

Viking CCS Pipeline

**Environmental  
Statement Volume IV –  
Appendix 6-2: Bat  
Survey Report**

Document Reference: EN070008/APP/6.4.6.2

Applicant: Chrysaor Production (U.K.) Limited,  
a Harbour Energy Company  
PINS Reference: EN070008  
Planning Act 2008 (as amended)  
The Infrastructure Planning (Applications: Prescribed Forms  
and Procedure) Regulations 2009 - Regulation 5(2)(a)  
Date: October 2023

<b>PINS Reference</b>	<b>Document Reference</b>	<b>Document Revision</b>	<b>Date</b>
EN070008	EN070008/APP/6.4.6.2	Revision 1	October 2023

<b>Prepared by</b>	<b>Verified by</b>	<b>Approved by</b>
KA	MWH	NP
Principal Ecologist	Associate Ecologist	EIA Technical Director

Prepared by:

AECOM Limited  
Exchange Station  
Tithebarn Street  
Liverpool  
Merseyside  
L2 2QP

© AECOM Limited. All rights reserved.

## Table of Contents

1	Bat Survey Report .....	1
1.1	Introduction.....	1
1.2	Legislation, Policy and Guidance.....	2
1.3	Methods.....	4
1.4	Results .....	25
1.5	Summary .....	37
1.6	Conclusion.....	37
1.7	References .....	38

## Figures

Figure 1: Emergence Re-entry Tree Locations.....	10
Figure 2: Crossing Point Locations.....	19

## Tables

Table 1: Desk Study Area and Data Sources .....	4
Table 2: Categories of Habitat Suitability (BCT Guidelines) .....	5
Table 3: Categories of Bat Roost Suitability (BCT Guidelines) .....	6
Table 4: Dates of Surveys and Weather Conditions – Emergence / Re-entry Surveys .....	7
Table 5: Bat Crossing Point Survey Locations.....	18
Table 6: Dates of Surveys and Weather Conditions – Crossing Point Surveys 2022/23	
Table 7: Dates of Surveys and Weather Conditions – Crossing Point Surveys 2023/24	
Table 8: Bat Records within 2 km of the DCO Site Boundary .....	25
Table 9: Bat crossing point survey results showing bat passes associated with the crossing point feature and additional passes .....	27
Table 10: Bat Passes associated with crossing point feature by Species (Survey 1). Includes records after 1-hour.....	27
Table 11: Bat Passes associated with crossing point feature by Species (Survey 2). Includes records after 1-hour survey end. ....	28
Table 12: Bat Emergence and Re-Entry Survey Results .....	29

# 1 Bat Survey Report

## 1.1 Introduction

- 1.1.1 This Appendix has been prepared for the Viking CCS Pipeline Environmental Statement (ES). It provides details on the methodologies used whilst compiling information and ecological baseline conditions relating to bats. Baseline data presented in this Appendix has been used to inform the assessment within *ES Volume II Chapter 6: Ecology and Biodiversity (Application Document 6.2.6)*.
- 1.1.2 The Viking CCS Pipeline ('the Proposed Development') comprises a new 24 " (609 mm) diameter onshore pipeline of approximately 55.5 km in length, which will transport Carbon Dioxide (CO<sub>2</sub>) from the Immingham industrial area to the Theddlethorpe area on the Lincolnshire coast, where it will connect into the existing 36 " (921 mm) diameter offshore LOGGS pipeline.
- 1.1.3 The Proposed Development is an integral part of the overall Viking CCS Project, which intends to transport compressed and conditioned CO<sub>2</sub> received at a facility at Immingham to store in depleted gas reservoirs under the Southern North Sea. The offshore elements of the Viking CCS Project, including the transport of CO<sub>2</sub> through the LOGGS pipeline to the Viking gas fields under the North Sea, are subject to a separate consenting process.
- 1.1.4 The key components of the Proposed Development comprise:
- Immingham Facility;
  - Approximately 55.5 km 24 inch (") onshore steel pipeline (including cathodic protection);
  - Three Block Valve Stations;
  - Theddlethorpe Facility;
  - Existing LOGGS pipeline and isolation valve to the extent of the Order Limits at Mean Low Water Springs (MLWS);
  - Permanent access to facilities;
  - Mitigation and landscaping works;
  - Temporary construction compounds, laydown, parking and welfare facilities;
  - Temporary access points during construction.
- 1.1.5 Further details of each element of the Proposed Development are set out in Chapter 3 of the *Environmental Statement (ES) Volume II (Application Document 6.2.3)*.

### Scoping Report and Scoping Opinion

- 1.1.6 A scoping exercise was undertaken in early 2022 to establish the content of the Ecological Impact Assessment (EclA) and the approach and methods to be followed. The Scoping Report (*ES Volume IV: Appendix 5.1 (Application Document 6.4.5.1)*) records the findings of the scoping exercise and details the technical guidance, standards, best practice and criteria proposed to be applied in the assessment to identify and evaluate the likely significant effects of the Proposed Development on ecology and biodiversity.
- 1.1.7 With reference to foraging and commuting bats, the Planning Inspectorate provided the following comments:

*“The Scoping Report identifies the intention to limit bat activity surveys to areas of suitable habitat which will be permanently lost. The Inspectorate accepts, as stated in Table 6-2 [of the scoping report], that such surveys may not be warranted in relation to temporary habitat loss.*

*However, the Inspectorate considers that they may be required to inform the assessment of likely significant effects and the design of appropriate mitigation in relation to the effects of construction lighting and effects resulting from impacts to linear habitat features. These matters should be considered in the ES where likely significant effects could occur, supported by appropriate evidence such as bat activity survey data. The Applicant should seek agreement from relevant consultees and provide a description of the approach taken in the ES, incorporating any relevant advice.”*

- 1.1.8 Within the *PEIR Volume II (Appendix 6.0)* and in response to stakeholder feedback, it was advised that bat activity surveys would be completed in areas where hedgerows would be affected by the development (i.e., direct loss, changes in lighting). It was considered that surveys would only be necessary where hedgerows were likely to provide important connectivity linkages (i.e., links between blocks of woodland, parkland or to watercourses).

### **Aims and Objectives**

- 1.1.9 The purpose of this report is to:

- Outline the legislative protection given to bats;
- Provide information on any statutory or non-statutory designated sites of relevance to bats within the Zone of Influence of the Proposed Development;
- Identify habitats and features within the DCO Site Boundary that have the potential to be used by bats; and
- Summarise the findings of the bat surveys undertaken to inform the EclA.

## **1.2 Legislation, Policy and Guidance**

### **Legislation**

- 1.2.1 All bat species and their roosts are legally protected in the UK under the Habitats and Species Regulations 2017 (as amended) (Habitat and Species Regs), which implements the EC Directive 92/43/EEC (the Habitats Directive) (Ref 1). In addition, barbastelle *Barbastella barbastellus*, lesser horseshoe bat *Rhinolophus hipposideros*, greater horseshoe bats *Rhinolophus ferrumequinum* and Bechstein’s bat *Myotis bechsteinii* are listed in Annex II of the Habitats Directive, which requires sites to be designated in member states for their protection. Bats and their roosts are also protected under the Wildlife and Countryside Act 1981 (as amended) (WCA) (Ref 2).

- 1.2.2 Taken together, the Habitats and Species Regs and the WCA make it illegal to:

- Deliberately capture, kill or injure a bat;
- Be in possession or control of any live or dead bat or any part of, or anything derived from a bat;
- Damage or destroy a breeding site or resting place of a bat;
- Intentionally or recklessly obstruct access to any structure or place that a bat uses for shelter or protection;
- Intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection; and

- Deliberately disturb bats, in particular any disturbance which is likely to (i) impair their ability to survive, breed, reproduce or to rear or nurture their young; or in the case of hibernating or migratory species, to hibernate or migrate; or (ii) affect significantly the local distribution or abundance of the species to which they belong.

1.2.3 A bat roost is defined as any structure a bat uses for breeding, resting, shelter or protection. It is important to note that since bats tend to re-use the same roost sites, current legal opinion is that a bat roost is protected regardless of whether the bats are present at a specific point in time.

1.2.4 Section 40 of The NERC Act (Ref 3) places a legal obligation on public bodies in England to have regard to particular living organisms and types of habitat that are of the greatest conservation importance while carrying out their functions, whilst also having a general regard for protecting all biodiversity. The NERC Act 2006 Section 41 includes seven bats as species of 'principal importance': barbastelle, bechstein's bat, noctule *Nyctalus noctula*, soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared bat *Plecotus auritus*, and lesser horseshoe bat and greater horseshoe bats.

1.2.5 Decision makers must be satisfied that the favourable conservation status of bats (and other European Protected Species) can be maintained before granting consent. Demonstrating the maintenance of favourable conservation status is one of three Habitats Directive "derogation tests" relating to European Protected Species that the decision maker must be satisfied are met.

1.2.6 The three "derogation tests" as set out in paragraph 53 of the Habitats and Species Regs are that:

- The development must be either for "public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment".
- 'That there is no satisfactory alternative'.
- "That the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range."

1.2.7 Favourable conservation status is defined in Article 1(i) of the Habitats Directive as when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future.
- There is, and will probably continue to be, a sufficiently large habitat to maintain its population on a long-term basis.

### European protected species mitigation licences

1.2.8 Although the law provides strict protection for bats, it also allows this protection to be set aside (derogated) under Regulation 53 of the Conservation of Habitats and Species Regs through the issuing of European Protected Species Mitigation Licences (EPSML) for the purpose of preserving public health; public safety; other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment (Ref 4). However, in accordance with the requirements of the Conservation of Habitats and Species Regs a licence can only be issued where the following requirements are satisfied:

- There is no satisfactory alternative.

- The action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

1.2.9 The process of obtaining an EPSML from Natural England will normally take two months (Natural England’s standard determination period is 30 working days). In addition, Natural England would normally expect any bat EPSML application to be accompanied by the data collected from the bat emergence surveys, which are used to determine the status of the structure or tree with regard to bats; specifically, the location of roost sites, the bat species utilising the roost and the type of roost (such as maternity, or transitional).

1.2.10 The application for an EPSML would need to include the production of a detailed method statement for the proposed works. This document would include details of working practices and mitigation measures required to ensure that the favourable conservation status of the bats using the structure or tree is not adversely affected.

### Local Biodiversity Action Plans

1.2.11 The Lincolnshire Biodiversity Plan (Ref 5) is the relevant Local Biodiversity Action Plan (LBAP) for the Study Area and was drafted by the Lincolnshire Biodiversity Partnership in 2011. The LBAP outlines biodiversity conservation objectives within the region and identifies priorities for action for priority habitats, species, locally important wildlife, and sites. The Lincolnshire Biodiversity Action Plan includes a species action plan for bats (covering all species recorded in Lincolnshire) with targets to:

- Maintain and enhance the existing populations and range of bats in Lincolnshire; and
- Increase the quantity and quality of suitable bat habitat for roosting, hibernating and particularly feeding.

1.2.12 The LBAP aims to:

- To protect roosts in trees as well as buildings;
- To continue to improve and widen understanding of the needs of bats, the threats to them, and the rationale for their legal status; and,
- To ensure that the available legal protection is fully used by local authorities, in development control and all other aspects of their operations.

## 1.3 Methods

### Desk Study

1.3.1 A desk study was completed as a part of the Phase 1 habitat survey (*ES Volume IV Appendix 6.1 (Application Document 6.4.6.1)*) to identify statutory and non-statutory designated sites, habitats, and species potentially relevant to the Proposed Development. Sources of information used to inform the desk study which are relevant to bats are summarised in **Table 1**.

**Table 1: Desk Study Area and Data Sources**

Ecological Feature	Study Area	Data Sources	Date Accessed
International statutory nature conservation sites designated for bats (e.g. Special Area	10 km	Multi-Agency Geographic Information for the Countryside (MAGIC) website. Joint Nature Conservation	August 2022

Ecological Feature	Study Area	Data Sources	Date Accessed
of Conservation (SAC))		Committee website ( <a href="http://jncc.defra.gov.uk">http://jncc.defra.gov.uk</a> )	
National statutory nature conservation designated for bats (e.g., Site of Special Scientific Interest (SSSI))	10 km	MAGIC website Natural England website	August 2022
Bat species records	2 km	Greater Lincolnshire Nature Partnership/Lincolnshire Environmental Records Centre	January 2022
Bat Species Records	VPI Immingham's Combined Heat and Power (CHP) Power Station Plant and Phillips 66 Ltd's Humber Refinery	Technical Appendix 13, Humber Zero Phase 1 (Ref 6-6).	January 2023

1.3.2 The study areas summarised in **Table 1** were defined with reference to the likely zone of influence over which the Proposed Development may have potential to result in significant effects on relevant ecological features, including bats.

1.3.3 It is important to recognise that the potential zone of influence of the Proposed Development may vary over time (e.g., the construction zone of influence may differ from the operational zone of influence) and/or depending on the individual sensitivities of different ecological features.

1.3.4 This was considered when defining study areas and these are sufficient to address the potential worst-case zone of influence of the Proposed Development on the relevant ecological features concerned.

### Habitat Suitability Assessment

1.3.5 Habitats were appraised for their suitability to support roosting, foraging and commuting bats during the Phase 1 habitat survey (*ES Volume IV Appendix 6.1 (Application Document 6.4.6.1)*) with reference to methodology outlined within the Bat Conservation Trust's (BCT) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Ref 13). The BCT Guidelines use the criteria summarised in **Table 2** to categorise the potential value suitability of habitats and features for use by foraging and commuting bats. These criteria have been used to characterise the suitability value of habitats within the DCO Site Boundary.

