Lower Thames Crossing

6.3 Environmental Statement Appendices Appendix 8.16 – Draft EPS mitigation licence application – bats (Clean version)

(1 of 4)

APFP Regulation 5(2)(a)

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

Volume 6

DATE: December 2023
DEADLINE: 8

Planning Inspectorate Scheme Ref: TR010032
Application Document Ref: TR010032/APP/6.3

VERSION: 2.0

Revision history

Version	Date	Submitted at
1.0	31 October 2022	DCO Application
2.0	5 December 2023	Deadline 8

The Conservation of Habitats and Species Regulations 2017 (as amended)

Licence Application Form

Mitigation Licensing - Bats

Wildlife Licensing Natural England Horizon House
Deanery Road
Bristol
BS1 5AH
T. 020 802 61089
eps.mitigation@naturalengland.org.uk

- Please complete this application form using **dark ink** and BLOCK CAPITALS.
- Return the completed form to the address shown.
- All questions should be answered as appropriate. Questions marked with `*' are mandatory and failing to complete these may result in delays to your application.
- If there is insufficient space for completing answers on this form, please attach a separate sheet.
- Natural England will aim to determine the outcome of a completed licence application within its published service standards.

- If you experience any problems completing this application - please contact Wildlife Licensing.

For Office Use Only
Ref No:

1. Applicant Details

Please enter the details of the person or company who will become the licensee.

(a) Customer Details

Please note: If you are the agent / named ecologist registering on behalf of the applicant you will need to provide their full authorisation with this application.

*Title
(please tick as appropriate) Mr ■ Mrs ☐ Mx ☐ Other ☐ Please Specify

*Forename: Gareth
Middle Name:
*Surname: Protheroe

*Email Address: [redacted]

Professional Membership (eg, CIEEM, IEMA, etc.)

House Name / No.: Beaufort House
*Address Line 1: Lower Thames Crossing
*Address Line 2: 15 St Botolph Street
Address Line 3:

Town		*County	London
*Postcode	EC3A 7DT	Country	

Either `Telephone No.' or `Mobile No.' must be completed.

Telephone		Mobile	[redacted]
Fax			

*Customer Type *(eg, Farmer, Householder, Ecologist, etc.)* Motorway and major A-road operator

(b) If you are registering on behalf of an organisation please complete this section.

*Position: Development Phase Lead

*Organisation Name: National Highways

What is the size of your organisation?

- ☐ Micro (1 to 10 employees)
- ☐ Small (11 to 49 employees)
- ☐ Medium (50 to 249 employees)
- ☒ Large (250 employees or more)

What is the legal status of your organisation?
(eg. private limited company, registered charity,voluntary organisation, Government agency, Local Authority)

Government-owned company

Companies House Registration or Registered Charity Number:

(c) Alternative Applicant Contact Details

In the event that the applicant is unavailable to discuss the application, it would be helpful if alternative contact details could be provided. By completing this section you are confirming that this contact is authorised to act on behalf of the applicant.

Name:	TBC
Telephone number:	
Email Address:	

2. Named Ecologist Details

Please enter the details of the named ecologist. Please note a named ecologist is required for all development and mitigation applications

(a) Ecologist Details

Please note: If you are the applicant registering on behalf of the agent/named ecologist you will need to provide their full authorisation with this application.

*Email Address

*Title (please tick as appropriate) Mr ■ Mrs Mx ☐ Other ☐ (Please Specify)

*Forename: Nick

Middle Name:

*Surname: Clark

Professional Membership (e.g. CIEEM, IEMA, etc): CIEEM; CEnv

If you represent an organisation please complete (I) (II) and (III)

(i) *Business Title: Lead Ecologist - Lower T

(ii) *Company: National Highways

(iii) *Position: Lead Ecologist - Lower T

House Name / No.: Beaufort House

*Address Line 1: Lower Thames Crossing

*Address Line 2: 15 St Botolph Street

Address Line 3:

Town:

*County: London

*Postcode: EC3A 7DT

Country:

Either 'Telephone No.' or 'Mobile No.' must be completed.

Telephone:

Fax:

Mobile: [redacted]

*Customer Type *(eg, Farmer, Householder, Ecologist, etc.)*: Ecologist

(b) If you are registering on behalf of an organisation please complete this section.

*Position: Lead Ecologist - Lower Thames Crossing

*Organisation Name: National Highways

What is the size of your organisation?

- Micro (1 to 10 employees) ☐
- Small (11 to 49 employees) ☐
- Medium (50 to 249 employees) ☐
- Large (250 employees or more) ■

What is the legal status of your organisation?
(eg, private limited company, registered charity, voluntary organisation, Government agency, Local Authority

Government-owned company

Companies House Registration or Registered Charity Number:

(c) Alternative Named Ecologist Contact Details

In the event that the named ecologist is unavailable to discuss the application, it would be helpful if alternative contact details could be provided. By completing this section you are confirming that this contact is authorised to act on behalf of the named ecologist and has a detailed knowledge of the application.

Name:

Telephone Number:

Email Address:

3. Communication Preferences

Please indicate who should be contacted if we need to discuss this application:
(Please note more than one option can be selected for each question):

Applicant ☐ Named Ecologist ■

Please indicate to whom the outcome documentation for this application should be sent:

Applicant ☐ Named Ecologist ■

Applicant Preferences: Email ■ Post ☐ Telephone ☐

If `Yes' for telephone, please provide a contact no.

Named Ecologist preferences: Email ■ Post ☐ Telephone ☐

If `Yes' for telephone, please provide a contact no.

4. Previous Applications

(a) * To your knowledge, have there been any previous applications or licence decisions concerning this site? ■ Yes ☐ No

If `No' please move to question 4(g). If `Yes' to (a), please complete the following.

(b) * Date of most recent application: 15/10/2020

(c) * Which species was the subject of the previous application? Brown long-eared bat, Common pipistrelle, Natterer's bat, Soprano pipistrelle

(d) * What was the application or licence reference number? 2020-49967-EPS-NSIP1

(e) * What was the outcome of the previous application? (Please select one of the following)

Granted ☐ Not Granted ☐ Advice Only ■ Deferred ☐ Not yet known ☐

(f) To your knowledge, does this application relate to any previously licensed `mitigation' work for any species on the site being applied for? ☐ Yes ■ No

If `Yes' to (f): Please provide application/ licence reference numbers, species details and outcome details.

(g) To your knowledge, is the site being applied for subject to any recent, concurrent, pending or future applications for licences for the same or other European protected species or other protected species? ■ Yes ☐ No

If `Yes' to (g): Please provide application/ licence reference numbers and/or species information.

Draft licences will be submitted to Natural England for the following protected species: badger, hazel dormouse, great crested newt, water vole.

For applications which are part of the Pre-Submission Screening Service:

More information on Natural England's Pre-Submission Screening Service can be found here.

Is this a first draft application? ☐ Yes ☐ No Is this a subsequent draft? ☐ Yes ☐ No

Are you aware if your case has been seen or reviewed by Natural England? ■ Yes ☐ No ☐ Not sure

If yes, who provided the advice and when?

Any further information you would like to provide:

Is this a formal application? ☐ Yes ☐ No

Please provide any earlier reference numbers

For applications which are part of Nationally Significant Infrastructure Projects:

Is this a first draft application? ☒ Yes ☐ No Is this a subsequent draft? ☐ Yes ☐ No

Is this a formal application? ☐ Yes ☒ No

Please provide any earlier reference numbers

This is a draft submission with the objective of securing a letter of no impediment. Discussions with Amy Radford, Matthew Ashton and Sonya Gray have been ongoing regarding this application since 2019. Sonya Gray and Matthew Ashton have commented on a working draft of this licence.

5. Purpose

(a) * Brief Description of Proposal
eg, Construction of a new road, maintenance of a bridge, construction of five flats with access road and car parking area.

Construction and operation of a new road linking A2/ M2 in Kent to the M25 junction 29 in Essex, via a twin bore tunnel under the River Thames. Total length is 23km, with 4.25km iin the tunnels. The road will mainly be three lanes in each direction.

(b) * Please tell us why you need a licence.
eg. A day roost will be damaged, a night roost will be destroyed, a maternity roost will be modified and a day roost will be destroyed.

Twenty known roosts will be lost or will be significantly disturbed as a result of the construction of the Project in a combination of trees and structures.
The known roosts to be lost are as follows:
Four common pipistrelle day roosts for one individual, four common pipistrelle day roosts for two individuals, a common pipistrelle day roosts for four individuals, three soprano pipistrelle day roosts for one individual, two brown long-eared bat day roosts for an individual, two noctule day roosts for an individual, a Daubenton's bat day roost for an individual; and, a hibernation roost within an air raid shelter will be within 1 m of main works and thus assumed to likely be abandoned. The hibernation roost is utilised by a small number (<4 per species) brown brown long-eared bats, Daubenton's bat and Natterer's bats.
Using Licence Policy 4 there are predicted to be a further 13 individual day roosts for common/soprano pipistrelle, 9 BLE day roosts, 9 Daubneton's day roost, 9 Natterers day roost and 9 noctule day roosts in trees impacted byt the project.
Two Daubenton's and 2 noctule maternity roosts are also predicted for the purpose of LP4

(c) * Please confirm the purpose of the application:

☒ Imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment under section 55(2)(e)

☐ Preserving public health or public safety, under section 55(2)(e)

☐ Preventing the spread of disease, under section 55(2)(f)

☐ Preventing serious damage to livestock, foodstuffs for livestock, crops, vegetables, fruit, growing timber, fisheries or inland waters, or any other form of property under section 55(2)(g)

☐ A purpose not specified in Regulation 55(2) that is consistent with Article 16(1)(e) of the Habitats Directive, under section 55(4)

(d) * Please confirm the category most appropriate to your proposed work
(Please select one of the following): :

- ☐ Agriculture / Farming/ Fishing / Forestry/ Nature conservation
- ☐ Archaeological investigation
- ☐ Barn conversion
- ☐ Commercial - eg, office, retail
- ☐ Communications
- ☐ Energy generation/Energy supply
- ☐ Flood and coastal defences
- ☐ Health and safety
- ☐ Heritage/Historical (eg, National Trust, listed building, scheduled monument)
- ☐ Householder home improvement (eg, loft conversion, extension, garage, conservatory, repairs)
- ☐ Housing (non-householder) (eg, residential development, repairs/maintenance, non-householders)
- ☐ Industrial/Manufacturing
- ☐ Mineral extraction/Quarrying
- ■ Nationally Significant Infrastructure Projects
- ☐ Places of worship
- ☐ Public buildings and land (eg, schools, universities, hospitals, care facilities, military, prisons)
- ☐ Tourism/leisure eg, golf courses, country parks, holiday camps
- ☐ Transport/Highways
- ☐ Water management
- ☐ Water supply and treatment/water environment
- ☐ Other

