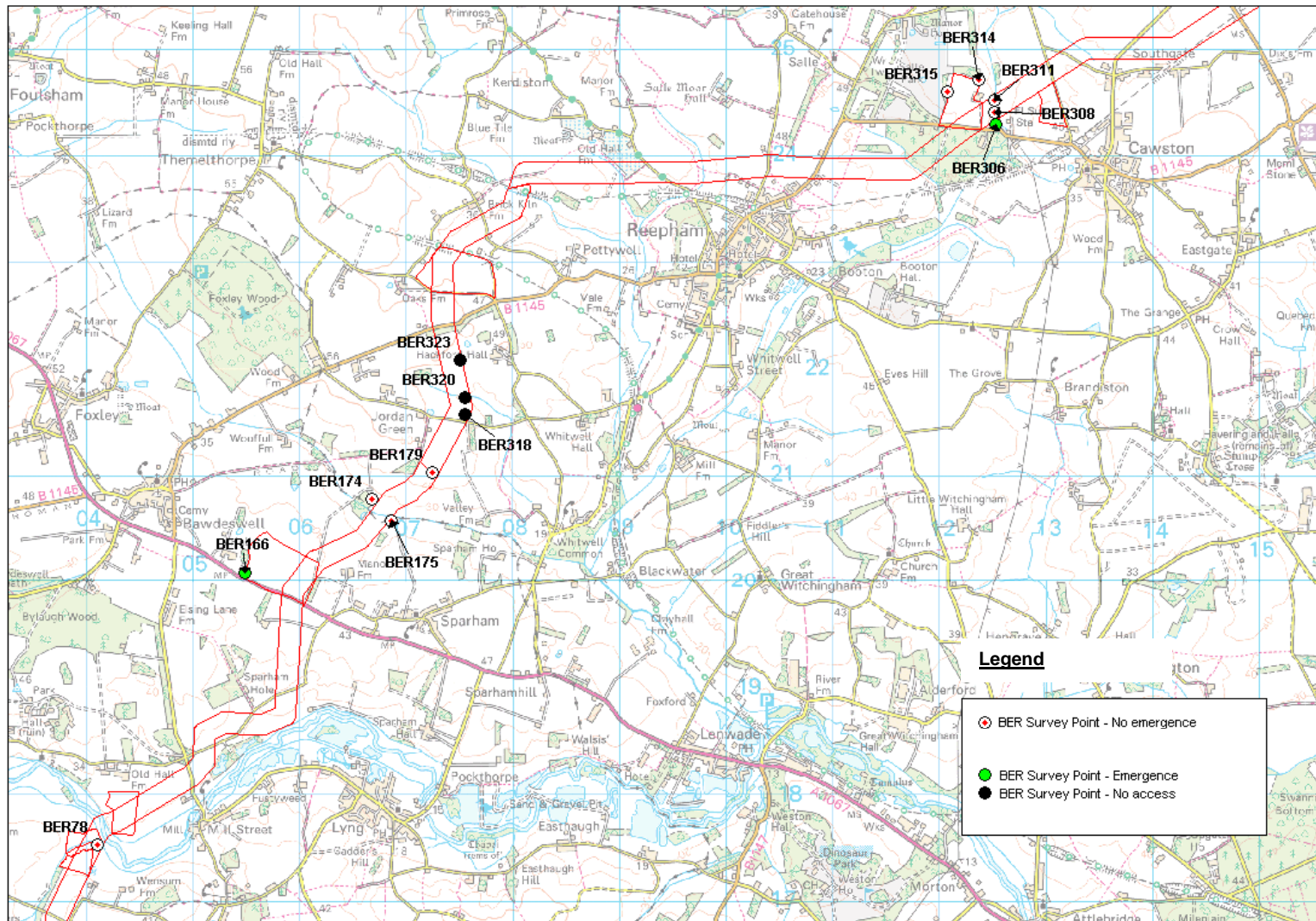
Survey Site	GPS co-ordinates	Habitat Suitability Assessment <sup>5</sup>	Description of site <sup>6</sup>	Surveyor amended/additional description	Discrepancies in location or species
BER306	TG1252724286	Moderate	Mature ivy clad oak on edge of woodland adjacent to ditch. Grassland either side. Commuting foraging habitat available.	Mature ivy clad Ash on edge of woodland adjacent to ditch. Grassland either side. Commuting foraging habitat available.	Yes
BER308	TG1251724406	Moderate	Mature ivy clad sycamore with splits and cracks; adjacent to stream within grassland area; commuting and foraging habitat available nearby	Mature ivy clad Alder with splits and cracks adjacent to huge ash tree with a broken bough.	Yes
BER311	TG1251924515	Moderate	Mature ivy clad oak with splits and cracks; adjacent to stream within grassland; good commuting and foraging habitat nearby	Mature ivy clad sycamore with splits and cracks; adjacent to stream within grassland; good commuting and foraging habitat nearby	Yes
BER314	TG1236624714	Moderate	Several trees within woodland with some roost potential, commuting and foraging habitat nearby		No
BER315	TG1207124599	Moderate	Several trees within woodland with potential roost features; commuting/foraging habitat nearby		No
BER318	TG0754221564	Moderate	Ivy clad mature oak, with splits and cracks for roosting, adjacent to pond and hedgerow for commuting foraging.		N/A
BER320	TG0754721726	Moderate	Mature ivy clad oak, set within hedgerow, good commuting foraging habitat, splits and cracks in tree.	Mature ivy clad Ash tree, set within hedgerow, good commuting foraging habitat, splits and cracks in tree.	Yes
BER323	TG0749322077	High	Veteran ivy clad oak tree, lots of splits and cracks, set within hedgerow.		N/A
BER344	TF9530114340	Moderate	Dead oak trunk, frequent, sizeable roost spaces under dead bark, if low to the ground (3m high). good connecting habitat.		No
BER345	TF9527514340	Moderate	Dead oak trunk, frequent, sizeable roost spaces in dead trunk, if low to the ground (3m high). Good connecting habitat.		N/A
BER349	TF9581314419	Moderate	Mature ivy-clad dead oak tree. Cracks beneath dead bark and multiple dead limbs. Potential for large cavities under ivy. Good connecting habitat along hedgeline.		No