**Table 2: Categories of Habitat Suitability (BCT Guidelines)**

Suitability	Typical Foraging and Commuting Features
Negligible	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated,



Suitability	Typical Foraging and Commuting Features
	<p>i.e. not very well connected to the surrounding landscape by other habitat.</p> <p>Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.</p>
Moderate	<p>Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens.</p> <p>Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.</p>
High	<p>Continuous high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge.</p> <p>High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland.</p> <p>Site is close to and connected to known roosts.</p>

### Preliminary Roost Assessment

1.3.6 Buildings, structures or trees within the DCO Site Boundary were assessed during the Phase 1 habitat survey (*ES Volume IV Appendix 6.1 (Application Document 6.4.6.1)*) and categorised with reference to **Table 3** below.

**Table 3: Categories of Bat Roost Suitability (BCT Guidelines)**

Suitability	Typical Roosting Features
Negligible	Negligible habitat features on site likely to be used by roosting bats.
Low	<p>A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).</p> <p>A tree of sufficient size and age to contain potential roost features but with none seen from the ground or features seen with only very limited roosting potential.</p>
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat, but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more

Suitability	Typical Roosting Features
	regular basis & potentially for longer periods of time due to their size, shelter, protection, conditions & surrounding habitat.

### Presence / absence surveys and roost characterisation surveys

- 1.3.7 Bat emergence / re-entry surveys were completed where trees with moderate or high suitability for roosting bats were present within the DCO Site Boundary and were likely to require removal. Figure VCCS\_BSR\_1 shows the locations of the trees which required surveys and the bat roost suitability level.
- 1.3.8 With reference to BCT guidelines, surveys commenced 15 minutes before sunset and continued for at least 1 hour and 30 minutes after sunset. Any exceptions to this are covered in the limitations section. Surveys were conducted on warm (>7°C), dry nights in the absence of strong wind (Force 4 or below) to avoid weather dependent variation in bat activity. Weather conditions were recorded on the record proforma at the start and end of each survey visit.
- 1.3.9 **Table 4** summarises the dates of the emergence and re-entry surveys, and weather conditions.

**Table 4: Dates of Surveys and Weather Conditions – Emergence / Re-entry Surveys**

Tree Ref	Date	Sunset/ Sunrise	Start Time	End Time	Air Temp °C	Wind Speed* (Bf)*	Cloud cover ** (%)	Precipitation ***
T1	13/07/2023	21:23	21:08	22:55	19	2	3	0
	22/08/2023	20:15	19:58	21:45	21	1	3	0
T2	13/07/2023	21:23	21:08	22:55	19	2	3	0
	22/08/2023	20:15	20:00	21:45	21	1	3	0
T3	12/07/2023	21:25	21:10	22:55	18	4	2	0
	01/08/2023	20:57	20:41	22:27	19	0	3	0
	21/08/2023	20:17	19:40	21:47	22	3	3	0
T4	21/06/2023	21:34	21:19	23:04	21	0	1	1
	19/07/2023	21:16	21:01	22:46	14	1	3	0
T6	06/06/2023	21:11	20:56	22:54	13	3	5	1
	10/07/2023	21:27	21:15	23:00	21	4	4	0
	24/07/2023	21:09	20:54	22:39	16	1	4	0
T7	06/06/2023	21:11	20:56	22:54	12	3	5	1
	11/07/2023	21:26	21:11	23:00	20	1	4	0
	24/07/2023	21:09	20:54	22:39	16	1	4	0
T8	06/06/2023	21:11	20:56	22:54	12	3	5	1
	11/07/2023	21:26	21:11	22:56	17	1	3	0
	04/09/2023	19:43	19:21	21:13	21	2	0	0
T9	06/06/2023	21:11	21:35	22:55	11	4	5	0

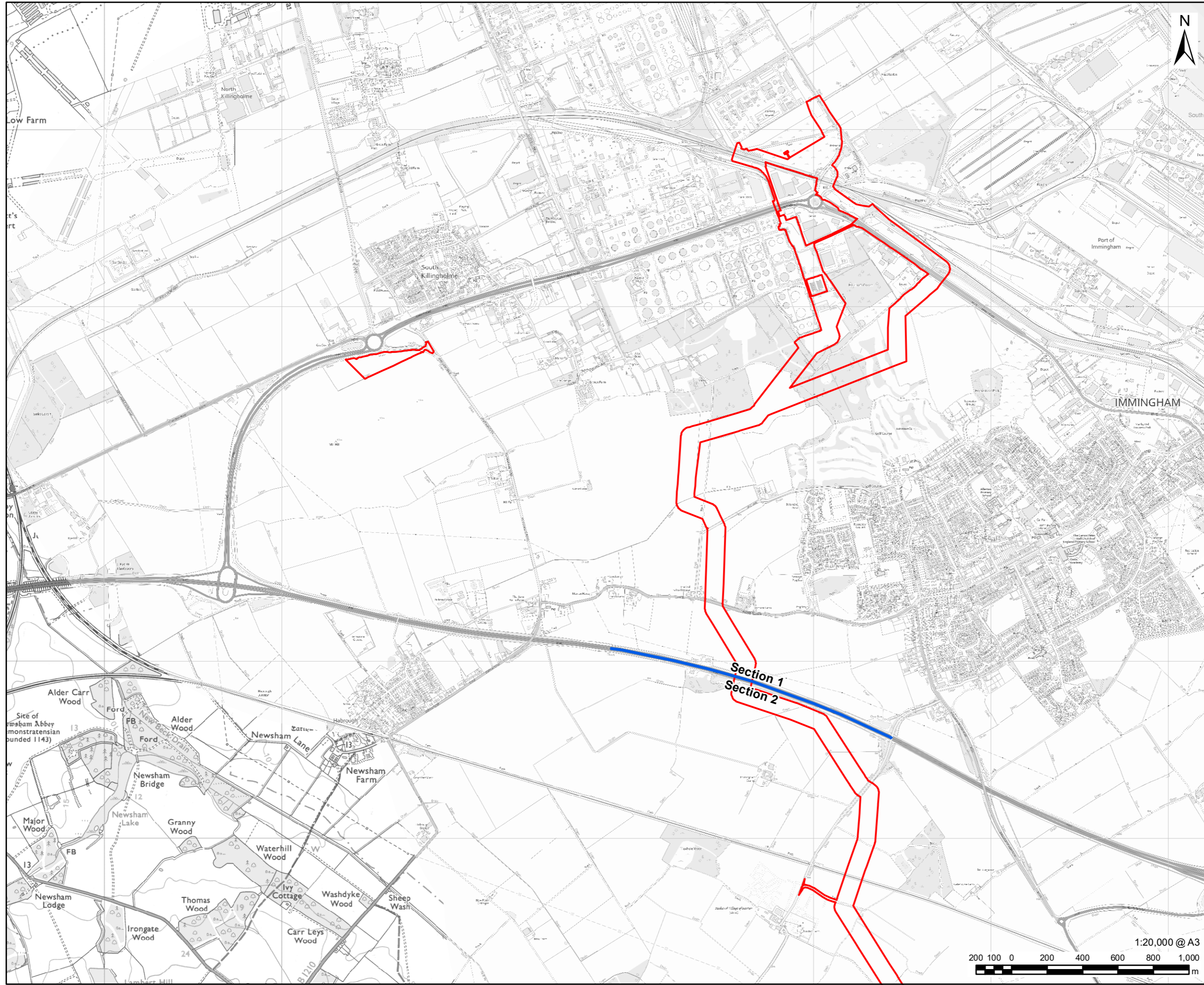
Tree Ref	Date	Sunset/ Sunrise	Start Time	End Time	Air Temp °C	Wind Speed* (Bf)*	Cloud cover **(%)	Precipitation ***
	05/09/2023	19:41	19:26	21:11	19	3	0	0
T10	08/06/2023	21:13	20:58	22:43	12	2	2	0
	24/07/2023	20:54	21:09	22:39	16	1	1	0
T11	22/06/2023	21:34	21:19	23:04	19	0	0	0
	25/07/2023	21:09	20:54	22:50	15	1	4	3
T12	31/05/2023	21:17	21:02	22:47	11	4	4	0
	25/07/2023	21:09	20:54	22:50	19	1	4	4
T13	31/05/2023	21:05	20:50	22:47	11	4	4	0
	17/07/2023	21:19	21:04	22:49	19	1	1	0
T20	21/06/2023	21:33	21:18	23:03	21	0	3	0
T21	21/06/2023	21:33	21:18	23:03	21	0	3	0
T22	14/06/2023	21:29	21:14	23:59	11	2	4	3
	18/07/2023	21:18	21:03	22:48	18	2	4	0
	16/08/2023	20:27	20:12	21:57	17	2	2	0
T23	22/06/2023	21:33	21:18	23:03	16	2	2	0
	19/07/2023	21:16	21:01	22:46	15	0	2	1
T24	22/06/2023	21:33	21:18	23:03	18	1	1	0
	19/07/2023	21:16	21:01	22:46	16	1	0	3
T26	22/06/2023	21:33	21:18	23:03	16	0	3	0
	24/07/2023	21:09	20:54	22:39	14	1	3	0
T27	14/06/2023	21:29	21:14	22:59	15	1	1	0
	19/07/2023	21:16	21:01	22:46	18	1	2	0
	22/08/2023	20:14	19:59	21:44	20	2/3	4	0
T28	17/07/2023	21:19	21:04	22:49	18	1	1	0
	07/08/2023	20:45	20:30	22:15	16	2	1	0
T29	14/06/2023	21:29	21:14	22:59	17	0	0	0
	05/07/2023	21:29	21:14	23:00	14	2	2	0
	23/08/2023	20:11	19:58	21:44	19	2	4	0
T30	17/07/2023	21:19	21:04	22:49	16	1	1	0
	24/08/2023	20:09	19:54	21:39	17	0	3	1
T33	25/07/2023	21:07	20:52	22:37	16	4	0	1
	08/08/2023	20:43	20:28	22:13	16	1	2	0
T34	15/06/2023	21:29	21:14	22:59	15	1	-	0
	20/07/2023	21:15	21:00	22:45	16	1	2	0
	09/08/2023	20:43	20:26	22:11	22	2	3	0

Tree Ref	Date	Sunset/ Sunrise	Start Time	End Time	Air Temp °C	Wind Speed* (Bf)*	Cloud cover **(%)	Precipitation ***
T35	21/06/2023	21:34	21:19	23:04	19	1	4	0
	15/08/2023	20:29	20:14	21:59	17	0	2	0
	29/08/2023	19:57	19:42	21:57	15	3	2	0
T36	08/08/2023	20:42	20:27	22:12	15	2	2	0
	30/08/2023	19:54	19:39	21:24	18-14	0	2	0
T37	08/08/2023	20:47	20:27	22:07	16	3	3	0
	30/08/2023	19:59	19:42	21:29	18	2	1	0

\*Wind speeds are measured using the Beaufort Scale.

\*\* \*\*Cloud cover is measured using the following scale: 0 – 0), 1 to 20%, 2 12-40%, 3 – 41-60%, 4 – 61 to 80%, 5 – 81-100%

\*\*\*Precipitation is measured using the following scale: 0-none, 1-drizzle, 2-shower, 3-rain, 4-downpour, 5-flood



NOTES:  
 Reproduced from Ordnance Survey digital map data © Crown copyright 2023. All rights reserved. Licence number 0100031673.