If other, please provide details here:

(e) * Is the proposed work part of a phased or a multi-plot development? ☐ Yes ■ No

If `Yes' to (e): You must submit a species specific master plan and Habitat Management and Maintenance Plan with this application, as a separate document. Guidance on what should be included in a master plan can be found at - http://webarchive.nationalarchives.gov.uk/20140605090108/http://www.naturalengland.org.uk/Images/WML- G11_tcm6-9930.pdf

6. Site Details

*Is the address for the site to be licensed different to the applicant's address? ■ Yes ☐ No

If `Yes': For the Site/Location to be licensed, please complete **all** of the following details:
If `No': Please complete Site/Location Name and OS Grid Reference boxes only.
(For linear projects, please add the start and end points separately)

Site Details

*Site / Location Name:	Lower Thames Crossing
House Number:	
Address Line 1:	
Address Line 2:	
Address Line 3:	
Town:	A2/M2 in the sourth to junction 29 of the M25 in the north
*County:	Kent in the south and Essex in the north
Postcode:	
*OS Grid Reference: *(In format XX123456)*	Southern Grid Ref: TQ 66809 70028 Northern Grid Ref: TQ 56934 92188

7. Conservation Considerations

(a) *Will any part of the proposed activity fall in and/or adjacent to a Designated Site? ■ Yes ☐ No ☐ N/A

If `Yes' to (a) please complete the table below. If `No', please go to the next section.

Please indicate whether the activity will fall on and/or adjacent to a designated site:	Designated Site Name	Type of Designated Site *Eg National Nature Reserve (NNR), Site of Special Scientific Interest (SSSI), Special Protection Area (SPA), Special Area of Conservation (SAC), Ramsar Site, Ancient Monument, Marine Nature Reserve (MNR), Area of Outstanding Natural Beauty (AONB)*
On ■ Adjacent to ☐	Shorne and Ashenbank Woods	SSSI
On ■ Adjacent to ☐	South Thames Estuary and Marshes	SSSI
On ☐ Adjacent to ■	Great Crabbles Wood	SSSI
On ☐ Adjacent to ■	Mucking Flats and Marshes	SSSI

Please indicate whether the activity will fall on and/or adjacent to a designated site:	Designated Site Name	Type of Designated Site *Eg National Nature Reserve (NNR), Site of Special Scientific Interest (SSSI), Special Protection Area (SPA), Special Area of Conservation (SAC), Ramsar Site, Ancient Monument, Marine Nature Reserve (MNR), Area of Outstanding Natural Beauty (AONB)*
On ☐ Adjacent to ■	Thames Estuary and Marshes	SPA
On ■ Adjacent to ☐	Thames Estuary and Marshes	Ramsar

(b) Have you consulted with Natural England for advice on the implications of the application on the designated site? ■ Yes ☐ No ☐ Not known

(c) Please give either the outcome of your consultations or the reason why you have not consulted us. Please provide any relevant correspondence and the name of the local Natural England adviser or reserve manager consulted.

Discussions with Natural England (Sean Hanna; Jonathan Bustard; Jim Seymour) have been ongoing during the Project's development. Effects to all statutory designated sites are identified and assessed as part of the Environmental Statement submitted in support of the DCO application for the Project.

8. Authorisation

(a) *Is the applicant the owner/occupier of the land? ☐ Yes ■ No ☐ N/A

If `Yes' to (a) please go to the next section. If `No' to (a) please answer (b).

(b) Have you received the owner occupier's permission to apply? ☐ Yes ■ No

Please note that it is your responsibility as the applicant to obtain the owner or occupier's permissions to act under licence on their property.

You may be asked to provide documentation which confirms that you have owner or occupier's permissions and we will contact you if this is necessary

9. Application Details

(a) Please add details for all licensable actions you wish to perform. Please complete one column per species. You may enter more than one Activity and/or Method or Field Technique per species. **All the data entered here MUST be accurately reflected in your accompanying method statement**.

- *Please see annex for guidance on bat roost definitions.*
- *If you require additional rows, please attach extra sheets to your application, presenting the information in the same table format.*

Application Subject	Bats	Bats	Bats	Bats	Bats
*Species	Common pipistrelle	Soprano pipistrelle	Daubenton's	Noctule	
*Activity	Capture Take ■ Disturb ■ Transport ■ Damage Breeding Site ☐ Destroy Breeding Site ☐ Damage Resting Place ☐ Destroy Resting Place ■	Capture Take ■ Disturb ■ Transport ■ Damage Breeding Site ☐ Destroy Breeding Site ☐ Damage Resting Place ☐ Destroy Resting Place ■	Capture Take ■ Disturb ■ Transport ■ Damage Breeding Site ☐ Destroy Breeding Site ■ Damage Resting Place ☐ Destroy Resting Place ■	Capture Take ■ Disturb ■ Transport ■ Damage Breeding Site ☐ Destroy Breeding Site ■ Damage Resting Place ☐ Destroy Resting Place ■	Capture Take ☐ Disturb ☐ Transport ☐ Damage Breeding Site ☐ Destroy Breeding Site ☐ Damage Resting Place ☐ Destroy Resting Place ☐
*Method or Field Technique	By hand ■ By static hand-held net ■ Temporary exclusion ☐ Permanent exclusion ■ Destructive search by soft demolition ■ Mechanical demolition ■ Disturbance by illumination (intentional by torch) ■ Disturbance by noise or vibration ☐ Temporary obstruction of roost access ☐ Endoscopes ■	By hand ■ By static hand-held net ■ Temporary exclusion ☐ Permanent exclusion ■ Destructive search by soft demolition ■ Mechanical demolition ■ Disturbance by illumination (intentional by torch) ■ Disturbance by noise or vibration ☐ Temporary obstruction of roost access ☐ Endoscopes ■	By hand ■ By static hand-held net ■ Temporary exclusion ■ Permanent exclusion ■ Destructive search by soft demolition ■ Mechanical demolition ■ Disturbance by illumination (intentional by torch) ■ Disturbance by noise or vibration ■ Temporary obstruction of roost access ☐ Endoscopes ■	By hand ■ By static hand-held net ■ Temporary exclusion ☐ Permanent exclusion ■ Destructive search by soft demolition ■ Mechanical demolition ■ Disturbance by illumination (intentional by torch) ■ Disturbance by noise or vibration ☐ Temporary obstruction of roost access ☐ Endoscopes ■	By hand ☐ By static hand-held net ☐ Temporary exclusion ☐ Permanent exclusion ☐ Destructive search by soft demolition ☐ Mechanical demolition ☐ Disturbance by illumination (intentional by torch) ☐ Disturbance by noise or vibration ☐ Temporary obstruction of roost access ☐ Endoscopes ☐
* Maximum number of bats to be licensed at the time that works are proposed	18 + up to 13 (estimated from LP4)	3 (see common pipistrelle for LP4 estimates)	5 + 9 (estimated from LP4)	2 + up to 9 (estimated from LP4)	Cannot write in species box. Please see annex for rest of the table.
* Number of breeding sites to be impacted	0	0	2 (estimated from LP4)	2 (estimated from LP4)	
* Number of resting sites to be impacted	9 + 13 (estimated from LP4)	3 (see common pipistrelle for LP4 estimates)	2 + 9 (estimated from LP4)	2 +9 (estimated from LP4)	

Expected roost type affected					
	Hibernation confirmed ☐	Hibernation confirmed ☐	Hibernation confirmed ■	Hibernation confirmed ☐	Hibernation confirmed ☐
	Day ■	Day ■	Day ■	Day ■	Day ☐
	Transitional/ Occasional ☐	Transitional/ Occasional ☐	Transitional/ Occasional ☐	Transitional/ Occasional ☐	Transitional/ Occasional ☐
	Feeding perch ☐	Feeding perch ☐	Feeding perch ☐	Feeding perch ☐	Feeding perch ☐
	Night ☐	Night ☐	Night ☐	Night ☐	Night ☐
	Satellite ☐	Satellite ☐	Satellite ☐	Satellite ☐	Satellite ☐
	Swarming or mating ☐	Swarming or mating ☐	Swarming or mating ☐	Swarming or mating ☐	Swarming or mating ☐
	Maternity ☐	Maternity ☐	Maternity ■	Maternity ■	Maternity ☐
	Underground - mines, caves, cellars, tunnels or bridges (number & type) ☐	Underground - mines, caves, cellars, tunnels or bridges (number & type) ☐	Underground - mines, caves, cellars, tunnels or bridges (number & type) ☐	Underground - mines, caves, cellars, tunnels or bridges (number & type) ☐	Underground - mines, caves, cellars, tunnels or bridges (number & type) ☐

Please enter the proposed start date of action below. *Please note this refers to the date of the first licensable action, not necessarily when the development commences.*

*Proposed Date From:					
*Proposed Date To:					

(b) * Have you sent your records to the Local Records Centre? ☐ Yes ■ No

Please note: You must send survey data and habitat assessment data to your Local Records Centre (LRC). It is a condition of survey licences that records are sent to LRCs annually or to other organisations as specified on a particular survey licence (e.g. People's Trust for Endangered Species).

(c) * Have surveys been conducted within the current or most recent optimal season and undertaken in accordance with the most up to date edition of the Bat Conservation Trust (BCT) *Bat Surveys for Professional Ecologists - Good Practice Guidelines* and the *Bat Mitigation Guidelines*? ☐ Yes ■ No

If `No', please confirm that full justification has been provided in section C5a in the Method Statement template. **Please note that inadequate or insufficient survey information is likely to cause a delay to your licence application and possibly result in a Further Information Request.** ■ Yes, I confirm

10. Experience

Please note: For guidance in completing this section please refer to the Experience in Bat Mitigation document at http:// webarchive.nationalarchives.gov.uk/20140605090108/http://www.naturalengland.org.uk/Images/bat-mitigation-guidance_tcm6-10534.pdf

(a) * Has the named ecologist associated with this application held or been named on a bat mitigation licence in the past three years for the same species and in relation to a project of similar scale, methodology and mitigation?

☐ Yes ☐ No

If `Yes' to (a):

(b) * Please provide the name of the issuing authority, the licence reference number, date of issue and the species and roost types of licences held

If `No' to (a) please complete the following section. If "Yes" to (a) go to the next section.