## Appendix 2: Maps showing bat emergence survey locations

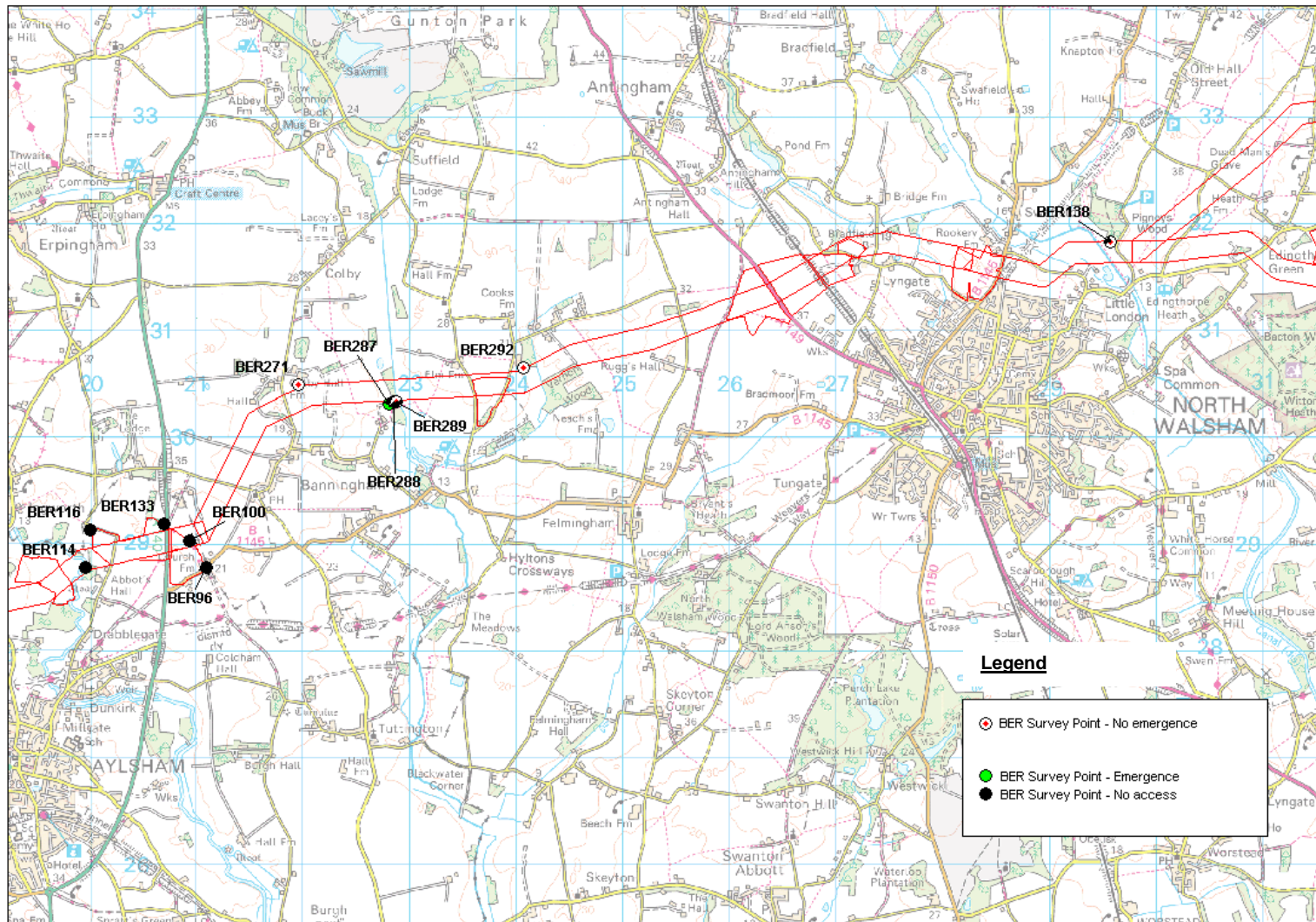
Map 1 Western section – Necton to Dereham