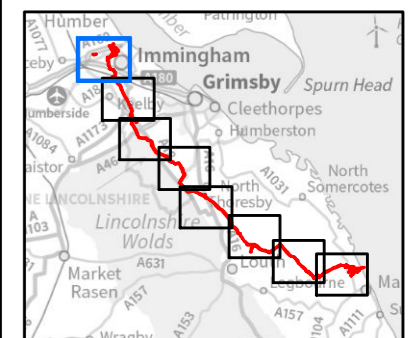
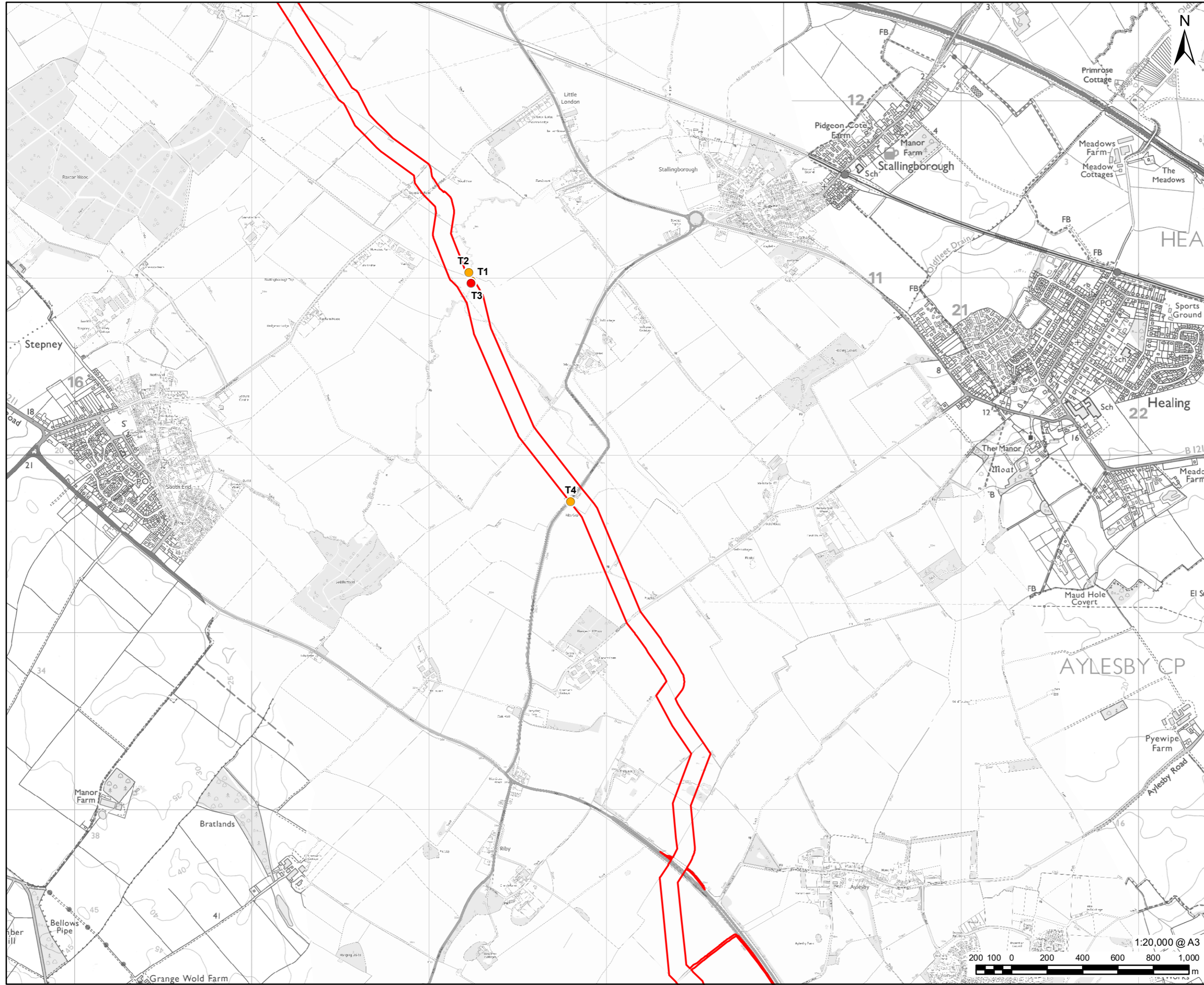


FIGURE TITLE  
**Figure 1 (1 of 8)**  
**Emergence Re-Entry Tree Locations**

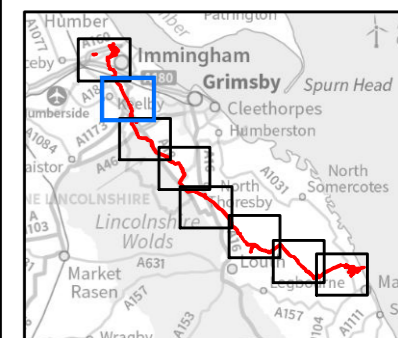
This drawing has been prepared for the use of AECOM's client. It may not be used, modified, reproduced or relied upon by third parties, except as signed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies on this drawing without AECOM's express written consent. Do not scale this document. All measurements must be obtained from the stated dimensions.



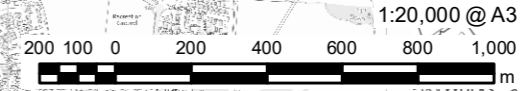
**LEGEND**

- DCO Site Boundary
- Emergence Re-Entry Tree Location Suitability**
- High
- Moderate

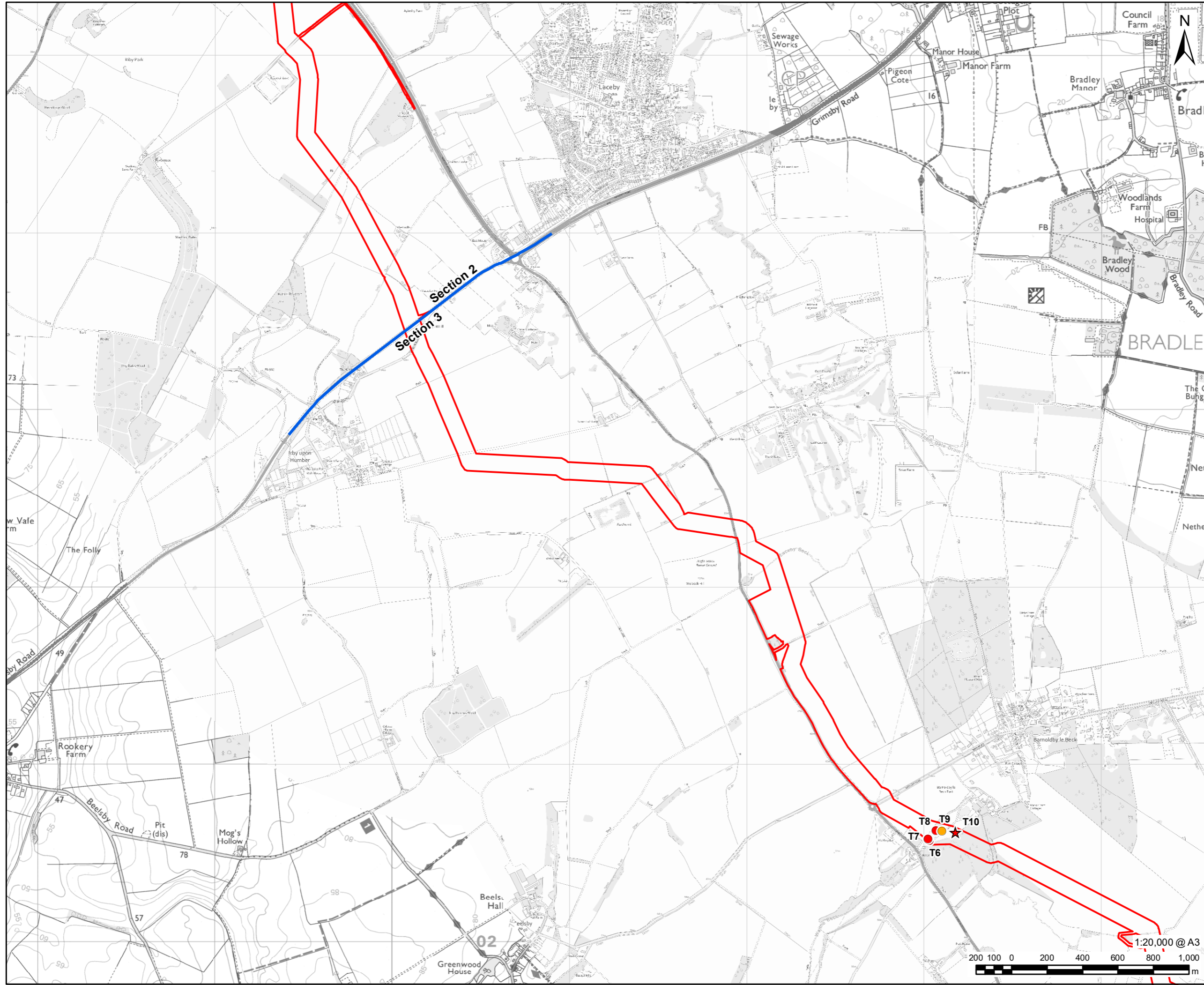
**NOTES:**  
 Reproduced from Ordnance Survey digital map data © Crown copyright 2023. All rights reserved. Licence number 0100031673.



**FIGURE TITLE**  
 Figure 1 (2 of 8)  
 Emergence Re-Entry Tree Locations

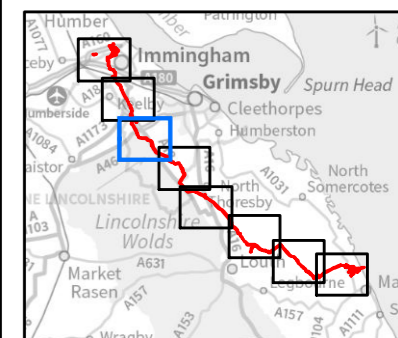


This drawing has been prepared for the use of AECOM's client. It may not be used, modified, reproduced or relied upon by third parties, except as signed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies on this drawing without AECOM's express written consent. Do not scale this document. All measurements must be obtained from the stated dimensions.

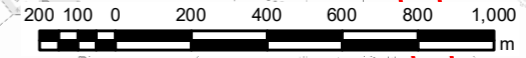


- LEGEND**
- DCO Site Boundary
  - Route Section Break
  - Emergence Re-Entry Tree Location Suitability**
  - ★ Confirmed
  - High
  - Moderate

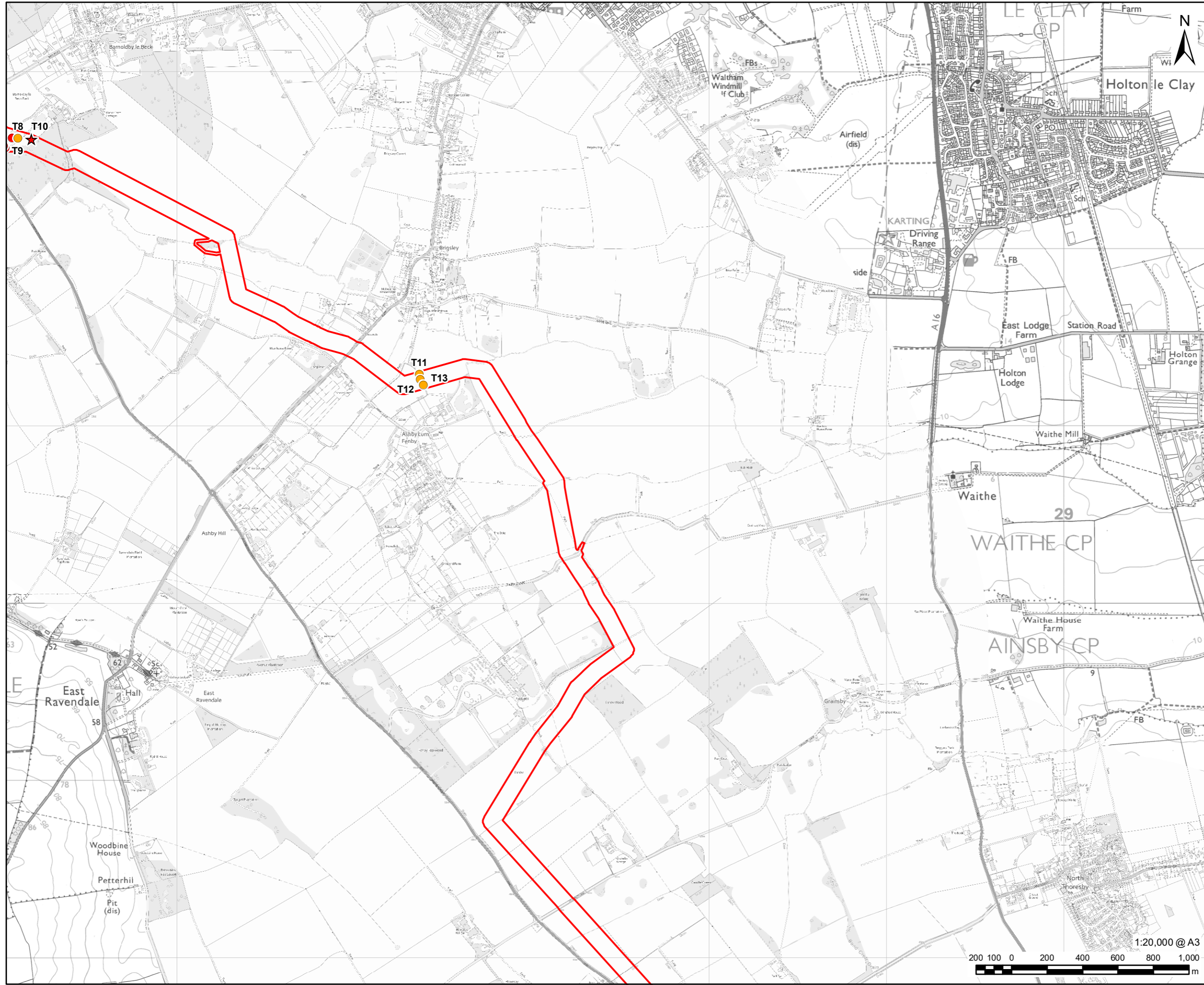
**NOTES:**  
 Reproduced from Ordnance Survey digital map data © Crown copyright 2023. All rights reserved. Licence number 0100031673.



**FIGURE TITLE**  
 Figure 1 (3 of 8)  
 Emergence Re-Entry Tree Locations



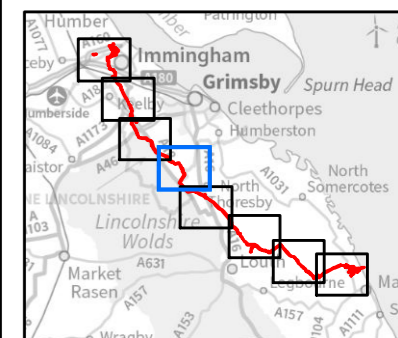
This drawing has been prepared for the use of AECOM's client. It may not be used, modified, reproduced or relied upon by third parties, except as signed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies on this drawing without AECOM's express written consent. Do not scale this document. All measurements must be obtained from the stated dimensions.