(c) * Does the named ecologist currently hold a valid personal survey licence or are they registered to use a minimum of Level 2 Bat class survey licence?

☐ Yes

☐ No

If `Yes' complete **all** of the following.

If `No' go to (f)

(d) * What is/are the survey licence reference number(s)?

(e) * Number of years the survey licence(s) have been held (minimum of 2 years):

(f) * Please give brief details of the named ecologist's current science, education or conservation licence or any other licences issued to the ecologist in the last three years relevant to the species relating to this application:

(g) * Please give brief details of the named ecologist's experience on mitigation projects (a minimum of 3 projects) relevant to the species relating to this application, including in what capacity they acted. State the site names and reference numbers of licences and the type of mitigation involved:

(h) * Please provide details of the named ecologist's Qualifications, including any Continual Professional Development (CPD) training relevant to the species relating to this application:

Please note: If you have not held a mitigation licence in the last three years you will need to provide written references from two people who are familiar with the named ecologist's work. Please attach these references with your application. References provided in support of your licence application should:

- Vouch for the named ecologist's suitability and competence to prepare and deliver mitigation projects;
- State how long referees have known the named ecologist and in what capacity;
- Provide details of the named ecologist's mitigation experience with the relevant species or a related species; and
- Provide details of the referees' own mitigation experience and mitigation licence held (if appropriate): at least one referee must have held a mitigation licence within the last 3 years.

(i) * Are you providing references? ☐ Yes ☐ No

If `Yes' to (i): Please provide details of the referees. We may need to contact these referees to verify their statements.

1st Referee:

2nd Referee:

11. Consent Status

(a) * Is any consent required for your proposed project and the subject of this licence application?

- ■ 1. Planning-related consent required (e.g. Planning permission, listed building consent, etc)
- ☐ 2. Demolition consent (under Building Act 1984) including prior notice to demolish.
- ☐ 3. Other type of consent required (e.g. Minerals consents, Highway Act consents, Secretary of State Decision Letter, Compulsory Purchase Order, Environment Agency Consent, etc.)
- ☐ 4. Permitted Development (under Town and Country Planning Act 1990) - no specific consent required.
- ☐ 5. No consent required (e.g. Public Health and safety issues)

If `3' is selected (b) * Please provide details of these consents

If `5' is selected (c) * Please explain why no consent is required

If `1', `2' or `3' is selected

(d) Have you obtained the necessary consent(s) to allow the proposed activity to be commenced? ☐ Yes ■ No

- *If `No' to (d), please complete `Consent Not Obtained'*
- *If `Yes' to (d), please complete `Consent Obtained'*

* Please confirm that you will submit copies of any consent(s) or extracts that are relevant to the proposed activity and this licence application if applicable: ☐ Yes, I confirm

Consent not obtained

Please note: If you have not held a mitigation licence in the last three years you will need to provide written references from two people who are familiar with the named ecologist's work. Please attach these references with your application. References provided in support of your licence application should:

(e) * Please provide details of the outstanding consents to be obtained and the likely time scales for their determination/issue.

An application for development consent will be submitted to the Planning Inspectorate in 2022. The information contained within this draft licence application demonstrates that the project could be constructed in accordance with the Conservation of Habitats and Species Regulations 2017. This information would also inform the issuing of a Letter of No Impediment (LONI) by Natural England with respect to the project.

Pre-submission Screening Service:

We will provide advice on draft applications, prior to consents being in place and prior to a formal licence application being submitted. We **strongly** advise customers to use this service rather than trying to pursue a licence under Exceptional Circumstances, particularly where there are concerns about financial implications resulting from delays in obtaining a licence once planning consents are in place. Please see our website for further advice about this.

Consent obtained

(f) * Please confirm details of all the consents that have been granted relevant to the proposed activity and this licence application.

Full Planning Permission	☐	Outline Planning Permission	☐
Demolition consent (under Building Act 1984) including prior notice to demolish	☐	Conservation Area Consent	☐
Listed Building Consent	☐	Tree Preservation Order	☐
Highways Act Consent	☐	Utilities Consent	☐
Mineral Consent	☐	Mineral Consent with Review of Mineral Planning Permission	☐
Mineral Consent (Review of Mineral Planning Permission submitted to Mineral Planning)	☐	Other consent type	☐

If Other, please provide details here:

(g) * Please provide consent reference number(s)

Please submit copies of the consents (or extracts) that are relevant to the proposed activity and this licence application, if applicable

(h) For all consents that have been granted, have all conditions or Reserved Matters relating to wildlife species and habitat issues (which are intended to be and are capable of being discharged before development begins) been discharged?

☐ Yes ■ No

If `No' to (i), please answer **all** of the following. If `Yes', please skip to (j).

Please note: If it is not possible or not intended for the conditions to be discharged before development commences then please complete the questions below.

(i) Please give details of those conditions that are still to be discharged and explain why they have not been discharged.

(j) Is the site subject to any commitment that affects the protected species named in this application?

■ Yes ☐ No

For example a Section 106 Agreement (Town and Country Planning act 1990) or other commitments made at a Public Inquiry or in an Environmental Statement.

If `Yes' to (j) Has the commitment been met? Please also explain what has been done.

If `Yes' to (j) What work is outstanding and when will it be completed?

(k) Is the site subject to any such commitment that affects other European Protected Species or other protected species? *Eg, a Section 106 Agreement (Town and Country Planning Act 1990) or other commitments made at a Public Inquiry or in an Environmental Statement.*

■ Yes ☐ No

If `Yes' to (k) Has this been met?

If `Yes' to (k) When will this be complete?

Reasoned Statement & Supporting Documents

A Reasoned Statement and supporting documents may be required in support of this application

Copies of the latest version of the Reasoned Statement template which sets out when a Reasoned Statement is required and further guidance to help are available on our website.

Please confirm that you have read and understood the Reasoned Statement template and advice note/guidance

☒ Yes, I confirm

(l) *Does your application require a Reasoned Statement? ☒ Yes ☐ No

If `No' to (l) *Please confirm the exception that applies

☐ Applications for home improvements and small scale housing developments:

- Repairs and maintenance
- Roof replacements, loft conversions and extensions
- Renovations of existing domestic dwellings and associated structures, such as garages
- Housing developments of less than 1 hectare, including:
  - existing buildings and associated structures that may need to be demolished before redevelopment takes place (whether domestic dwellings or other types of buildings)
  - barn conversions for domestic dwellings (this doesn't include conversions for commercial use, such as holiday lets)

☐ Applications to conserve and protect listed buildings, scheduled monuments or places of worship:

- listed buildings
- scheduled monuments
- registered places of worship or a place of worship belonging to the Church of England for:
  - repairs and maintenance (including roof replacement)
  - restoration
  - essential works to:
    - prevent serious damage to buildings and structures (including contents
    - preserve public health and safety
    - enable continued appropriate use of the building or structure

☐ Applications to maintain, repair, improve public buildings or develop public land

Public buildings and public land includes buildings and land owned or leased by the government, their departments, agencies and arm's length bodies, such as:

- schools (state funded and academies only)
- hospitals
- prisons
- courts
- airfields

You don't need to include a reasoned statement where bats and their roosts will be affected by:

- repairs and maintenance
- restoration
- renovation

- redevelopment of an existing building(s), which may include demolition before redevelopment, as long as it remains in use as a public building
- extending or adding new buildings within the grounds of the existing developed site
- essential works to:
  - prevent serious damage to buildings (including contents)
  - preserve public health and safety
  - allow the building to be continued to be used as it was intended

Extending public buildings beyond existing boundaries, changing them to private use, or developing land for private use will need a reasoned statement with your application.

If you have selected one of the above exceptions, please provide details of how the proposed works meet the exception criteria:

(m) Does your application affect a regionally or nationally important population of a European Protected Species? ☐ Yes ■ No

If `Yes' to (m) ***and*** *a Reasoned Statement is* ***not required ...*** (n) You must consult Natural England for advice before making an application. Please give either the outcome of your consultation (with details of who you consulted) or the reason why you have not consulted us

12. Consenting Authority

Please provide the Local Planning Authority/Authorities that have granted consent for the proposed project and the subject of this licence application. Please then provide contact details for the responsible officer.
If consent is granted by another body (e.g. Secretary of State, Natural England, Environment Agency, Utilities Consent, Highways Consent, etc) then please provide details for it as appropriate.
If no consent is required (e.g. Public health and safety issues) then please leave the remaining fields blank.

*Consenting Authority Name: Secretary of State for Transport

*Title	*Forename	*Surname	*Position

Email Address:

Telephone Number

Address

13. Method Statement

A Method Statement must be provided to support this application, along with other supporting documents, which may include some or all of the following:

- Maps
- Figures
- Habitat management and maintenance plans
- Master plan
- Appended survey results
- A work schedule

Please note: The Method Statement should be prepared by a consultant ecologist or another suitably qualified person because compiling the content requires specific species and site-related knowledge.

14. Supplementary Information

Please provide any additional information you may have to support your application.

15. Charge Screening

15a. Applicant Screening

Natural England will use this section to assess whether you need to pay for your licence. If you do not complete your form correctly, your request might take longer.

Charge screening relating to modifications to a wildlife licence granted before 22 April 2019 only
Enter your licence reference number

15b. Is there a charge for your licence?

Your answers must not conflict with the questions 5, 9 and 11. If you are going to conserve a bat roost in situ, you must give evidence in your method statement.

The main purpose of my licence application is:

- ☐ To prevent the spread of disease
- ☐ To prevent serious damage to property
- ☐ To preserve public health or public safety - but not for imperative reasons of overriding public interest of a social or economic nature
- ☐ To conserve an important bat roost in situ - where the roost will not be altered

For the conservation of:

- ☐ a scheduled monument,
- ☐ a listed building
- ☐ a registered place of worship
- ☐ a traditional farm building in a Stewardship agreement

For a householder home improvement project to a single home (such as an extension, a garage, or a car port, a wall or fence) for which you

- ☐ have received planning consent through a householder planning application
- ☐ do not need planning consent (permitted development).

If you have ticked any of the purposes above, you may be exempt from licence charges.

If your application is to conserve a bat roost in situ, you are only exempt from charges if you can select all of the following factors:

- ☐ The proposed works do not affect the roost
- ☐ The roost is a maternity, swarming or hibernation roost **or** the roost is a day roost containing 3 or more bats at one time
- ☐ The roosting space(s) and pre-emergent flight areas will stay accessible to bats and keep the same length, height and width
- ☐ Access points will not be changed
- ☐ For roof roosts, the roof timbers must not be changed
- ☐ No more than 5% of the building materials in the roost space will be replaced
- ☐ The temperature and humidity of the roost must not be changed
- ☐ Light levels inside and outside the roost and flight paths to and from the roost will not be affected

If your licence is exempt from charges, you do not need to complete the rest of this section 15.