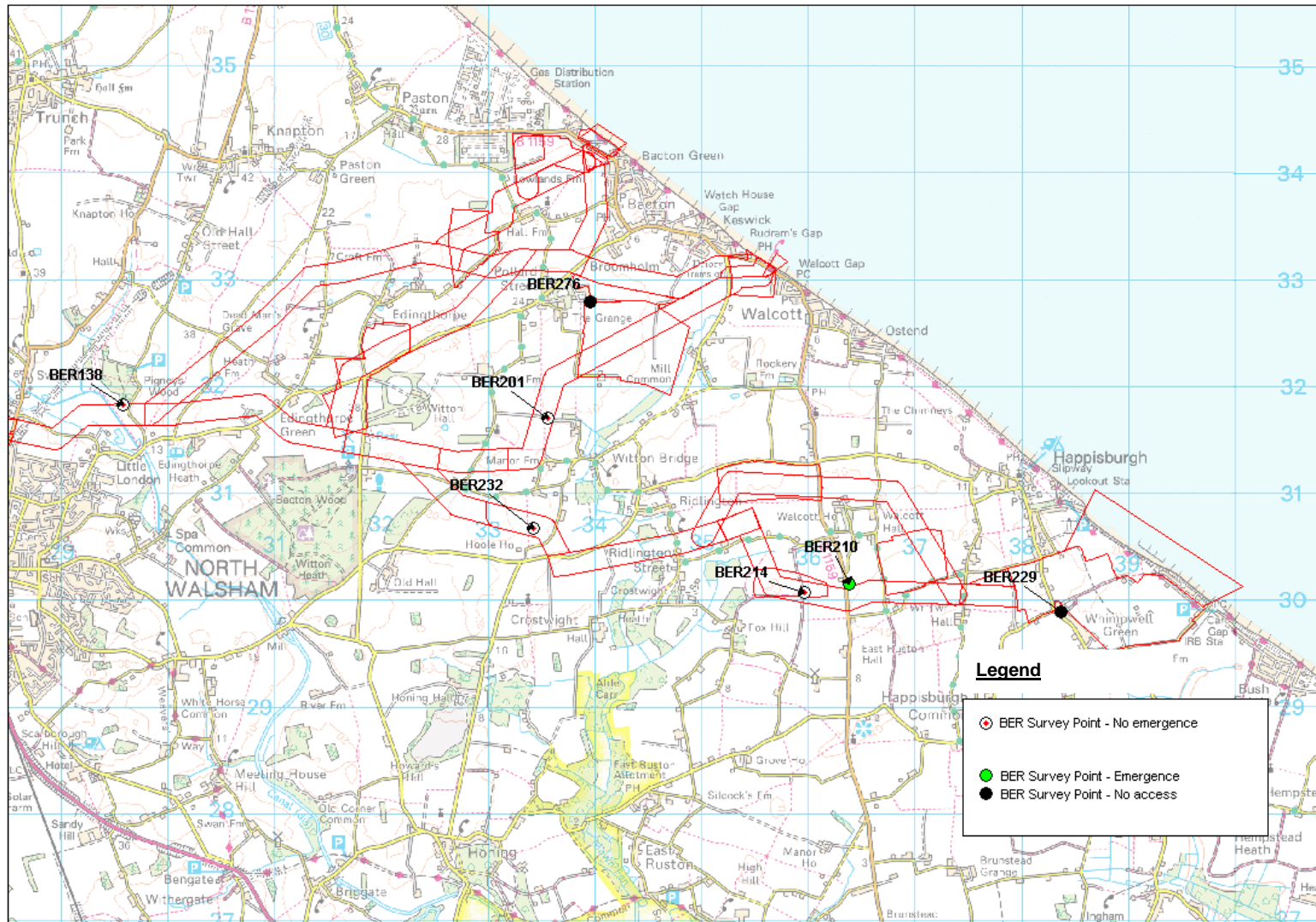
Map 2 Central western section – Dereham to Reepham



Map 3 Central eastern section – Aylsham to North Walsham



Map 4 Eastern section – North Walsham to Walcott



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