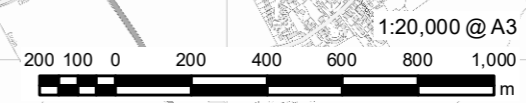
**LEGEND**

- DCO Site Boundary
- Emergence Re-Entry Tree Location Suitability
- ★ Confirmed
- High
- Moderate

**NOTES:**  
 Reproduced from Ordnance Survey digital map data © Crown copyright 2023. All rights reserved. Licence number 0100031673.

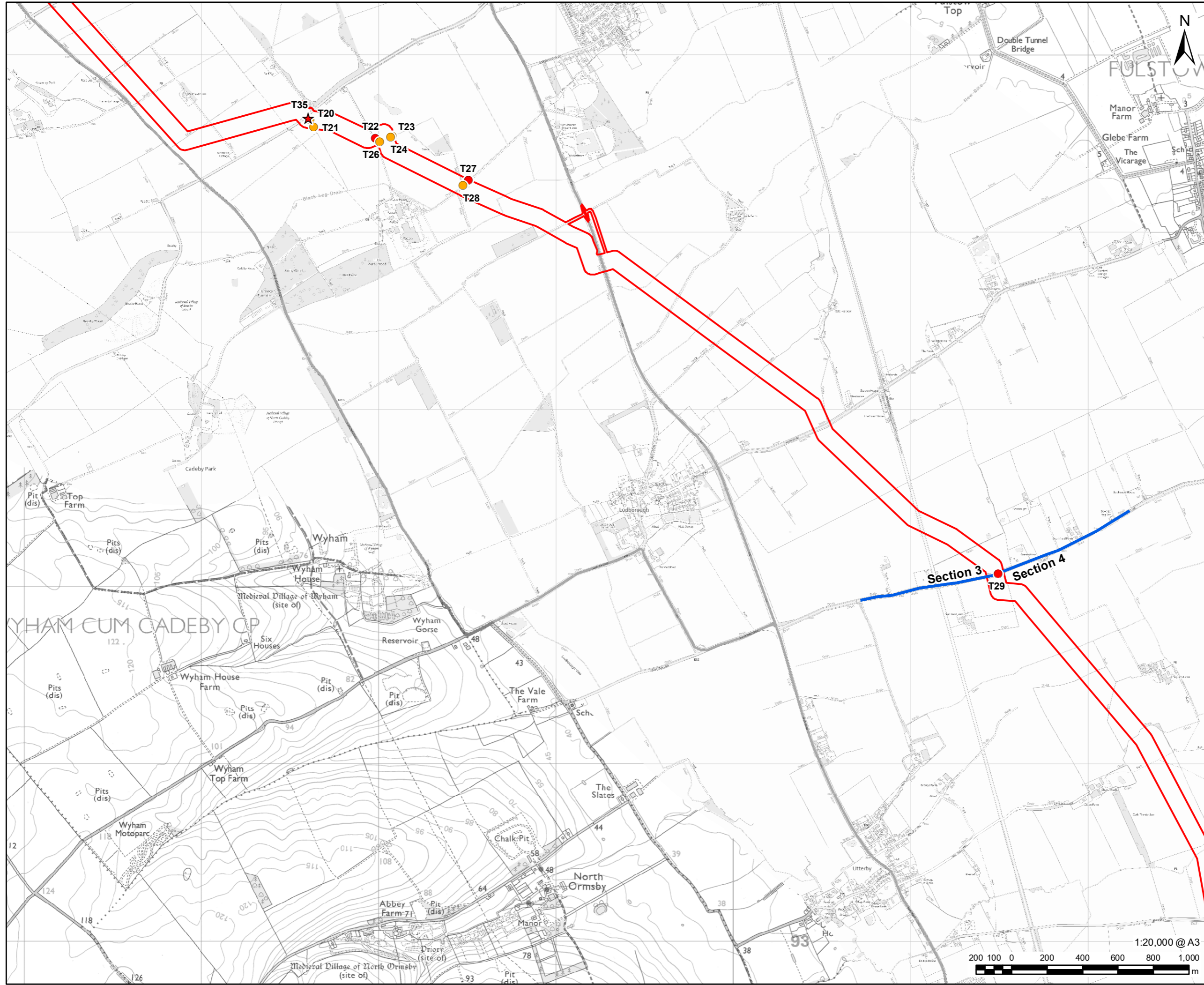


**FIGURE TITLE**  
 Figure 1 (4 of 8)  
 Emergence Re-Entry Tree Locations



This drawing has been prepared for the use of AECOM's client. It may not be used, modified, reproduced or relied upon by third parties, except as signed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies on this drawing without AECOM's express written consent. Do not scale this document. All measurements must be obtained from the stated dimensions.

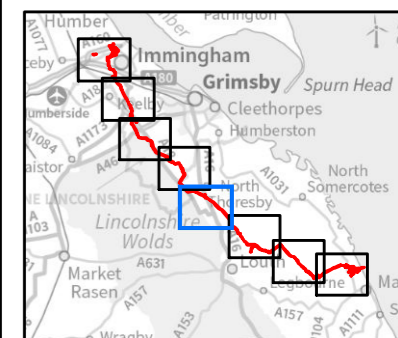




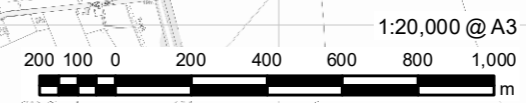
**LEGEND**

- DCO Site Boundary
- Route Section Break
- Emergence Re-Entry Tree Location Suitability**
- ★ Confirmed
- High
- Moderate

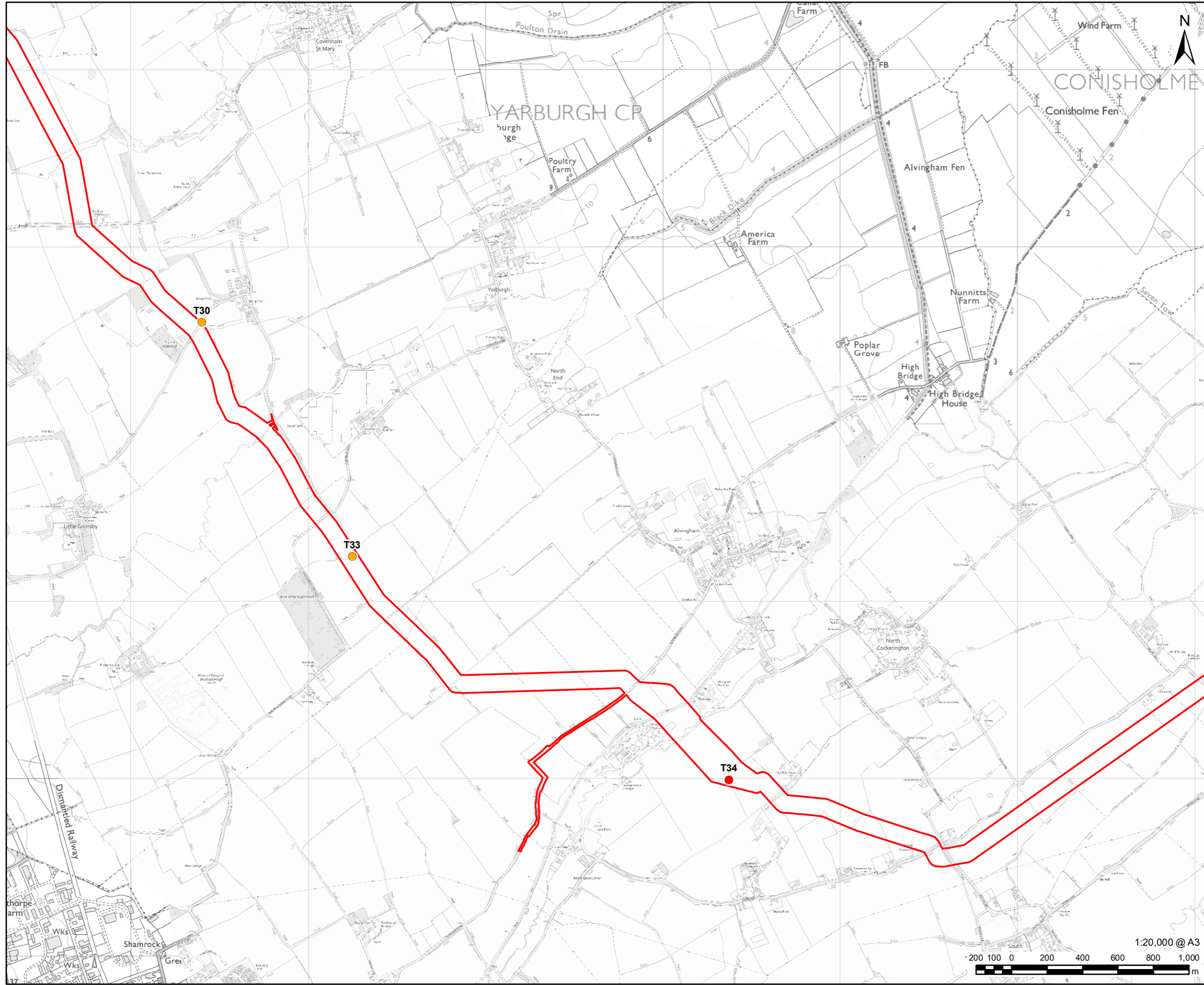
**NOTES:**  
 Reproduced from Ordnance Survey digital map data © Crown copyright 2023. All rights reserved. Licence number 0100031673.



**FIGURE TITLE**  
**Figure 1 (5 of 8)**  
**Emergence Re-Entry Tree Locations**

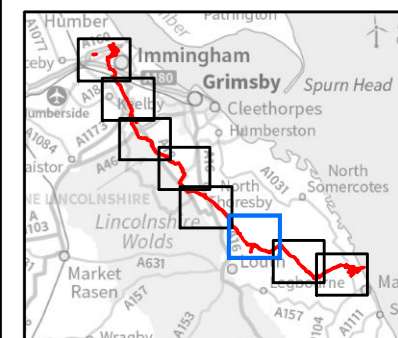


This drawing has been prepared for the use of AECOM's client. It may not be used, modified, reproduced or relied upon by third parties, except as signed by AECOM or as required by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies on this drawing without AECOM's express written consent. Do not scale this document. All measurements must be obtained from the stated dimensions.



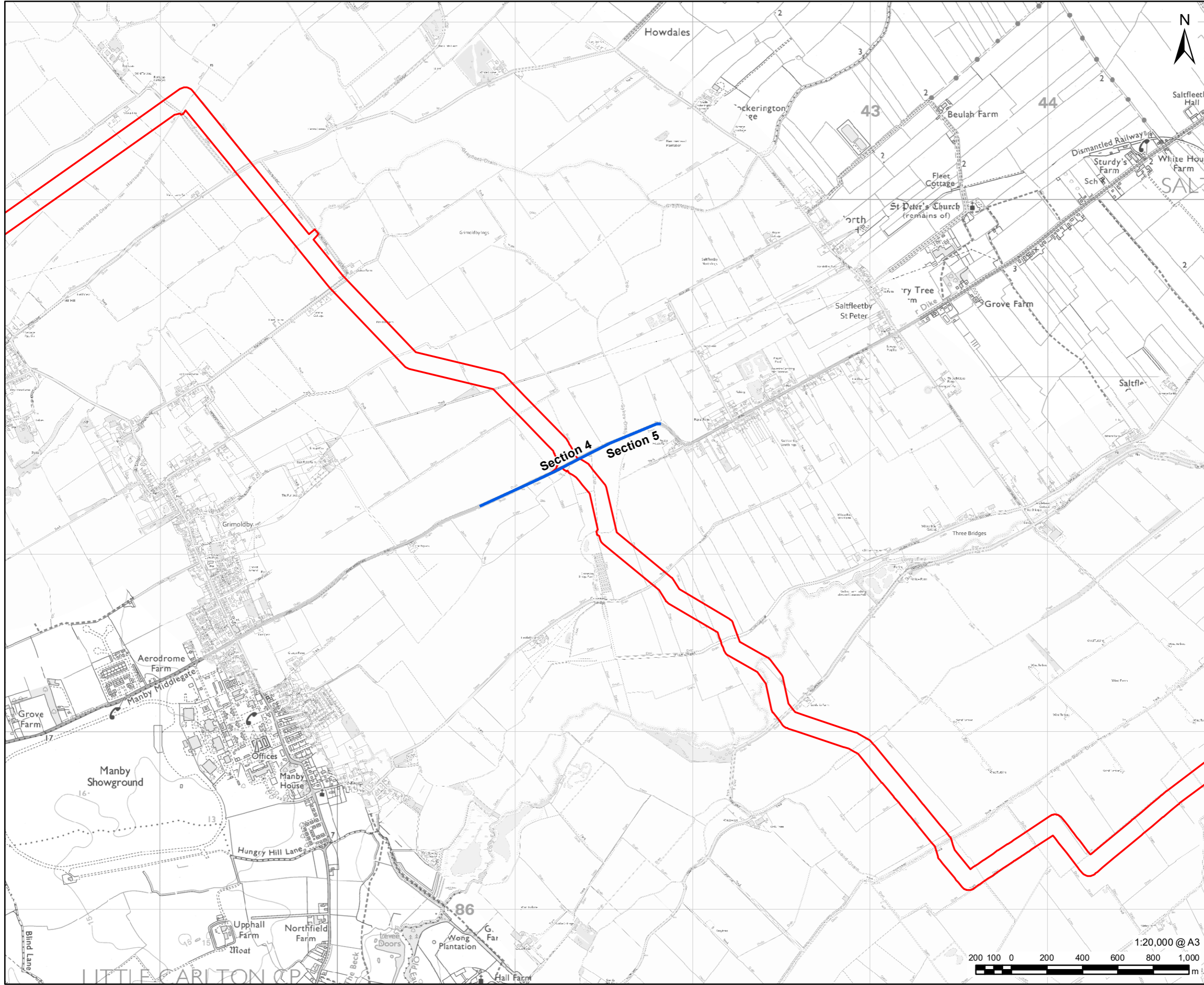
- LEGEND**
- DCO Site Boundary
  - Emergence Re-Entry Tree Location
  - Suitability
    - High
    - Moderate

**NOTES:**  
 Reproduced from Ordnance Survey digital map data © Crown copyright 2023. All rights reserved. Licence number 0100031673.