15c. Invoice Details

Only complete this section if your licence is charged for.

Please note:

- if the section below needs to be completed and is left blank, the form will be returned to you for completion. Licence assessment will not commence until these details are provided
- requests for changes to invoice details made after an invoice has been issued (including missing purchase order numbers) will be subject to a £101 administration charge.

☐ Contact details are the same as applicant details

Company name

Address including postcode

Telephone number Mobile number

Email address for invoices

Contact name for invoices

Email address (if different from invoice email address)

Do you use a purchase number for company invoices?

◉ Yes

○ No

If yes, enter the purchase order number, if available

15d. Licence Cost

The cost of the A13 licence is either:

- a fixed price of £500
- a variable price depending on the time taken to assess your application

Can I pay a fixed price for my licence?

Your answers must be supported by evidence in your licence application (questions 5, 7, 9) and method statement.

The project:

- is not a phased or multi-plot development
- will not impact on a Site of Special Scientific Interest, a Special Protection Area or a Special Area of Conservation

☐ yes

☐ no

The application is for:

☐ common pipistrelle, soprano pipistrelle, whiskered, Brandt's, Natterers, Daubenton's or brown long-eared bats **AND** is only for a day roost, night roost, feeding perch or transitional / occasional roosts

☐ serotine bats **AND** is only for a day roost, night roost, feeding perch or transitional / occasional roosts **AND** is in one of the following counties: Kent, East Sussex, West Sussex, Surrey, Greater London, Hertfordshire, Essex, Buckinghamshire, Berkshire, Oxfordshire, Hampshire, Wiltshire, Somerset, Dorset and Devon

☐ lesser horseshoe bats **AND** is for a day roost or transitional / occasional roost **AND** is in one of the following counties: Cornwall, Devon, Somerset, Bristol, Wiltshire, Dorset, Gloucestershire and Herefordshire

If you have answered yes and have selected one of the species, roost and location combinations above, you can pay the fixed price for your licence.

If your licence is not eligible for the fixed price, you will need to pay a variable price.

Variably priced licences

The variable price is calculated to the nearest quarter of an hour, based on an hourly rate of **£101** plus a £183 compliance check.

Likely costs are:

- new licences between £500 and £2000
- modifications between £100 and £1800
- resubmissions between £500 and £1500

Complex cases are likely to cost more, such as:

- works on multiple buildings with a number of roosts and different species
- works during sensitive times for bat species, for example during the maternity period to a maternity roost
- rarer bat species
- railway tunnels and mines with swarming sites or hibernation roosts
- linear infrastructure that could lead to habitat fragmentation
- where other local projects may cause cumulative effects on bat species (this is easier to assess if you provide evidence with your application)
- projects using unusual, new or contentious methods
- applications or project plans that have incomplete or inaccurate details
- applications or project plans with unnecessary additional information
- issues with ecologist experience or poor references
- surveys that do not follow guidance or are limited or constrained
- phased or multi-plot developments
- use of licensing policies
- applications where compliance issues have been identified or have previous police involvement
- applications without relevant planning permissions (or other consents) in place; that do not have conditions or reserved matters fully discharged; or that propose the use of exceptional circumstances
- applications that affect a protected site

16. Using and Sharing Your Information

How we use your personal information is set out in the Wildlife Licensing privacy notice which can be found here

https://www.gov.uk/government/publications/natural-england-privacy-notices

Important Advice:

- If your application is made under the Wildlife and Countryside Act 1981 (as amended) or the Conservation of Habitats and Species Regulations 2017 (as amended), any person who in order to obtain a licence knowingly or recklessly makes a statement or representation, or furnishes a document or information which is false in a material particular, shall be guilty of an offence and may be liable to criminal prosecution. Any person found guilty of such an offence is liable, on summary conviction, to imprisonment for a term not exceeding six months or to a fine not exceeding level 5 on the standard scale, or to both. Regarding other wildlife legislation, we will look to provisions in the Fraud Act 2006 (as amended) in respect of applicants making any false representations.

- Natural England or the Secretary of State can modify or revoke at any time any licence that is issued, but this will not be done unless there is good reason for doing so. Any licence that is issued is likely to be revoked immediately if it discovered that false information has been provided that resulted in the issue of a licence.

17. Declaration

17a. Applicant Declaration

*Have you or any person listed in the application been convicted of any wildlife-related or animal welfare offence? ☐ Yes ☐ No

If `Yes' to (16a) Please provide details of the convictions: *(including dates)*

The offences we are referring to relate to persons convicted on or after 1 January 2010 of an offence under the Wildlife and Countryside Act 1981, the Conservation (Natural Habitats &c.) Regulations 1994, the Conservation of Habitats and Species Regulations 2017 (as amended), the Protection of Badgers Act 1992, the Deer Act 1991, the Hunting Act 2004, the Wild Mammals (Protection) Act 1996, the Animal Welfare Act 2006 and the Protection of Animals Act 1911 (all as amended). You do not have to declare conviction if the person concerned is: (1) a rehabilitated person for the purposes of the Rehabilitation of Offenders Act 1974 and their conviction is treated as spent; or (2) in respect of such an offence, a court has made an order discharging them absolutely.

17b. Applicant Declaration

☐ I have read and understood the privacy notice above.

- Where required, I undertake to obtain permission from landowners / occupiers of land to exercise any licence resulting from this application, and to allow any employee or representative of Natural England to monitor or inspect the work described in this application.
- I have read and understood the guidance provided in the application form and on the Wildlife Licensing Internet guidance pages.
- I have read and understood the Terms and Conditions for payment in respect of Wildlife Licence Applications and agree to pay all the relevant charges due.
- I declare the particulars given are correct to the best of my knowledge and belief, and I apply for a licence in accordance with the information I have provided.
- I confirm that there is no satisfactory alternative to meet the need/resolve the problem detailed in this application.

☐ I agree to the declaration above.

Signature of applicant:

For electronic applications, please insert an electronic signature above or tick this box to confirm with the declaration. ☐

Name: *(In BLOCK letters)*

Date:

17c. Ecologist Declaration

☐ I have read and understood the privacy notice above.

- I confirm that I have visited the site(s).

- I confirm that I have visited the site(s).
- I have designed and inputted into the licence proposal.
- I confirm that there is no satisfactory alternative to meet the need/resolve the problem detailed in this application
- I am satisfied that the proposal will result in no adverse impact on the species concerned
- I declare the particulars given are correct to the best of my knowledge and belief, and the applicant may apply for a licence in accordance with information I have provided
- I have documentary evidence that I am authorised to act on behalf of the applicant that I will supply to Natural England on request.

☐ I agree to the declaration above.

Signature of ecologist:

For electronic applications, please insert an electronic signature above or tick this box to confirm with the declaration. ☐

Name: *(In BLOCK letters)*

Date:

18. Application Notes

Applicant

The applicant is the person submitting the application (usually the landowner or occupier) who, if the licence was granted, would become the licensee. The applicant may appoint agents to produce the application pack and act on their behalf. A person with specific skills and knowledge of the species concerned, such as a consultant ecologist, must be appointed to assist in the preparation and the delivery of the proposals that ensure the species protection requirements can be met.

Licensee

The "Licensee" named on the licence is responsible for ensuring that all activities carried out on site in relation to the licence comply with the terms and conditions of the licence. However, all persons authorised to act under the licence must comply with the licence and its conditions (see Regulation 60(1) of the 2017 Regulations (as amended)). This means that all authorised persons have a responsibility for ensuring that the licence terms and conditions, including any special conditions, are understood and complied with. Failure to do so could lead to prosecution.

Consultant/Named Ecologist

The "Named Ecologist" is a professional ecological consultant who has satisfied Natural England that they have the relevant skills, knowledge and experience of the species concerned and is responsible for undertaking and/or overseeing the work undertaken in respect of the licensed species. The `Named Ecologist' has a responsibility for ensuring that the licence is complied with. They are responsible for advising the licensee on the suitability and competence of any Accredited Agents or Assistants employed on site to undertake the required duties and may include the direct supervision of Assistants where appropriate. More information about the experience required to become a named ecologist can be found at: http://webarchive.nationalarchives.gov.uk/20140605090108/http:/www.naturalengland.org.uk/Images/bat- mitigation-guidance_tcm6-10534.pdf

Accredited Agent

An "Accredited Agent" is a suitably trained and experienced person who is able to carry out work under a licence without the personal supervision of the Named Ecologist. Any Accredited Agent must be appointed by the Licensee and be in possession of a letter signed by the Licensee confirming their appointment. Agents shall carry a copy of the said letter when acting under the licence and shall produce it to any police or Natural England officer on request.

Assistants

An "Assistant" is a person assisting a Named Ecologist or Accredited Agent. Assistants are only authorised to act under this licence whilst they are under the direct supervision of either the Named Ecologist or an Accredited Agent.

Bat Roost Definitions

Day roost: a place where individual bats, or small groups of males, rest or shelter in the day but are rarely found by night in the summer.

Night roost: a place where bats rest or shelter in the night but are rarely found in the day. May be used by a single individual on occasion or it could be used regularly by the whole colony.

Feeding roost: a place where individual bats or a few individuals rest or feed during the night but are rarely present by day.

Transitional / occasional roost: used by a few individuals or occasionally small groups for generally short periods of time on waking from hibernation or in the period prior to hibernation.

Swarming site: where large numbers of males and females gather during late summer to autumn. Appear to be important mating sites.

Mating sites: where mating takes place from later summer and can continue through winter.

Maternity roost: where female bats give birth and raise their young to independence.

Hibernation roost: where bats may be found individually or together during winter. They have a constant cool temperature and high humidity.

Satellite roost: an alternative roost found in close proximity to the main nursery colony used by a few individual breeding females to small groups of breeding females throughout the breeding season.

Other - if applicable this will be specified in special condition 7.

For the purpose of this licence the following licensed methods are defined as:

Destructive search by soft demolition: the taking apart of a bat structure in a controlled and careful manner by hand, or in some instances with the assistance of hand-held tools and machinery, under direct ecological supervision. Only the Named Ecologist, Accredited Agent or a directly supervised Assistant may take any bats found.

Mechanical demolition: destruction of a structure that previously supported a bat roost using mechanical means after the structure has been declared free of bats by the Named Ecologist or Accredited Agent. Mechanical demolition usually is preceded by a soft demolition exercise or completion of an exclusion process.

The Conservation of Habitats and Species Regulations 2010 (as amended)

European Protected Species Mitigation Licensing - Reasoned Statement for the purpose of Imperative Reasons of Overriding Public Interest

The information provided in this form will be used by Natural England to determine whether the proposed activity affecting the European Protected Species meets the requirements of Regulation 53(2)(e) and 53(9)(a) within The Conservation of Habitats and Species Regulations 2010 (as amended). These are known as the '**purpose**' and '**no satisfactory alternatives**' tests.

This form, for the purpose of Imperative Reasons of Overriding Public Interest, only needs to be completed if your application proposal is **not** covered by one the scenarios and categories listed on GOV.UK.

Important Note: Detailed information on the proposal is required to demonstrate that it will meet the tests set out under the Regulations. If you encounter difficulty answering the questions or providing the evidence required, it may suggest that your proposal is insufficiently advanced to satisfy the licensing tests. In that case, you should consider delaying your application until this information is available.

Please read the following and complete:

- ***Section A: Purpose test***
  "*Imperative reasons of overriding public interest" (IROPI) including those of a social or economic nature and beneficial consequences of primary importance for the environment*"

- ***Section B: No Satisfactory Alternative test***

The tests are applied proportionately, so the strength of the evidence required to meet each will need to be sufficient to justify the impact upon the protected species (see guidance for further information). Where the supporting evidence upon which your reasoning is based consists of lengthy documents, please do not submit these in their entity as this will delay your application if we need to go through them to find the relevant extracts. You need to provide clear, concise information for us to be able to meet the licensing tests. Please note that your application is likely to be rejected in cases where the supporting evidence has not been clearly referenced.

Section A: Purpose Test

A1 Please select against all of the following below which apply to your proposal. You are asked to indicate against those that apply whether the projected benefits are primary or secondary or not applicable to your proposal.

Please note: A primary benefit is considered to be the key social, economic or environmental benefit brought about from the proposal. A secondary benefit is considered to be an additional benefit, but not the main reason for the proposal. There may be more than one secondary benefit but supporting evidence should be provided in Section A2 where applicable, for each benefit selected.

Does your proposal:	
Provide housing in an area where shortfalls have been clearly identified?	☐ Primary benefit ☐ Secondary benefit ☒ N/A
Create, repair or enhance essential infrastructure at a local, regional or national level?	☒ Primary benefit ☐ Secondary benefit ☐ N/A
Provide care facilities or another essential public service in an area where it is known to be required?	☐ Primary benefit ☐ Secondary benefit ☒ N/A
Address another clearly identified social, religious or cultural need?	☐ Primary benefit ☒ Secondary benefit ☐ N/A
Create long term employment opportunities in an area of high unemployment?	☐ Primary benefit ☒ Secondary benefit ☐ N/A
Deliver other economic benefits or otherwise contribute in some way to the wider economy?	☒ Primary benefit ☐ Secondary benefit ☐ N/A
Contribute to addressing problems associated with climate change or promote sustainable energy use	☐ Primary benefit ☐ Secondary benefit ☒ N/A
Conserve a place of environmental interest?	☐ Primary benefit ☐ Secondary benefit ☒ N/A
Provide alternative sources of energy?	☐ Primary benefit ☐ Secondary benefit ☒ N/A
Deliver other benefits from those specified above?	☐ Primary benefit ☐ Secondary benefit ☒ N/A
If ‘Other benefits’ is selected, please provide details here:	

A2 In relation to the primary and secondary benefits identified in A1, to help demonstrate the need for the proposal, please provide the evidence and details for all the benefits ticked above.

Important note: Reference the supporting evidence upon which your reasoning is based and include the relevant extracts (please do not send in documents with no indication where the evidence being referred to is). This evidence must link back to the tick boxes selected above. Failure to do so will lead to us having to come back to you for further information.

Supporting evidence can usefully include some or more of the following: Local planning polices and plans, planning permission, policy documents, specialist reports, feasibility studies, extracts from relevant legislation, photographs, media articles or related correspondence. Where applicable, please ensure that planning officer or committee reports and design and access statements are included as supporting evidence.

A2 (a) (i) Please provide full details of the proposal in the box below.

The Lower Thames Crossing (the 'Project') would provide a connection between the A2 and M2 in Kent, east of Gravesend, crossing under the the River Thames through two bored tunnels, before joining the M25 south of junction 29. The Lower Thames Crossing is a Nationally Significant Infrastructure Project (NSIP) within Section 14(1)(h) and 22(1)(a) of the Planning Act 2008.

The A122 Road would be approximately 23km long, 4.25 km of which would be in tunnel. On the south side of the River Thames, the Project route would link the tunnel to the A2 and M2. On the north side, it would link to the A13 and junction 29 of the M25. The tunnel portals would be located to the east of the village of Chalk on the south of the River Thames and to the west of East Tilbury on the north side.

The Project would be three lanes in both directions except for; link roads, stretches of carriageways through junctions, and the southbound carriageway from the M25 to the junction with the A13/A1089, which would have two lanes.

The Project would include adjustment to a number of side roads to accommodate the A122 road and to connect with the Project road at the A13 and A2 junctions. There would also be adjustments to a number of public rights of way, used by walkers, cyclists and horse riders. Construction of the Project would also require the diversion of a number of utilities, including gas pipelines, overhead and underground electricity cables, as well as water supplies and telecommunications assets.

A full description of the Project is set out in Environmental Statement (Chapter 2 - Project Description) (Application Document 6.1), specifically section 2.4 (Description of the Project) and section 2.8 (Operations, maintenance and management), submitted as part of the application for a development consent order.

A2 (a) (ii) Explain why your proposal is considered to be imperative (essential).
For example, if your development proposal is for a housing development reference the local housing need as set out in the area plan and explain how your proposal contributes to meeting this need or how the requirement for the proposed new public service, care facility or infrastructure project was identified.

The main drivers behind the need case are to reduce existing congestion at the Dartford Crossing and improve the resilience of the Thames Crossing and the major road network. The need case is set out in full within the Need for the Project, notably section 3 (Policy context) (Application Document 7.1) submitted as part of the application for development consent.

Government policy for Transport NSIPs is set out in the National Policy Statement for National Networks (NPSNN).
Paragraph 2.2 of the NPSNN recognises that there is a critical need to improve the national networks to address road congestion in order, '… to provide safe, expeditious and resilient networks that better support social and economic activity; and to provide a transport network that is capable of stimulating and supporting economic growth'.

This is supported by paragraph 2.22 of the NPSNN which states that without improving the road network, including its performance, it will be difficult to support further economic development, and this will impede economic growth and reduce people's quality of life. The Government has therefore concluded that, at a strategic level, there is a compelling need for the development of the national road network.

Paragraph 2.27 of the NPSNN goes on to state that, in some cases to meet the needs of traffic, it will not be sufficient to simply expand capacity on the existing network. In those circumstances new road alignment and corresponding links, including those alignments which cross a river or estuary, may be needed to support increased capacity and connectivity.

Please provide details of supporting evidence.
Provide clear referencing such as page numbers and paragraphs of specific documents so these can easily be cross-referenced. To help with our assessment, please only provide the relevant extracts that help to demonstrate the reasoning given above rather than including lengthy documents in their entirety. Please do not provide website links to separate documentation, unless you identify where exactly in the linked document or web page the evidence referred to is located (our preference is for you to extract the evidence and copy it below, referencing where it has come from).

A full description of the Project is set out in the Environmental Statement (Chapter 2 - Project Description. Application Document 6.1), specifically section 2.4 (Description of the Project) and section 2.8 (Operations, maintenance and management), submitted as part of the application for a development consent order. The need case is set out in full in the Need for the Project (Application Document 7.1).

Please confirm that relevant extract/s from supporting evidence to verify the above have been included

Yes ☒ No ☐

A2 (b) Explain why the benefits of your proposal override any harm to the protected species.
The benefit/s arising from the proposal must outweigh the harm (or risk of harm) to the protected species. Generally this means long-term public benefits rather than short term benefits (ie creation of permanent employment opportunities rather than temporary employment or creation of infrastructure that helps to provide long-term solutions to clearly identified national problems associated with energy demands).

The benefits of the Project address the long-standing transport problems at Dartford Crossing which constrain the economy and impose negative issues on nearby communities. National policy recognises the contribution the Project would make to the national and regional economy, notably around the Government's levelling up proposals.

High level traffic demand for crossing the River Thames east of London significantly outstrips the available road space supply, with growth in this demand progressively making this situation worse. This results in traffic congestion and poor journey time reliability, ranking this part of the Strategic Road Network as being in the top 1% of worst performing sections for reliability. Such congestion, delay and poor journey time reliability are identified as being a major impediment to economic growth in the South East of England and the rest of the country.

The Project will increase the supply of available road space by over 80%, and provide an alternative route to the Dartford Crossing. This would reduce congestion and journey time, and improve reliability, increasing the growth potential for local economies both sides of the River Thames, and benefiting the flow of goods and services using the South East ports. Local communities would see reduced congestion in the local area, as well as reductions in noise and air pollution.

Further details on the need case for the Project are given in Need for the Project (Application Document 7.1).

The potential adverse effects on terrestrial biodiversity associated with the construction and operation of the Project are set out in Chapter 8: Terrestrial Biodiversity of the Environmental Statement (Application Document 6.1), notably section 8.4 (Baseline), section 8.5 (Project Design and Mitigation), and section 8.6 (Assessment of Likely Significant Effects), submitted as part of the application for a development consent order. There are no potential significant residual effects predicted to occur to any protected species, although significant adverse effects are predicted for some assemblages of terrestrial invertebrates, as well as a number of statutory and non-statutory designated sites.

The Planning Statement (Application Document 7.2), provides a Project-wide assessment of effects on protected species in a national policy context, and demonstrate that the benefits of the proposed development outweigh any harm or risk to protected species. Biodiversity impacts are detailed within section 6 (National Policy - Project-wide Assessment), notably paragraphs 6.5.45 to 6.5.93. Paragraphs 6.5.68 to 6.5.76 deal specifically with protected species.

Please provide details of supporting evidence as explained in A2 above.

Please refer to the following documents:

Environmental Statement. Chapter 2 - Project Description. (Application Document 6.1). Notably section 2.4 (Description of the Project) and section 2.8 (Operations, maintenance and management).
Environmental Statement. Chapter 8 - Terrestrial Biodiversity. (Application Document 6.1). Notably section 8.4 (Baseline), section 8.5 (Project Design and Mitigation), and section 8.6 (Assessment of Likely Significant Effects).
Need for the Project. (Application Document 7.1). Notably section 3 (Policy Context).