**FIGURE TITLE**  
 Figure 1 (6 of 8)  
 Emergence Re-Entry Tree Locations

This drawing has been prepared for the use of AECOM's client. It may not be used, modified, reproduced or relied upon by third parties, except as signed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies on this drawing without AECOM's express written consent. Do not scale this document. All measurements must be obtained from the stated dimensions.



VikingCCS

**AECOM**

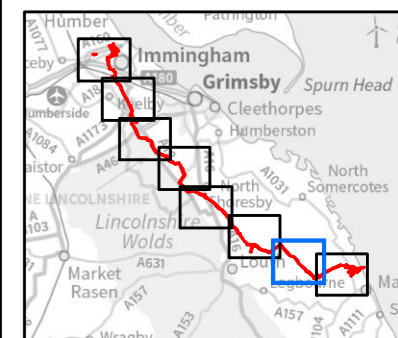
PROJECT

**Viking CCS Pipeline**

LEGEND

- DCO Site Boundary
- Route Section Break

NOTES:  
 Reproduced from Ordnance Survey digital map data © Crown copyright 2023. All rights reserved. Licence number 0100031673.

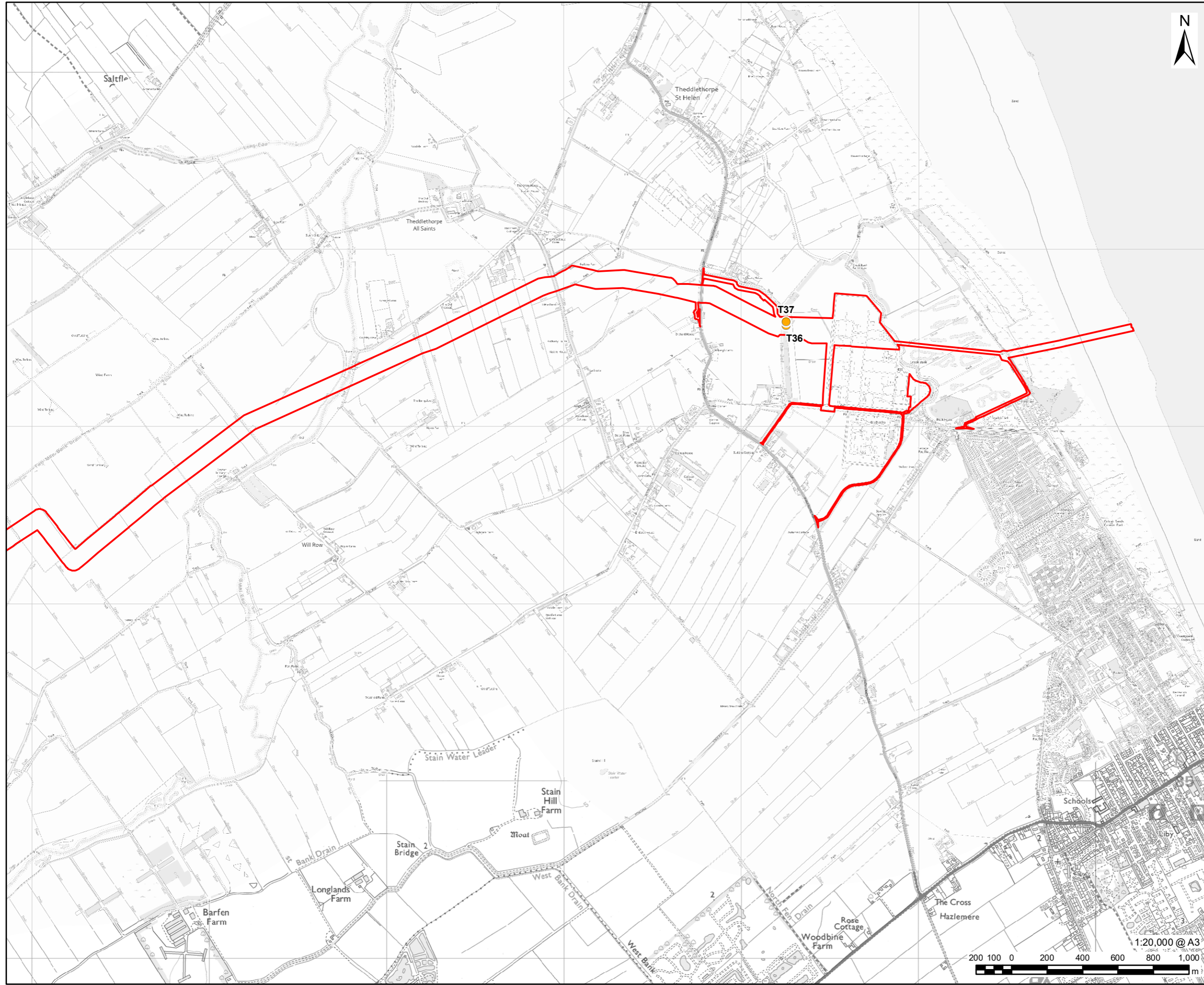


**FIGURE TITLE**  
**Figure 1 (7 of 8)**  
**Emergence Re-Entry Tree Locations**

**ISSUE PURPOSE**  
 BAT SURVEY REPORT  
 PROJECT NUMBER / REFERENCE  
 60668955 / VCCS\_230928\_BSR\_1



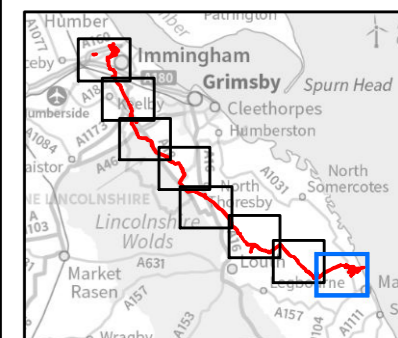
This drawing has been prepared for the use of AECOM's client. It may not be used, modified, reproduced or relied upon by third parties, except as signed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies on this drawing without AECOM's express written consent. Do not scale this document. All measurements must be obtained from the stated dimensions.



- LEGEND**
- DCO Site Boundary
  - Emergence Re-Entry Tree Location
  - Suitability
  - Moderate

This drawing has been prepared for the use of AECOM's client. It may not be used, modified, reproduced or relied upon by third parties, except as signed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies on this drawing without AECOM's express written consent. Do not scale this document. All measurements must be obtained from the stated dimensions.

**NOTES:**  
 Reproduced from Ordnance Survey digital map data © Crown copyright 2023. All rights reserved. Licence number 0100031673.



**FIGURE TITLE**  
**Figure 1 (8 of 8)**  
**Emergence Re-Entry Tree Locations**



1.3.18 Any bats recorded were identified to species level (where possible) and recorded on a field map. The calls were recorded on Batlogger M detectors or Anabat Scout detectors and if bats were noted to be emerging or re-entering they were later analysed by an experienced bat ecologist using bat analysis software packages (Bat Explorer, Analook W and Kaliedoscope Viewer) to allow identification to species or genus level where possible.

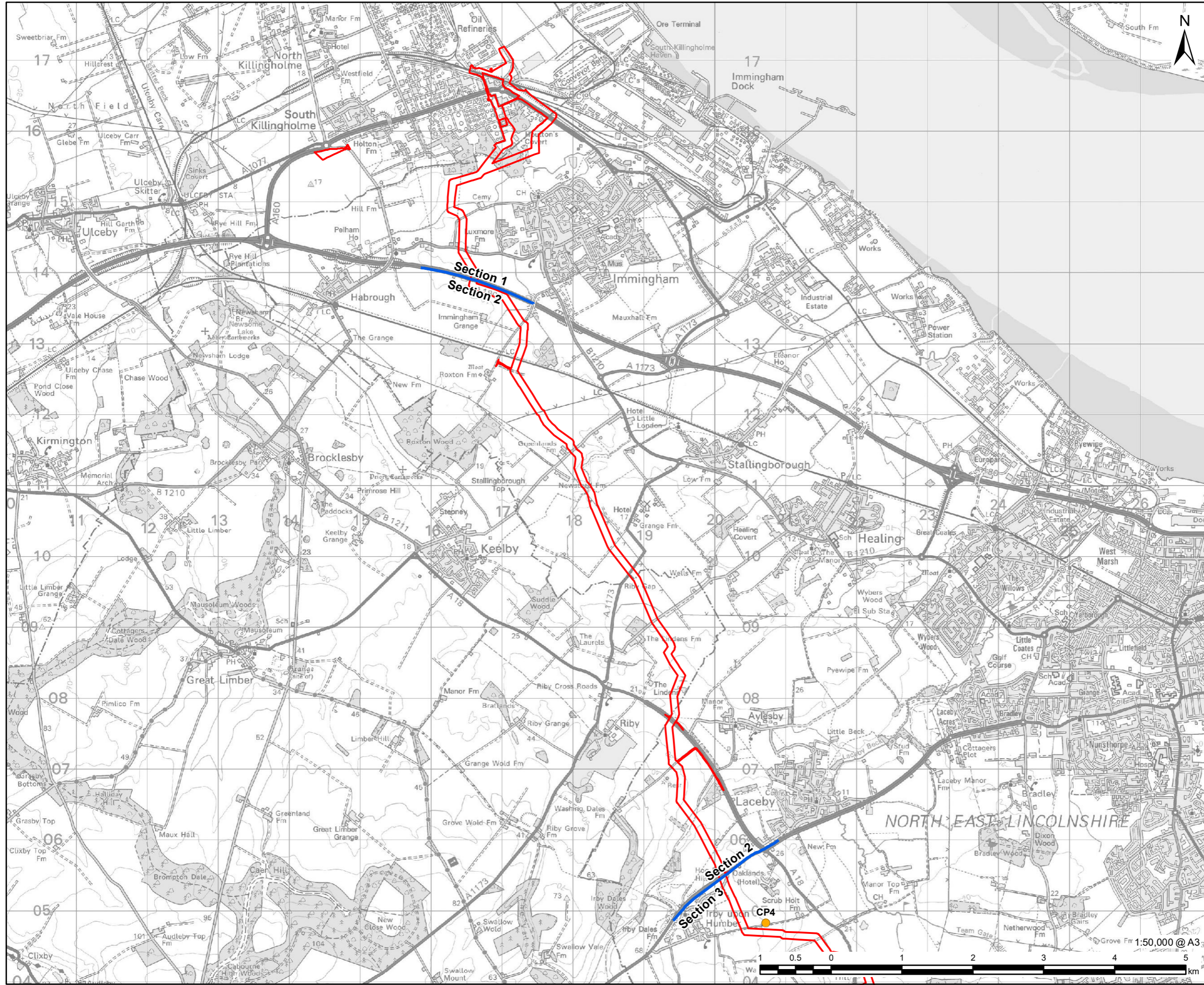
### Bat crossing point surveys.

1.3.19 Bat crossing point surveys were undertaken at sample points where linear features (such as hedgerows, watercourses or lines of trees) would be affected by the Proposed Development. The locations initially selected for the crossing point surveys were restricted to suitable habitats and linear features for commuting bats in areas where land access was possible. The crossing point survey methodology was designed with reference to Defra's "*Development of a cost-effective method for monitoring the effectiveness of mitigation for bats crossing linear transport infrastructure*" (Ref 6), the BCT guidelines (Ref 7) and the BCT Interim Guidance Note on the Use of vision aids (Ref 8). The locations of the crossing point surveys are shown on Figure VCCS\_BSR\_2 and are summarised in **Table 5** below.

1.3.20 As effects upon habitats will be temporary and during the construction phase only, it was considered that these surveys would focus on features which could provide important linkages (i.e., links between blocks of woodland, parkland, or to watercourses). Areas of suitable habitat were identified through review of aerial mapping and photography and confirmed during the Phase 1 habitat survey.