Planning Statement (Application Document 7.2). Notably section 6 (National Policy - Project-wide Assessment)

Please confirm that relevant extract/s from supporting evidence to verify the above have been included Yes ☒ No ☐

A3 There must be a <u>Public Interest</u>. You need to demonstrate that your proposal will deliver a public benefit rather than a solely private interest.
Note: Planning consent (or its equivalent) is considered evidence of public interest so please ensure to reference here but only include details in the application form.

A3 (a) Indicate the scale of these benefits: Local ☒ Regional ☒ National ☒

A3 (b) Where possible, explain the scale of the benefits that will be achieved from your proposal, in quantifiable terms, as indicated above.
For example, this could be the number of new houses provided in proportion to the identified need at a local and regional scale; the number of long term employment opportunities that will be created at a local level; the level of reduced Co2 emissions at an 'X' level.

The Project will deliver benefits locally, regionally and nationally, across transport, community and environment, and economic sectors. Transport benefits would see increased road capacity and resilience through the creation of an alternative river crossing to the Dartford Crossing. There would also be reduced congestion, reduced journey times, improved journey reliability and safety benefits. From a community and environment perspective, local communities would experience improved connectivity to the wider road network and greater ease to cross the River Thames. Environmentally, the Project would see a net increase in receptors predicted to experience better air quality, and would create a positive legacy of green infrastructure through the creation of recreational sites such as Chalk Park and Tilbury Fields. The Project would also see direct and indirect provision of local jobs and opportunity for upskilling the local workforce. Economic benefits would aid growth potential north and south of the River Thames through the creation of a single market, no longer fragmented by the river, which would enhance the labour market, competition and efficiencies, driving up productivity.

The detail of these benefits is set out in the Need for the Project (Application Document 7.1), section 5 (Project Benefits) submitted as part of the application for a develoment consent order.

A3 (c) Please provide details of supporting evidence to verify the above as explained in A2 above

Need for the Project (Application Document 7.1). Notably section 5 (Project Benefits).

Please confirm that relevant extract/s from supporting evidence to verify the above have been included Yes ☒ No ☐

SECTION B: No Satisfactory Alternative Test

Please explain why there is no satisfactory alternative to your proposal.

A "satisfactory alternative" is a different way of achieving the objective of the activity (ie meeting your need) which has a *less negative impact on the protected species*. If there is a less damaging satisfactory alternative available that is feasible, then legally, a licence cannot be granted.

You are expected to have considered all reasonable alternative solutions when developing your proposal(s) and to have suitable grounds (and evidence) for discounting each against the proposed solution to meet the need. There are technical and non-technical elements to consider for this test and this part of your application will consider the non-technical elements – focussing on delivering the need. Alternatives can include different locations, routes, designs and timings. The Method Statement focusses on the technical elements of this test – ie reducing the impact on the species (see 'Important Advice' below).

Important Advice: Please note that alternative mitigation (including timing of licensable works) and compensation solutions are considered as part of the Favourable Conservation Status test and should be included in the relevant species Method Statement submitted with your application and not here.

B1 (a) Firstly, please explain why the current situation (ie the status quo) isn't acceptable or feasible.

The Need for the Project Document (Application Document 7.1), section 4 (Need Case: Issues and Opportunities) identifies the need for the Project and explains why the status quo is not acceptable or feasible. Currently demand outstrips road space supply, with no major increase in capacity achieved since the opening of the Dartford Crossing in 1991, despite increasing demand. This problem is exacerbated by the configuration of the road network at the Dartford Crossing and its approaches, particularly when compared to modern standards (e.g. high constraints within specific tunnel lanes leading the traffic weaving; the need to prevent traffic queuing within tunnels leading to increased congestion at tunnel entrances; drivers using local roads to avoid congestion on M25 and then rejoining the M25 closer to the crossing location). Congestion on M25 and local roads leads to increased and unreliable journey times.

There is a lack of alternative crossing routes east of London, those being limited to the Woolwich Ferry, 10 miles upstream of the Dartford Crossing, and the Blackwall Tunnel, 15 miles upstream. Limitations for some vehicles using these crossing points mean some vehicles are forced to follow the M25 west around London, significantly increasing their journey time.

B1 (b) Details of supporting evidence.

Provide clear referencing such as page numbers and paragraphs of specific documents so these can easily be cross-referenced. To help with our assessment, please only provide the relevant extracts that help to demonstrate the reasoning given above rather than including lengthy documents in their entirety. Please do not provide website links to separate documentation, unless you identify where exactly in the linked document or web page the evidence referred to is located (our preference is for you to extract the evidence and copy it below, referencing where it has come from).

See Need for the Project (Application Document 7.1). In particular, please refer to section 4 (Need Case: Issues and Opportunities) which details why the current situation at Dartford Crossing isn't acceptable or feasible.

B1 (c) Confirm relevant extract(s) from supporting evidence is included to verify the above.

Yes ☒ No ☐

NATURAL ENGLAND

Please use the tables below to describe each alternative considered.

Please use a separate line for each and tick the relevant reason(s) why it was dismissed. It is important to explain why each alternative was judged to be unsatisfactory or unfeasible to meet the need for the proposal put forward in your application and to provide concise supporting evidence as appropriate (*Please insert additional rows as required).*

B2 (a) Set out <u>what</u> alternative locations and/or routes were considered and indicate how and why they were not acceptable.	Not applicable to situation	Won't deliver need	Not feasible	Greater impact on species
Location or route 1:	☐	☒	☐	☐
If you have ticked '*Not applicable to situation',* please explain why here, otherwise please complete this table as appropriate:				
Describe the location or route considered	Additional capacity at the existing Dartford Crossing			
Clearly set out how and why the alternative location/route was discounted.	Option need not meet traffic-related objectives as it did not provide an alternative route, performed poor in relation to safety, noise and air quality impacts, and had drawbacks from a deliverability perspective.			
Location or route 2	☐	☒	☐	☐
Describe the location or route considered	Swanscombe peninsula link to the A1089			
Clearly set out how and why the alternative location/route was discounted.	Option would have a significant adverse impact on committed development within the area			
Location or route 3:	☐	☒	☐	☐
Describe the location or route considered	M2 link to the A130 via Cliffe/Pitsea			
Clearly set out how and why the alternative location/route was discounted.	Failure to meet the objective of relieving congestion on the Dartford Crossing			
Location or route 4:	☐	☒	☐	☐
Describe the location or route considered	M2 link to the A130 via Canvey Island			

Clearly set out how and why the alternative location/route was discounted.	Failure to meet the objective of relieving congestion on the Dartford Crossing

*****Please note: you can add more rows to the table: Right click in the bottom row > Choose Insert > Insert rows below.*

B2 (b) Details of supporting evidence.

Provide clear referencing such as page numbers and paragraphs of specific documents so these can easily be cross-referenced. To help with our assessment, please only provide the relevant extracts that help to demonstrate the reasoning given above rather than including lengthy documents in their entirety. Please do not provide website links to separate documentation, unless you identify where exactly in the linked document or web page the evidence referred to is located (our preference is for you to extract the evidence and copy it below, referencing where it has come from).

One additional route options were identified which could not be incorporated into table B2: Route 5: Isle of Grain link to east of Southend Route discounted as wouldn't deliver the need case due to failure to meet the objective of relieving congestion on the Dartford Crossing. The Planning Statement (Application Document 7.2), section 5 (Project Evolution and Alternatives) submitted in support of the application for a development consent order provides a consideration of all routes reviewed as part of the optioneering process and sets out why each option was assessed. In particular, please refer to section 5.4 (Route Selection) to understand the overview of the alternative options that were reviewed since 2009 (consisting of six potential crossing locations between the Dartford Crossing and the Isle of Grain) through to 2017 when the Secretary of State made the Preferred Route Announcement selecting the current location, as well as the subsequent reappraisal of the Preferred Route Announcement which sought to ensure that the previous work that had been undertaken to identify the preferred route, and to discount other routes, was still valid.

B2 (c) Confirm relevant extract(s) from supporting evidence is included to verify the above. Yes ☒ No ☐

B3 (a) Set out <u>which</u> alternative development scales or designs were considered.	Not applicable to situation	Won't deliver need	Not feasible	Greater impact on species
Important note: If new infrastructure is to be created explain why the need cannot be met by expanding existing infrastructure.				
Development scale or Design 1:	☒	☐	☐	☐
If you have ticked '*Not applicable to situation',* please explain why here otherwise please complete this table as appropriate:				
Describe the development scale or design considered.	See Route 2 Plate 5.10 - Shortlisted routes. Planning Statement (Application Document 7.2).			
Clearly explain how and why the different development scale or design considered was discounted.	Route 2 would be closer to existing urban areas and would require challenging construction works, leading to the mixing of local and long distance traffic.			
Development scale or Design 2:	☒	☐	☐	☐
Describe the development scale or design considered.	See Route 4 Plate 5.10 - Shortlisted routes. Planning Statement (Application Document 7.2).			

Clearly explain how and why the different development scale or design considered was discounted.	Route 4 had greater impacts on designated sites and was a longer, higher cost option than the Project design			
Development scale or Design 3:	☐	☐	☐	☐
Describe the development scale or design considered.	See Comment below			
Clearly explain how and why the different development scale or design considered was discounted.	See Comment below			
Development scale or Design 4:	☐	☐	☐	☐
Describe the development scale or design considered.	See Comment below			

Clearly explain how and why the different development scale or design considered was discounted.	See Comment below

Please note: you can add more rows to the table: Right click in the bottom row > Choose Insert > Insert rows below.

B3 (b) Details of supporting evidence.

Provide clear referencing such as page numbers and paragraphs of specific documents so these can easily be cross-referenced. To help with our assessment, please only provide the relevant extracts that help to demonstrate the reasoning given above rather than including lengthy documents in their entirety. Please do not provide website links to separate documentation, unless you identify where exactly in the linked document or web page the evidence referred to is located (our preference is for you to extract the evidence and copy it below, referencing where it has come from).

The Planning Statement (Application Document 7.2), section 5 (Project Evolution and Alternatives) submitted in support of the application for a development consent order provides a consideration of all routes reviewed as part of the optioneering process and sets out why each option was assessed. In particular, please refer to section 5.4 (Route Selection - development of the preferred route. Paragraph 5.4.97 - 5.4.130) to understand the refinement of the route options which led to the Secretary of State's Preferred Route Announcement selecting the current location, as well as the subsequent reappraisal of the Preferred Route Announcement which sought to ensure that the previous work that had been undertaken to identify the preferred route, and to discount other routes, was still valid.