**Table 5: Bat Crossing Point Survey Locations**

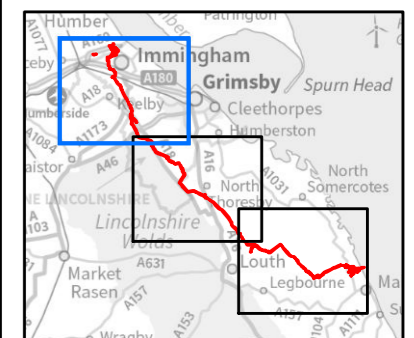
Bat Crossing Point (CP) Reference	Ordnance Survey National Grid Reference (OSNGR)	Habitat Description
CP1	TA 25374 01274	Hedgerow with mature trees. Brigsley and Waith Beck are located to the north and Asnby cum Fenby and a large pond to the south.
CP2	TA 24976 01424	Hedgerow adjacent to the B1203. Brigsley, Waith beck and a waterbody are present to the north and Moorhouse Farm with woodland and a pond is located to the south.
CP3	TA 24299 01866	Hedgerow with mature trees located to the south of Waith Beck.
CP4	TA 20721 04830	Hedgerow linking Irby upon Humber to Scrub Holt Farm / the grounds of the Oaklands Hotel.
CP5	TA 23389 02477	Treeline / ditch linking Barnoldby le Beck Park to Waith Beck.
CP6	TF 26322 98391	Treeline linking Grainsby Grange and Hawerby.
CP7	TF 42373 87387	Long Eau watercourse linking waterbodies to the north with woodland to the south.
CP8	TF 31058 95338	Double hedgerow along disused railway corridor.



**LEGEND**

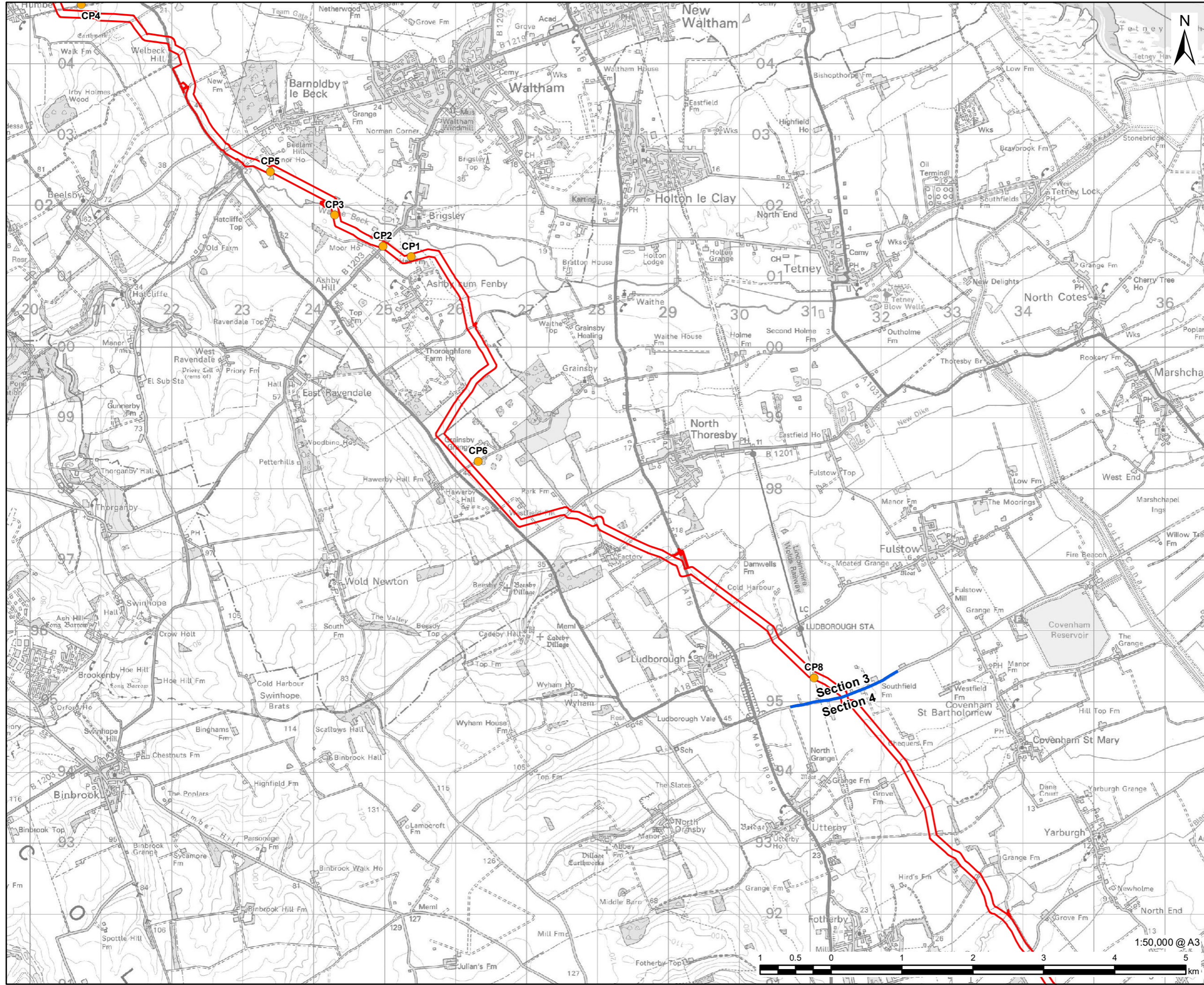
- ▭ DCO Site Boundary
- Route Section Break
- Crossing point Location

**NOTES:**  
 Reproduced from Ordnance Survey digital map data © Crown copyright 2023. All rights reserved. Licence number 0100031673.



**FIGURE TITLE**  
 Figure 2 (1 of 3)  
 Crossing Point Locations

This drawing has been prepared for the use of AECOM's client. It may not be used, modified, reproduced or relied upon by third parties, except as signed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies on this drawing without AECOM's express written consent. Do not scale this document. All measurements must be obtained from the stated dimensions.



LEGEND

- DCO Site Boundary
- Route Section Break
- Crossing point Location

NOTES:  
 Reproduced from Ordnance Survey digital map data © Crown copyright 2023. All rights reserved. Licence number 0100031673.

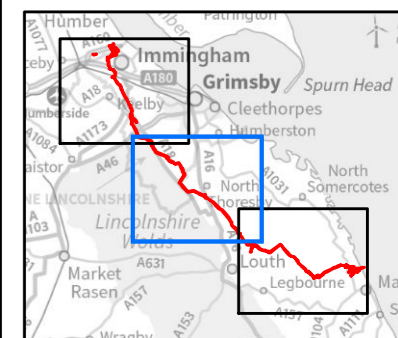


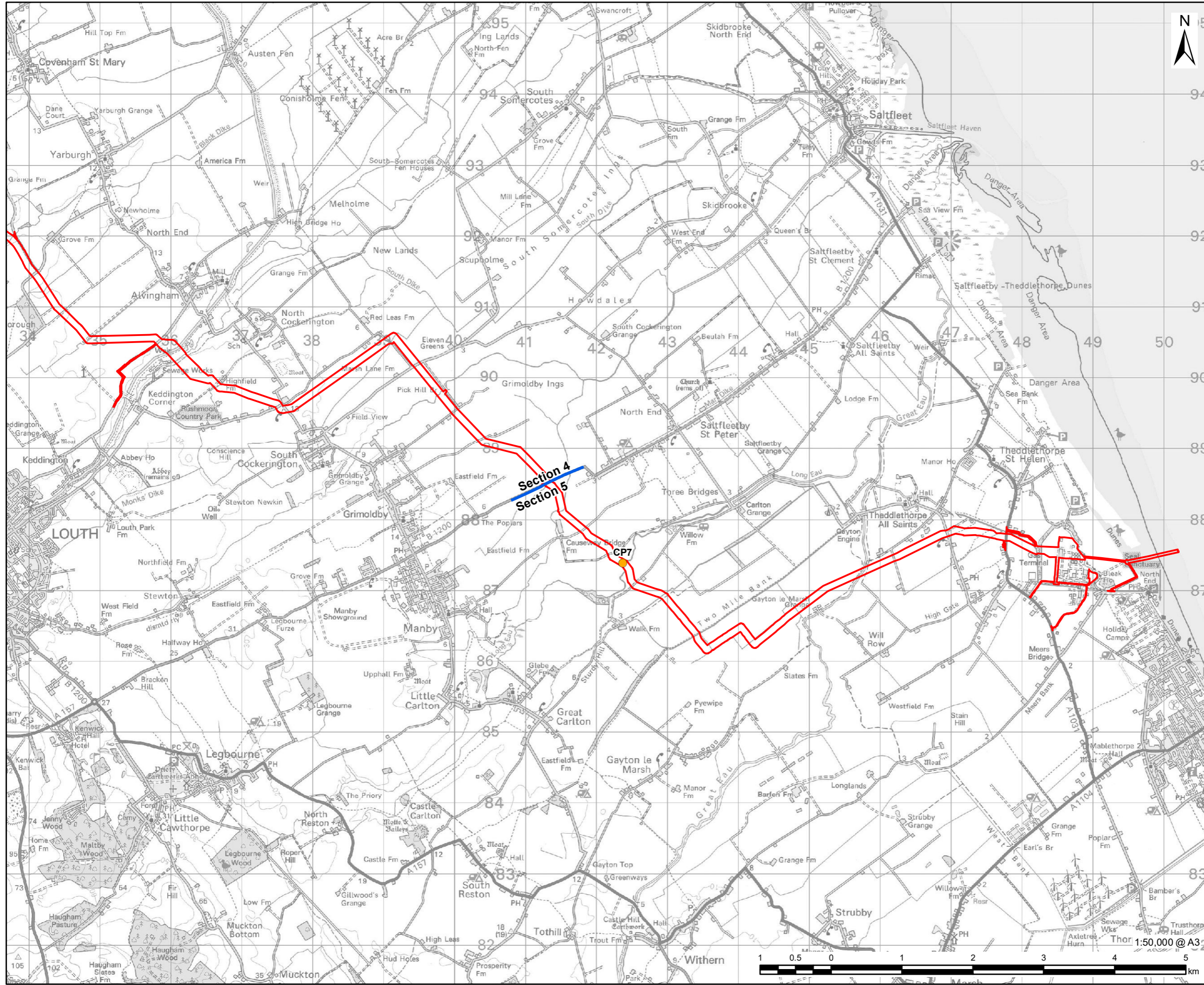
FIGURE TITLE

**Figure 2 (2 of 3)**

**Crossing Point Locations**

This drawing has been prepared for the use of AECOM's client. It may not be used, modified, reproduced or relied upon by third parties, except as signed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies on this drawing without AECOM's express written consent. Do not scale this document. All measurements must be obtained from the stated dimensions.

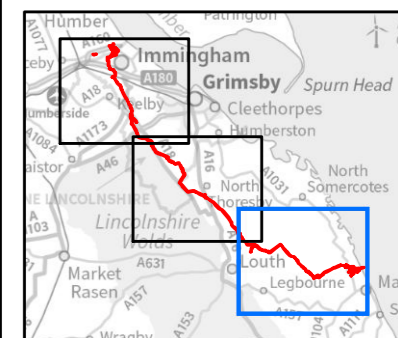




**LEGEND**

- DCO Site Boundary
- Route Section Break
- Crossing point Location

**NOTES:**  
 Reproduced from Ordnance Survey digital map data © Crown copyright 2023. All rights reserved. Licence number 0100031673.



**FIGURE TITLE**  
**Figure 2 (3 of 3)**  
**Crossing Point Locations**

This drawing has been prepared for the use of AECOM's client. It may not be used, modified, reproduced or relied upon by third parties, except as signed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies on this drawing without AECOM's express written consent. Do not scale this document. All measurements must be obtained from the stated dimensions.



- 1.3.21 The objectives of the crossing point surveys were to collect quantifiable data from a sample of potential bat commuting routes that would be directly impacted by the Proposed Development. The data was then used to help the assessment of overall bat activity. One crossing point survey was completed at dusk and at dawn at each crossing point location. The surveys commenced at sunset and continued for one hour after the start of the survey. In some instances where there was sustained bat activity the survey continued for longer than one hour after sunset.
- 1.3.22 The following information was recorded on a standard proforma:
- Time of the observation;
  - Species (if known) and recording reference number;
  - The height of the bat above the commuting feature in metres;
  - Distance of the bat from the feature (on the horizontal plane) in metres;
  - The side of the feature that the bat commuted along (e.g. east or west), and
  - The direction the bat was flying in when it commuted along the feature (e.g. south to north).
- 1.3.23 Only those bats seen commuting along the length of the linear feature where it is likely to be severed by the Proposed Development were counted as having crossed the Proposed Development, and only those that were flying within 5 metres of it (on the horizontal plane). Any duplicate crossing events were removed from the data, i.e. bats recorded crossing at the same time, height, distance and direction by more than one surveyor. Those bats that flew less than 50% across the proposed route before changing direction were not counted as having crossed. If it was likely the same individual bat was commuting up and down the length of the linear feature crossing the Proposed Development multiple times, each crossing was still counted. Other incidental records of bat activity (i.e. any bats observed that were not using the feature) were also recorded on the proformas.
- 1.3.24 Any bats recorded were identified to species level (where possible) and recorded on a field map. The calls were recorded on Anabat Scout or Batlogger M detectors and were later analysed by an experienced bat ecologist using the relevant bat analysis software packages (Bat Explorer, Analook W and Kaleidoscope Viewer) to allow identification to species or genus level. Analysis then determined the number of bat passes at each crossing point per survey.
- 1.3.25 To aid the assessment, one surveyor was equipped with a NVA (night visual aid) which was either a FLIR T120 thermal camera or an infra-red camera that was also used to film the linear route for bat activity.
- 1.3.26 Following the sound analysis the confirmed records of crossing bats i.e. those bats which were recorded by surveyors to cross the proposed route option whilst using the feature (i.e. within  $\leq 5\text{m}$  of it on a horizontal plane), were recorded in an Excel spreadsheet in accordance with standard guidance (Ref 7). Any duplicate crossing events were removed from the data, i.e. bats recorded crossing at the same time, height, distance and direction by more than one surveyor. Any other incidental records of bats from the field recording forms  $>5\text{m}$  from the feature were listed but not included as using the feature, as per the method. This information was then used to inform the ecological impact assessment.

**Table 6: Dates of Surveys and Weather Conditions – Crossing Point Surveys 2022**

Crossing Point Reference	Date	Sunset/ Sunrise	Start Time	End Time	Air Temp p °C	Wind Speed (Bf)	Cloud Cover (%)	Precipitation
CP1	07/09/2022	19:38	19:23	21:08	20	1	40	Heavy rain prior to survey
CP2	31/08/2022	19:53	19:38	21:23	18	1	20	0
CP3	31/08/2022	19:53	19:53	21:23	17	3	20	0
CP4	01/09/2022	19:50	19:35	21:20	18	1	100	0
CP5	08/09/2022	19:33	19:18	21:03	17	1	80	Light rain at start of survey
CP6	01/09/2022	19:50	19:35	21:20	18	1	80	0
CP7	06/09/2022	19:40	19:25	21:10	21	2	50	0
CP8	30/08/2022	20:00	19:45	21:30	17	2	40	0

**Table 7: Dates of Surveys and Weather Conditions – Crossing Point Surveys 2023**

Crossing Point Reference	Date	Sunset/ Sunrise	Start Time	End Time	Air Temp °C	Wind Speed (Bf)	Cloud Cover (%)	Precipitation
CP1	01/06/2023	04:40	03:07	04:47	11	1	60	0
CP2	07/06/2023	04:42	03:09	04:49	11	1	50	0
CP3	08/06/2023	04:34	03:09	04:49	11	1	50	0
CP4	08/06/2023	04:37	03:10	04:52	11	4	100	0
CP5	15/06/2023	04:39	03:09	04:54	13	1	0	0
CP6	22/06/2023	04:32	03:02	04:47	18	0	60	0
CP7	22/06/2023	04:31	02:58	04:46	18	1	60	0
CP8	22/06/2023	04:35	03:02	04:57	16	0	80	0

\*Wind speeds are measured using the Beaufort Scale.

\*\*\*Precipitation is measured using the following scale: 0-none, 1-drizzle, 2-shower, 3-rain, 4-downpour, 5-flood

### Competency of surveyors

- 1.3.27 All field surveys were led by competent ecologists, familiar with bat ecology and surveying, with the relevant class licences for the survey type.
- 1.3.28 Prior to the start of the surveys in each new location, a daytime site visit was undertaken at each location by the lead surveyor in order to plan the works, assess any health and safety issues on site, and record the context of the survey locations.

## Assessment Assumptions and Limitations

- 1.3.29 The desk study aims to assess the baseline context of the Proposed Development and provides valuable background information that would not be captured by a single site survey alone. Desk study data is dependent upon people and organisations submitting records for the area of interest. As such, a lack of records for a particular species does not necessarily mean that the species do not occur in the study area. Likewise, the presence of records for particular species does not automatically mean that these still occur within the area of interest or are relevant in the context of the proposed development/works.
- 1.3.30 Crossing point surveys were undertaken between 31 August and 8 September 2022, with September still considered to be within the bat active period. It should be noted that bat activity may be lower (based on bat passes) than in other months when bats are active (i.e. June to August). This is not considered to be a significant limitation as crossing point surveys were completed within the optimal period for bat activity surveys with reference to BCT Guidelines (Ref 9).
- 1.3.31 In September 2022 limited access had been granted by of landowners within the DCO Site Boundary and field surveys were ongoing. The areas which could be surveyed were limited by access availability and the field survey data on habitat suitability available at that time. In 2022 survey effort was therefore limited to locations where access had been granted. Access in 2023 was improved. Notwithstanding this limitation, the survey effort applied is considered sufficient to meet the aims of the survey and this report, in accordance with the aforementioned guidelines.
- 1.3.32 T20 and T21 were both noted as having moderate suitability, however only one emergence survey was completed on these trees. The completed survey of each tree was undertaken within the bat maternity season, with no bats observed emerging or returning to the tree. Therefore, it is considered that that, at most, the tree may represent a low status (non-maternity) bat roost. This assumption is sufficient to inform the assessment of impacts and design appropriate mitigation.
- 1.3.33 T10 was noted to be a confirmed roost, however only had two surveys completed. A single bat was observed emerging from this tree in June, with no bats observed emerging in July. As only an individual bat was observed emerging on one occasion from this tree during the maternity period, it is considered that, despite the lack of a full complement of surveys, the data is consistent with T10 representing a low status roost (transitional or day roost) used by individual bats.
- 1.3.34 The survey of T6 on 10 July 2023 started 12 minutes before sunset and the survey of T29 on 23 August 2023 started 13 minutes before sunset, instead of the 15 minutes stated in the guidance. As three survey visits were completed on each of these trees, including in both cases a separate visit in the maternity period, these slight deviations from the guidelines are not considered to represent a survey constraint.
- 1.3.35 The survey of T9 on 06 June 2023 started 25 minutes after sunset; instead of 15 minutes before as stated in the guidelines. The second visit to this tree was completed in September and therefore this deviation from the guidelines is considered to represent a constraint to the survey. No bats were observed emerging or returning to the tree during the period in which the tree was surveyed and it is therefore considered reasonable to assume that, at most, the tree may represent a low status (non-maternity) bat roost. This assumption is sufficient to inform the assessment of impacts and design appropriate mitigation.

## 1.4 Results

### Desk Study

- 1.4.1 There are no statutory designated sites with bats listed as qualifying species within 10 km of the DCO Site Boundary.
- 1.4.2 The following bat species were identified through the desk study as present within 2 km of the DCO Site Boundary, or potentially within the zone of influence of the Proposed Development, as shown in **Table 8**.

**Table 8: Bat Records within 2 km of the DCO Site Boundary**

Common Name	Scientific Name	Number of Records within DCO Site Boundary	Number of Records within 2 km of the DCO Site Boundary	Most Recent Year Recorded
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	14	58	2019
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	1	15	2012
Pipistrelle bat species	<i>Pipistrellus</i> sp.	6	85	2020
Brown long-eared bat	<i>Plecotus auritus</i>	2	68	2020
Myotis bat species	<i>Myotis</i> sp.	1	9	2012
Noctule	<i>Nyctalus noctula</i>	3	22	2020
Daubenton's bat	<i>Myotis Daubentoni</i>	0	10	2017
Natterer's Bat	<i>Myotis nattereri</i>	0	3	2006
Bat	Chiroptera	9	281	2019

- 1.4.3 Bat roost assessments and bat activity surveys were completed to inform the Humber Zero project, and the information has been shared with the Applicant for the Proposed Development (Ref 10). All the structures surveyed to inform Humber Zero project were found to be industrial buildings associated with the VPI plant and were assessed as having negligible suitability for use by roosting bats. No trees were identified with suitability for roosting bats; trees were either too young, too healthy and/or had insufficient girth in the trunk. The bat activity surveys completed to inform the Humber Zero project recorded low levels of activity from common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), Nathusius's pipistrelle (*Pipistrellus nathusii*), noctule (*Nyctalus noctule*) and bats from the *Myotis* genus (not identified to species level).

### Habitat Suitability Assessment

- 1.4.4 A description of the Proposed Development is provided in Chapter 3 of the Environmental Statement (ES) Volume II (*Application Document 6.2.3*). This includes details of the proposed Immingham Facility, Theddlethorpe Facility, and the pipeline route.

### **Immingham Facility**

- 1.4.5 Habitats within the DCO Site Boundary were assessed for their suitability to support roosting, foraging and commuting bats during the Phase 1 habitat survey (*ES Volume IV Appendix 6.1 (Application Document 6.4.6.1)*). At the proposed Immingham Facility, habitats comprised of poor semi-improved grassland, improved grassland and ephemeral / short perennial vegetation. Habitats are open and subject to lighting from existing industry. As confirmed by the surveys to inform the Humber Zero project (refer to Section 1.4.3), these habitats are used by low levels of numbers of foraging and commuting activity from pipistrelle, *Myotis* sp. and noctule bats. There will be no habitat suitable for roosting bats lost as a result of the Proposed Development.
- 1.4.6 There are blocks of woodland immediately south of the Phillips 66 refinery including Houlton's covert and Mayflower Woods. These habitats have high suitability for roosting, foraging and commuting bats. The Proposed Development has been designed to avoid affects upon woodland habitat through the use of Horizontal Direct Drilling (HDD) construction techniques. As such, these habitats will remain unaffected and will be available to foraging and commuting bats during construction, operation and decommissioning.

### **Theddlethorpe Facility**

- 1.4.7 Habitats are open and exposed at the former Theddlethorpe Gas Terminal (TGT), where Theddlethorpe Facility (Option 1) is proposed, comprising of bare ground with ephemeral / short perennial and tall ruderal vegetation. As such, this location is also considered to have negligible suitability for roosting bats and negligible suitability for foraging and commuting bats. Theddlethorpe Facility Option 2 is within arable habitat and is considered to have low suitability for foraging and commuting bats.

### **Pipeline Route**

- 1.4.8 The majority of habitats within the DCO Site Boundary are arable and are considered to have low suitability for foraging and commuting bats. The Proposed Development crosses linear features which are present on field boundaries including hedgerows and watercourses along the route. Bats can use linear features for foraging and commuting; hedgerows can aid orientation, attract insects and provide shelter from wind or predators (Ref 11, Ref 12). Bats are likely to use hedgerows, woodland and watercourses within the DCO Site Boundary for foraging and commuting.

### **Preliminary Roost Assessment – Trees**

- 1.4.9 A total of 36 trees with bat roost potential were found within the Survey Area that could be affected by the Proposed Development. The relevant trees are detailed in Annex B of the Phase 1 Habitat Survey Report (*ES Volume IV Appendix 6.1 Phase 1 Habitat Survey Report (Application Document 6.4.6.1)*) and encompass 10 trees assessed to be of low suitability, 18 trees of moderate suitability and nine trees of high suitability.

### **Crossing Point Surveys**

- 1.4.10 **Table 9** provides a summary of the number of bat passes, using the feature (i.e. within a 5 metre horizontal distance of the feature) and not using the feature (>5 metres of the feature) this includes bat passes after the 1 hour survey end (where applicable) at each of the eight bat crossing points in 2022 and 2023. Most bats recorded, except Noctule were within a 5 metre height of the feature.
- 1.4.11 The number split between species/species groups at each crossing point, is shown in **Table 10** and

1.4.12 **Table 11.** This includes bat passes after the 1 hour survey end (where applicable).

**Table 9: Bat crossing point survey results showing bat passes associated with the crossing point feature and additional passes**

Crossing Point Reference	Survey 1		Survey 2		Mean number of passes associated with crossing point feature
	Passes associated with crossing point feature	Passes > 5 m from feature	Passes associated with crossing point feature	Passes > 5 m from feature	
CP1	18	1	11	209	14.5
CP2	12	1	3	19	7.5
CP3	168	0	2	74	85
CP4	8	0	0	2	4
CP5	19	1	11	0	15
CP6	47	0	3	42	25
CP7	2	0	1	5	1.5
CP8	2	1	0	36	1

**Table 10: Bat Passes associated with crossing point feature by Species (Survey 1). Includes records after 1-hour.**

Crossing Point Reference	Soprano pipistrelle	Common pipistrelle	Pipistrellus Sp.	Myotis Sp.	Noctule	Brown long-eared bat	Nyctalus Sp.	Unidentified bat
CP1	1	16	0	0	1	0	0	0
CP2	0	11	1	0	0	0	0	0
CP3	2	66	0	100	0	0	0	0
CP4	0	8	0	0	0	0	0	0
CP5	12	7	0	0	0	0	0	0
CP6	25	22	0	0	0	0	0	0
CP7	2	0	0	0	0	0	0	0
CP8	0	0	0	1	1	0	0	0

**Table 11: Bat Passes associated with crossing point feature by Species (Survey 2). Includes records after 1-hour survey end.**

Crossing Point Reference	Soprano pipistrelle	Common pipistrelle	Pipistrellus Sp.	Myotis Sp.	Noctule	Brown long-eared bat	Nyctalus Sp.	Unidentified bat
CP1	1	10	0	0	0	0	0	0
CP2	0	3	0	0	0	0	0	0
CP3	0	2	0	0	0	0	0	0
CP4	0	0	0	0	0	0	0	0
CP5	1	10	0	0	0	0	0	0
CP6	2	0	1	0	0	0	0	0
CP7	0	1	0	0	0	0	0	0
CP8	0	0	0	0	0	0	0	0

- 1.4.13 The species recorded using the linear features were common pipistrelle, soprano pipistrelle, noctule and *Myotis* genus bats. The most frequently recorded species were common pipistrelle and soprano pipistrelle at all locations, with the exception of CP3.
- 1.4.14 The lowest levels of bat activity were recorded at CP7 and CP8. CP7 is located adjacent to the Long Eau watercourse. Watercourses such as the Long Eau should provide suitable habitat for foraging and commuting bats and the low levels of bat activity recorded could be attributed to the arable nature of the surrounding land. CP8 was sampled as disused railway lines can often provide wildlife corridors within the landscape. The low levels of bat activity recorded at this location may also be linked to its location in a largely arable context.
- 1.4.15 The highest levels of bat activity were recorded at CP3. CP3 was along a hedgerow with mature trees located to the south of Waith Beck. *Myotis* bats were recorded only at CP3 and CP8 in 2022, with none recorded in 2023. Species such as Daubenton's bat (*Myotis daubentonii*) often forage along watercourses but also woodland, trees and hedgerows. It can be difficult to identify *Myotis* bats to species level due to their overlapping call parameters.
- 1.4.16 The second highest levels of bat activity were recorded at CP6 which was a line of trees linking Grainsby Grange and Haweby. Common and soprano pipistrelle were recorded using this feature.
- 1.4.17 Similar levels of bat activity were recorded at CP1 and CP5. CP1 is a hedgerow with mature trees between Brigsley and Ashby cum Fenby. Although this hedgerow is used by some foraging and commuting bats, the lower numbers of passes recorded may be due to the presence of more suitable habitat north and south of the crossing point. CP5 is a treeline / ditch linking Barnoldby le Beck Park to Waith Beck. Bats were recorded at this location, but not in high numbers.
- 1.4.18 Lower levels of bat activity were recorded at CP2 and CP4. CP2 is adjacent to a road which could reduce suitability for bats. CP4 links Irby upon Humber to Scrub Holt Farm / the grounds of the Oaklands Hotel. CP4 is between large parcels of arable farmland which could reduce suitability for bats.
- 1.4.19 In general, lower numbers of crossing bats were recorded in 2023 compared to 2022, this could be due to the 2023 surveys being dawn surveys, where typically bat activity may be lower.