B3 (c) Confirm relevant extract(s) from supporting evidence is included to verify the above. Yes ☒ No ☐

B4 (a) Other alternative activities, processes or construction methods considered to reduce the impact upon the species	Not applicable to situation	Won't deliver need	Not feasible	Greater impact on species
Important note – detailed timings of licensable works, alternative mitigation and compensation which will reduce the degree of harm are to be considered within the Method Statement and not here.				

Alternative activity, process or method 1:	☐	☐	☐	☐
If you have ticked '*Not applicable to situation',* please explain why here otherwise please complete this table as appropriate:				
Describe the alternative activity, process or method considered.	See comment below			
Clearly explain why this alternative was discounted.	See comment below			
Alternative activity, process or method 2:	☐	☐	☐	☐
Describe the alternative activity, process or method considered.	See comment below			
Clearly explain why this alternative was discounted.	See comment below			
Alternative activity, process or method 3:	☐	☐	☐	☐
Describe the alternative activity, process or method considered.	See comment below			
Clearly explain why this alternative discounted.	See comment below			
Alternative activity, process or methods 4:	☐	☐	☐	☐
Describe the alternative activity, process or method considered.	See comment below			

Clearly explain why this alternative was discounted.	See comment below

Please note: you can add more rows to the table: Right click in the bottom row > Choose Insert > Insert rows below.

B4 (b) Details of supporting evidence.

Provide clear referencing such as page numbers and paragraphs of specific documents so these can easily be cross-referenced. To help with our assessment, please only provide the relevant extracts that help to demonstrate the reasoning given above rather than including lengthy documents in their entirety. Please do not provide website links to separate documentation, unless you identify where exactly in the linked document or web page the evidence referred to is located (our preference is for you to extract the evidence and copy it below, referencing where it has come from).

During the design process undertaken following the Secretary of State's Preferred Route Annoucement, a huge number of design decisions were considered across every aspect of the Project's design. These are too numerous to detail in this document but instead are summarised in the Planning Statement (Application Document 7.2), section 5.5 (Design Refinement and Evolution) submitted in support of the application for a development consent order. These include the development of designs for utilities diversions required to facilitate the Project, the location of construction compounds, and junction and road alignments.

B4 (c) Confirm relevant extract(s) from supporting evidence is included to verify the above. Yes ☒ No ☐

The Conservation of Habitats and Species Regulations 2017

Wildlife and Countryside Act 1981 (as amended)

Bats – Method Statement template to support a licence application

The Method Statement will be used to determine the impact of the proposal on the favourable conservation status (FCS) and population survival of the species concerned (Regulation 55(9)(b) and Section 16(3B)(b))
You are strongly advised to refer to the Bat Mitigation Guidelines.
Please use recent photographs to support your application.

Wildlife Licensing
Natural England
Horizon House
Deanery Road
Bristol
BS1 5AH.
T. 020802 61089
EPS.Mitigation@naturalengland.org.uk

Important advice:

The format below must be used. Please enter text below each heading keeping information as concise as possible.

All maps/figures that will become part of any annexed licence granted must be submitted as separate documents (with the site name and date included on the map/figure. See section I for list – all others may be included within the Method Statement document (e.g. survey maps/figures) if preferred).

A separate work schedule must also be submitted on form WML-A13a-E5a&b to accompany the Method Statement.

A Executive summary

Provide an overview (no more than 1 side of A4) of what works are proposed and how the impacts identified will be addressed in order to ensure no detriment to the maintenance of the population at a favourable conservation status.

July 2023 - All additions following NE comments have been made in yellow highlight, with November 2023 updates made in green.

The A122 Lower Thames Crossing (the Project) would provide a connection between the A2 and M2 in Kent and the M25 south of junction 29, crossing under the River Thames through a tunnel.

The A122 would be approximately 23km long, 4.25km of which would be in tunnel. On the south side of the River Thames, the Project route would link the tunnel to the A2 and M2. On the north side, it would link to the A13, M25 junction 29 and the M25 south of junction 29. The tunnel portals would be located to the east of the village of Chalk on the south of the River Thames and to the west of East Tilbury on the north side.

Junctions are proposed at the following locations:

- New junction with the A2 to the south-east of Gravesend
- Modified junction with the A13/A1089 in Thurrock
- New junction with the M25 between junctions 29 and 30

Construction is anticipated to start in 2024 with the Project Road and tunnel expected to open in 2030.

Survey work was undertaken between 2017-22 across the whole Project to identify roosts, main commuting routes and foraging habitats and subsequently to identify potential impacts and inform mitigation design. Survey work comprised 27 activity transects, deployment of 56 static detectors, crossing point surveys at 21 locations, roosts assessments of 181 structures and 994 trees, and roost presence/absence surveys of 50 structures and 548 trees (116 of these trees received full presence absence surveys). Hibernation surveys were undertaken in January and February 2021 on the air raid shelters in Shorne Woods.

A total of ten species (this consolidates the small myotis bats as a single species group) were recorded (barbastelle (*Barbastella barbastellus)*, brown long-eared bat (*Plecotus auritus*), common pipistrelle (*Pipistrellus pipistrellus*), Daubenton's bat (*Myotis daubentionii*), Nathusius' pipistrelle (*Pipistrellus nathusii*), noctule (*Nyctalus noctula*), serotine (*Eptesicus serotinus*), small myotis ((Alcathoe (*Myotis alcathoe*), whiskered (*Myotis mystacinus*), Brandt's (*Myotis brandti*)), Natterer's bat (M*yotis nattereri*) and soprano pipistrelle (*Pipistrellus pygmaeus*)). Leisler's bat (*Nyctalus leisleri*) was identified as an additional species in the local area from desk study records.

An earlier draft of this licence was submitted to NE on 15/10/2020 in support of the 2020 application for a Development Consent Order (DCO); that application was subsequent withdrawn prior to formal acceptance by the Planning Inspectorate. Since that application, further baseline survey work has been undertaken covering the majority of relevant features. Every tree (access permitting) within the Project Order Limits and 50m buffer has been ground assessed and the majority received at least one direct survey (climb and inspect, ground endoscope or emergence survey). 143 structures within the Order Limits (250 structures when including those outside the Order Limits) have been assessed, and 95 were deemed as requiring further survey. Of these, 46 received their full complement of further roost surveys whilst four received partial roost surveys. These additional surveys have a more detailed baseline with which to inform the assessment of impacts of the Project on bats. Pre-construction surveys are proposed in 2023 and 2024 to support the application for a full licence should a DCO be granted, but the effort employed at this stage is considered sufficient to reliably inform impacts to bats and design appropriate mitigation and compensation to maintain Favourable Conservation Status (FCS).

For this draft licence, all probable roosts (roosts where bats were suspected to have emerged but were not 100% confirmed) have been considered as roosts. Desk study and surveys identified a total of 26 structures or trees containing a total of 37 bat roosts. 15 bat roosts, within 11 structures or trees are within the Order Limits and are to be destroyed. One structure containing three bat roosts is within the Order Limits but 1 m from works, whilst another structure, with two roosts, is outside of the Order Limits but adjacent to works. Thus, all five roosts are likely to be significantly impacted and thus assumed lost through disturbance and severance. Species and peak counts can be seen below:

Known roosts to be lost or damaged

Structure (Sx) or tree (Tx) reference number	Species present	Peak count
T284	Soprano pipistrelle Brown long-eared bat	1 1
T116	Noctule	1
T183	Noctule Daubenton's bat. Common pipistrelle	1 1 2
T185	Soprano pipistrelle	1
S2	Common pipistrelle	1
S14	Brown long-eared bat Common pipistrelle	1 2
S25	Common pipistrelle Soprano pipistrelle	4 1
S28	Common pipistrelle	1
S29	Common pipistrelle	1
S42	Common pipistrelle	1
S174	Common pipistrelle	2
S328	Brown long-eared bat Daubenton's bat Natterer's bat	2 1 3
S356	Common pipistrelle	1

Except for S328 which is a hibernation roost, all other roosts are considered to be day roosts.

In addition, following discussion with NE we are using Licence Policy 4 to make an estimate of the number of roosts that could be lost in the trees with roost suitability impacted by the scheme. This is based on the most reasonable worst-case situation and is informed by the species assemblages confirmed (or indicated) through the bat activity surveys across the scheme. The suitability of the trees is also used to inform potential roost types and the number of trees with high suitability. It is indicative as full surveys will be completed prior to construction but provides some measure of impact assessment and compensation provision that will likely be required.

Currently, it is estimated 431 trees (111 high suitability; 164 moderate suitability; 156 low suitability) are within a 20m buffer of the vegetation clearance areas and will be directly or indirectly impacted. Based on the method of acoustic analysis it isn't possible to compare the species assemblage beyond broad groups between different areas. Roost records have been used and the same assemblage is thought to be present across the scheme, broadly speaking. Therefore, the following formula has been developed based on precautionary judgement to calculate the potential roost losses in these trees, in lieu of the full survey data at this point in the project.

Tree loss	Assumed roost	Total LP4 roosts assumed present
Every 20 moderate and high suitability trees	1 Pipistrellus day roost	13
Every 30 moderate and high suitability trees	1 BLE day roost	9
Every 30 moderate and high suitability trees	1 noctule day roost	9
Every 30 moderate and high suitability trees	1 Daubenton's bat day roost	9
Every 30 moderate and high suitability trees	1 Natterer's bat day roost	9
Every 30 moderate and high suitability trees	1 Leisler's bat day roost*	9
Every 50 high suitability trees	1 Daubenton's bat maternity roost	2
Every 50 high suitability trees	1 noctule bat maternity roost	2
Every 50 high suitability trees	1 Leisler's bat maternity roost*	2

* Historic desk study data for Leisler's bat maternity roost so have been included as part of the LP4 but there has yet to be a recent confirmed record.

It is acknowledged that completion of the survey effort pre-construction may find additional roosts so the mitigation matrix in section E3.3b has been provided to demonstrate the compensation strategy that would be employed for all species and roost types listed. This is intended to provide information NE can review and assess and have confidence that FCS could be maintained should these roosts be discovered.

In the absence of mitigation, the potential impacts on bats from the construction of the Project are roost loss, and the severance and fragmentation of roosting locations and foraging and commuting routes.

Mitigation for the confirmed roost losses include the installation of 51 bat boxes and the creation of a bat bunker. In addition, bat boxes will be installed for the loss of trees with suitable (high, moderate and low) features. Any new tree roosts discovered prior to and during the construction phase of the Project will be compensated using the following ratios.