## Bat Emergence Surveys - Trees

1.4.20 **Table 12** provides a summary of the results of the bat emergence surveys on the 27 trees identified as having moderate or high bat roosting potential after the PRA surveys. These trees were surveyed to determine the presence or likely absence of a bat roost at the time of the survey and to record any other bat activity observed during the survey duration.

1.4.21 During these surveys, some of the trees had their suitability upgraded, this is noted in **Table 12**.

**Table 12: Bat Emergence and Re-Entry Survey Results**

Tree Reference	Grid Reference	Tree PRA Suitability	Survey Date	Results	Suitability
T1	518239, 410987	Moderate	13/07/2023	No emergence or re-entry. Foraging and commuting of noctule and common pipistrelle bats.	Moderate
			22/08/2023	No emergence or re-entry. Foraging and commuting of noctule and common pipistrelle and soprano pipistrelle bats.	
T2	518224, 411034	Moderate	13/07/2023	No emergence or re-entry. Foraging and commuting of noctule and common pipistrelle bats.	Moderate
			22/08/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle bats.	
T3	518236, 410974	Moderate	12/07/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle and soprano pipistrelle bats.	High
			01/08/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle bats.	
			21/08/2023	No emergence or re-entry. Foraging and commuting of noctule and common pipistrelle bats.	
T4	518799, 409740	Moderate	21/06/2023	No emergence or re-entry. pipistrelle sp. heard but not seen.	Moderate



Tree Reference	Grid Reference	Tree PRA Suitability	Survey Date	Results	Suitability
			19/07/2023	No emergence or re-entry. Foraging and commuting of noctule, common pipistrelle and soprano pipistrelle bats.	
T6	523030, 402570	High	06/06/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle, soprano pipistrelle and myotis sp. bats.	High
			10/07/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle, soprano pipistrelle, brown long-eared and myotis sp. bats.	
			24/07/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle, soprano pipistrelle and myotis sp. bats.	
T7	523021, 402581	High	06/06/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle, soprano pipistrelle and Myotis sp bats.	High
			11/07/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle, soprano pipistrelle and brown long-eared bats.	
			24/07/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle and soprano pipistrelle bats.	
T8	523068, 402626	High	06/06/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle, soprano pipistrelle and myotis sp.	High

Tree Reference	Grid Reference	Tree PRA Suitability	Survey Date	Results	Suitability
			11/07/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle, soprano pipistrelle, brown long-eared and myotis sp. bats.	
			04/09/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle, soprano pipistrelle and unknown bats.	
T9	523101, 402624	Moderate	06/06/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle, soprano pipistrelle and unknown bats.	Moderate
			05/09/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle, soprano pipistrelle and brown long-eared bats.	
T10	523177, 402617	High	08/06/2023	Re-entry of a single bat observed, which is assumed to be a common pipistrelle due to the bats recorded at the time of emergence. Foraging and commuting of common pipistrelle, soprano pipistrelle bats and myotis species bats.	Confirmed
			24/07/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle and soprano pipistrelle bats.	
T11	525367, 401293	Moderate	22/06/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle and soprano pipistrelle bats.	Moderate
			25/07/2023	No emergence or re-entry. Foraging and	

Tree Reference	Grid Reference	Tree PRA Suitability	Survey Date	Results	Suitability
				commuting of common pipistrelle and soprano pipistrelle bats.	
T12	525370, 401263	Moderate	31/05/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle and soprano pipistrelle bats.	Moderate
			25/07/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle bats.	
T13	525389, 401233	Moderate	31/05/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle, soprano pipistrelle and noctule bats.	Moderate
			17/07/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle bats.	
T20	527612, 397636	Moderate	21/06/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle and unknown bats.	Moderate
T21	527633, 397594	Moderate	21/06/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle and unknown bats.	Moderate
T22	527979, 397532	High	14/06/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle and soprano pipistrelle bats.	High
			18/07/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle and noctule bats.	
			16/08/2023	No emergence or re-entry.	
T23	528077, 397544	Moderate	22/06/2023	No emergence or re-entry. Foraging and commuting of common	Moderate

Tree Reference	Grid Reference	Tree PRA Suitability	Survey Date	Results	Suitability
				pipistrelle and soprano pipistrelle bats.	
			19/07/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle and soprano pipistrelle bats.	
T24	528067, 397539	Moderate	22/06/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle and soprano pipistrelle bats.	Moderate
			19/07/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle and soprano pipistrelle bats.	
T26	528006, 397510	Moderate	22/06/2023	Possible emergence of unknown bat species. Foraging and commuting of common pipistrelle, soprano pipistrelle and noctule bats.	Moderate
			24/07/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle and soprano pipistrelle bats.	
T27	528506, 397294	High	14/06/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle, soprano pipistrelle and noctule bats.	High
			19/07/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle, soprano pipistrelle and unknown bats.	
			22/08/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle, soprano pipistrelle, noctules and unknown bats.	

Tree Reference	Grid Reference	Tree PRA Suitability	Survey Date	Results	Suitability
T28	528475, 397264	Moderate	17/07/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle, soprano pipistrelle and myotis sp. bats.	Moderate
			07/08/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle and soprano pipistrelle bats.	
T29	531495, 395074	High	14/06/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle and soprano pipistrelle bats.	High
			05/07/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle and pipistrelle sp. bats.	
			23/08/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle, soprano pipistrelle and noctule bats.	
T30	533401, 392575	Moderate	17/07/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle and soprano pipistrelle bats.	Moderate
			24/08/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle, soprano pipistrelle and unknown bats.	
T33	534248, 391255	Moderate	25/07/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle and soprano pipistrelle bats.	Moderate
			08/08/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle, soprano	

Tree Reference	Grid Reference	Tree PRA Suitability	Survey Date	Results	Suitability
				pipistrelle and unknown bats.	
T34	536372, 389994	High	15/06/2023	No emergence or re-entry. Foraging of common pipistrelle bats.	High
			20/07/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle and soprano pipistrelle bats.	
			09/08/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle, soprano pipistrelle and noctule bats.	
T35	527602, 397642	High	21/06/2023	Emergence of two bats observed, which are assumed to be brown long-eared bats due to the bats recorded at the time of the emergence. Foraging and commuting of common pipistrelle and brown long-eared bats.	Confirmed
			15/08/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle, soprano pipistrelle, noctule and myotis sp. Bats.	
			29/08/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle, soprano pipistrelle, noctule and brown long-eared.	
T36	548253, 387571	Moderate	08/08/2023	No emergence or re-entry. Foraging of common pipistrelle, soprano pipistrelle and myotis species bats.	Moderate
			30/08/2023	No emergence or re-entry. Foraging and commuting of common	

Tree Reference	Grid Reference	Tree PRA Suitability	Survey Date	Results	Suitability
				pipistrelle and soprano pipistrelle bats.	
T37	548253, 387593	Moderate	08/08/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle and soprano pipistrelle bats.	Moderate
			30/08/2023	No emergence or re-entry. Foraging and commuting of common pipistrelle and soprano pipistrelle bats.	

## 1.5 Summary

### Roosting Bats

- 1.5.1 Of the 27 trees surveyed, 25 of the trees had no roosting bats recorded emerging or re-entering from the tree at the times of the surveys. Bat roosts were confirmed at trees T10 and T35 after bats were observed emerging from the trees during the surveys.
- 1.5.2 Survey data has confirmed the emerging bats from T35 are likely to be brown long-eared bats; and the re-entering bat to T10 is likely to be a common pipistrelle bat based on the bats recorded at the time of emergence.
- 1.5.3 Due to some limitations associated with survey of the trees T9, T20 and T21 a precautionary approach has been taken and it has been assumed that these trees support bat roosts. The bat activity present at each tree (and across most surveys) was dominated by frequently occurring and widespread species. It is considered that in this context, and given that only individual bats emerged from confirmed roosts, that the roosts are likely to represent low status roosts (transitional or day roosts) for common species (pipistrelle bat species). This assumption is sufficient to inform the assessment and the design of mitigation.
- 1.5.4 All of the confirmed and assumed roosts are going to be avoided during works.

### Foraging and Commuting Bats

- 1.5.5 The crossing point surveys have identified bat activity associated with locations across the Proposed Development. Consistent with biological data for the area, the bat activity is dominated by common and widespread species. Activity is low at three of the survey locations (CP4, CP7 and CP8). Where activity levels are higher the frequency of passes and species present considered to be typical of the habitats present. Higher levels of activity that included a proportion of Myotis species are present at CP3, which may be a result of the connectivity of habitats to the corridor formed by the nearby Waithe Beck.

## 1.6 Conclusion

- 1.6.1 Bat roosts have been confirmed in trees T9, T10, T20, T21 and T35. These are considered to represent low status roosts used by common and widespread species. Activity survey has identified bat activity that is typical of the habitats present across the Proposed Development, with localised levels of increased activity in habitats near Waithe Beck.



## 1.7 References

**Ref 1** Conservation of Habitats and Species Regulations, 2017 (as amended). Accessed: 02/10/2023 at: The Conservation of Habitats and Species Regulations 2017 (legislation.gov.uk).

**Ref 2** Wildlife and Countryside Act, 1981. Accessed: 02/10/2023 at: [Wildlife and Countryside Act 1981 \(legislation.gov.uk\)](#).

**Ref 3** Natural Environment and Rural Communities Act, 2006. Accessed: 02/10/2023 at: [Natural Environment and Rural Communities Act 2006 \(legislation.gov.uk\)](#).

**Ref 4** Natural England (2022) European Protected Species: Apply for a mitigation licence [Online] Available at: <https://www.gov.uk/government/publications/european-protected-species-apply-for-a-mitigation-licence>. Accessed 04.10.2023

**Ref 5** *Lincolnshire Wildlife Trust, 2006*. Lincolnshire Biodiversity Action Plan Action for Wildlife in Lincolnshire 2<sup>nd</sup> Edition. Accessed: 02/10/2023 at: <http://www.southkesteven.gov.uk/CHttpHandler.ashx?id=2058&p=0>

**Ref 6** *Department for Environment Food & Rural Affairs*. Development of a cost-effective method for monitoring the effectiveness of mitigation for bats crossing linear transport infrastructure - WC1060. Accessed: 02/10/2023 at: [Science Search \(defra.gov.uk\)](#).

**Ref 7** *Collins, J. (ed.), 2016*. Bat Surveys for Professional Ecologists Good Practice Guidelines (3<sup>rd</sup> edn). The Bat Conservation Trust, London. Accessed: 02/10/2023 at: [Bat Survey Guidelines 2015](#).

**Ref 8** Bat Conservation Trust (2022) Interim Guidance Note: Use of night vision aids for bat emergence surveys and further comment on dawn surveys [Online] Available at:

[REDACTED]

**Ref 9** Collins, J. (ed) (2023) Bat Surveys for Professional Ecologists: Good Practice Guidelines (4<sup>th</sup> Edition). The Bat Conservation Trust, London.

**Ref 10** Humber Zero (2022) Environmental Statement – Volume I. Chapter 13: Ecology and Nature Conservation.

**Ref 11** Kunz, T. H. Brock Fenton, M. (2005) Bat Ecology. The University of Chicago Press. London.

**Ref 12** Broughey, K. Lake, I.R., Haysom, KA, Dolman, P.M (2011) Improving the biodiversity benefits of hedgerows: How physical characteristics and proximity of foraging habitat affect the use of linear features by bats. Biological conservation. 144, 1790-1798.

**Ref 13** *Reason, P.F. and Wray, S., 2023*. UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats. Chartered Institute of Ecology and Environmental Management, Ampfield. Accessed 02/10/2023 at

[REDACTED]