Roost loss mitigation ratios

Species and roost type	Minimum compensation ratio (roost/tree loss: replacement features)
Annexe II species. All roost types	1:4
All species Maternity, hibernation, mating,	1:4

unknown	
Non-annexe II species. Any roost type excluding maternity, hibernation or mating.	1:3
High suitability tree*	1:1
Moderate & low suitability tree*	1:1

* If judged by the named ecologist that there is already sufficient roosting resource within retained woodlands and the inclusion of bat boxes may be counterproductive, the ratio for non-roost compensation may be varied. Decisions will be recorded with justification and reported to NE.

To mitigate for severance and fragmentation, the creation of seven mixed-use green bridges and a network of extensive woodland and hedgerow planting is proposed, to provide and enhance connectivity across the Project. The green bridges have been specifically designed to maximise and enhance benefit for bats at each crossing. They range from single lane to dual lane mixed use bridges providing connectivity across Project. Additionally, the scheme will result in the creation of three viaducts and one large culvert, all of which are suitable for commuting bats. The landscape design will provide connectivity to these green bridges, viaducts and culvert to encourage the wildlife to these safe crossing areas and link existing woodlands and commuting routes.

Good practice mitigation measures will be employed during construction to avoid disturbance (lighting, noise and visual) to retained roosts.

Overall, with the implementation of mitigation, there are no licensable operational impacts predicted and the Project will result in no detriment to the maintenance of favourable conversation status for bats.

B Introduction

B1 Background to activity/development:

Include a brief summary of:

- Why the activity and a licence are necessary (*e.g. bridge structure repairs are required and will affect a known maternity roost of Daubenton's bats, which will be temporarily lost whilst works are being undertaken; renovation works to an office building will result in the permanent loss of three day roosts of common pipistrelle bats; demolition of an existing hospital to be replaced with flats will result in the loss of a brown-long eared bat maternity roost*).

This Method Statement provides supporting information for a draft licence application to Natural England for the purpose of obtaining the Letter of No Impediment to support the application for a Development Consent Order (DCO) for the Project. A licence is required as it is predicted bat roosts will be affected by the proposal to construct the Lower Thames Crossing project (hereafter referred to as the Project).

The Project lies within Kent and Essex counties, crossing the river Thames between them. It is proposed to build 23km of new roads connecting the existing road network of the M25, A2 and A13 via a tunnel under the river Thames. The Project objectives are:

a. to support sustainable local development and regional economic growth in the medium to long term;

b. to be affordable to government and users;

c. to achieve value for money;

d. to minimise adverse impacts on health and the environment;

e. to relieve the congested Dartford Crossing and approach roads and improve their performance by providing free-flowing north-south capacity;

f. to improve the resilience of the Thames crossings and the major road network; and,

g. to improve safety.

The Project will be undertaken between Ordnance Survey Grid References TQ 56934 92188 in the north, and TQ 66809 70028 in the south (OSGR). Figure C5a illustrates the Order Limits required to construct and operate the Project, together with the route alignment of the new roads and tunnel.

The licensable area for the purpose of this application is the Order Limits (see Figure C5a) as well as structure S14 (Marling Manor which is within 15 m of the Order Limits). The proposed design of the Project will result in the permanent loss of 18 known roosts within the Order Limits and an additional two that are outside of the Order Limits but are likely to be so significantly disturbed that it is assumed the roosts will be abandoned.

The known roosts to be lost or damaged are:

Known roosts to be lost or damaged

Structure (Sx) or tree (Tx) reference number	Species present	Peak count
T284	Soprano pipistrelle Brown long-eared bat	1 1
T116	Noctule	1
T183	Noctule Daubenton's bat. Common pipistrelle	1 1 2
T185	Soprano pipistrelle	1
S2	Common pipistrelle	1
S14	Brown long-eared bat Common pipistrelle	1 2
S25	Common pipistrelle Soprano pipistrelle	4 1
S28	Common pipistrelle	1
S29	Common pipistrelle	1
S42	Common pipistrelle	1
S174	Common pipistrelle	2
S328	Brown long-eared bat Daubenton's bat Natterer's bat	2 1 3
S356	Common pipistrelle	1

- Include current status of planning permission (if applicable) *e.g. full planning permission with all relevant wildlife conditions discharged; permitted development; demolition with prior notification of demolition issues resolved*. If the proposal is for demolition only of a structure supporting a bat roost/s, please confirm whether there are plans to develop the site in the future and if so when.

The Project is a nationally significant infrastructure project (NSIP), for which an application for a DCO is being submitted in autumn 2022. This method statement supports a draft mitigation licence application with respect to the loss of bat roosts, the objective of which is to demonstrate the Project will result in no detriment to the maintenance of favourable conversation status for bats. The information contained within this document will support the granting of any Letter of No Impediment (LONI) from Natural England. The LONI will be submitted to support the application for a DCO.

This method statement provides background information about the Project and describes the status of bats at the site. It also provides details of mitigation techniques and subsequent monitoring requirements.

The mitigation measures specified in this report have been developed following current best practice guidance as set out in the Bat Conservation Trust (BCT) Best Practice Guidelines (Collins, 2016), and are in accordance with measures described in the application for a DCO.

B2 Relationship with other nearby development and cumulative impacts

B2.1 Is the current application part of a larger development project? For example, is it part of a phased or multi-plot housing development that will require more than one bat licence? Enter Yes, No or N/A in the text box below. If yes, note a separate ***master plan*** document will be required.

No

Important Advice: If yes to the above, please note that sections in this Method Statement on impact assessment and mitigation measures must explicitly relate *only* to impacts from the works currently proposed.

A project-wide master plan must detail the overall impact assessment and mitigation and explain where, and why, each of the bat licences will be required. The master plan must be included as a separate document to this application: see https://webarchive.nationalarchives.gov.uk/ukgwa/20140605090108/http:/www.naturalengland.org.uk/Images/WML-G11_tcm6-9930.pdf for details that are to be included in this separate document. The separate master plan is expected to take due regard of the overall project to ensure that in-combination effects are considered, and mitigation and compensation measures are both sufficient and coherent.

If the current development is part of a larger development project, summarise very briefly here how the current application relates to the larger project and how the in-combination effects are considered and mitigation/compensation is sufficient.

N/A

Important Advice: to accompany this Method Statement also include Figure. B2.1 for a Master plan overview - and see section I "Map checklist" at the end of this document.

B2.2 Apart from any mention in B2.1, please inform us of any past or future development or other projects (in the last 5 years or next 5 years) in the vicinity which may have significantly impacted or are likely to significantly impact on the same population/s of bats as this application (e.g. loss of maternity or hibernation roosts). You must make reasonable efforts to establish this, including discussions with your client and the Local Planning Authority – stating below what you undertook. A brief summary of the project/s should be provided including the site name and location, dates and if known the licence reference number(s).

Please note we are not expecting details of every licence/planning permission issued within the vicinity of the site – we are only concerned with projects that have the potential to significantly impact or have impacted on same population of bats (maternity and hibernation roosts). Note: Natural England is aiming to make available licensing records from the last 5 years publically available.

Data from MAGIC shows 19 bat mitigation licences have been granted in relation to bat roosts within 5km of the Project, the closest of which is approximately 0.8km east of the Order Limits.

Roosts identified within 5km of the project on MAGIC

Licence number	Species	Start date	Impacts
EPSM2009-1165	Common pipistrelle, Soprano pipistrelle, Daubenton's bat, Natterer's bat, Brown long-eared bat, Brandt's bat, Whiskered bat	03/09/2009	Impact on a breeding site Destruction of breeding site Destruction of a resting place
EPSM2011-2954	Common pipistrelle Brown long-eared bat	14/04/2011	Destruction of a resting place
EPSM2012-4100	Common pipistrelle	09/02/2012	Destruction of a resting place
EPSM2012-4625	Common pipistrelle, Brown long-eared bat	04/09/2012	Destruction of a resting place
EPSM2012-5011	Common pipistrelle	30/10/2012	Destruction of a resting place
2015-7929-EPS-MIT	Common pipistrelle	14/04/2015	Destruction of a resting place
2015-9990-EPS-MIT-1	Brown long-eared bat, Common pipistrelle	29/09/2015	Impact on a breeding site Damage of a resting place Destruction of a breeding site

			Destruction of a resting place
2016-21327-EPS-MIT	Common pipistrelle	01/03/2016	Destruction of a resting place
2017-28793-EPS-MIT	Brown long-eared bat, Common pipistrelle	01/06/2017	Destruction of a resting place
2017-29257-EPS-MIT	Natterer's bat, Soprano pipistrelle	05/07/2017	Destruction of a resting place
2018-34833-EPS-MIT	Brown long-eared bat	04/06/2018	Destruction of a resting place
2018-37451-EPS-MIT	Common pipistrelle Soprano pipistrelle	01/11/2018	Destruction of a resting place
2019-38845-EPS-MIT	Brown long-eared bat, Common pipistrelle, Soprano pipistrelle	01/02/2019	Destruction of a resting place
2019-39320-EPS-AD2-1	Brown long-eared bat, Common pipistrelle, Soprano pipistrelle	10/06/2019	Impact on a breeding site Destruction of a breeding site Destruction of a resting place Following a FOI request the breeding site is a common pipistrelle lekking roost of up to four individuals
2019-40328-EPS-MIT-2	Natterer's bat	12/06/2019	Destruction of a resting place
2019-43863-EPS-MIT-2	Brown long-eared bat, Whiskered bat	18/02/2020	Destruction of a resting place
2019-44295-EPS-BDX	Soprano pipistrelle	01/04/2020	Impact on a breeding site Damage of a resting place Destruction of a breeding site Destruction of a resting place
2020-48474-EPS-MIT	Brown long-eared bat, Common pipistrelle Natterer's bat, Soprano pipistrelle	01/09/2020	Destruction of a resting place
2021-51011-EPS-MIT	Brown long-eared bat, Common pipistrelle, Daubenton's bat, Soprano pipistrelle	09/04/2021	Damage of a resting place Destruction of a resting place

A search on MAGIC shows Licence 2019-39320-EPS-AD2-1 (which impacted breeding roosts) to be 10 m from the order limits. Following a freedom of information request it was established that the roosts impacted were day roost, night roosts, feeding perch and mating/lekking roost for common species (common pipistrelle, brown long-eared bat and soprano pipistrelle). The mitigation for this licence (six tree mounted bat boxes, one post mounted bat box and two bridge mounted bat tubes) will not be significantly impacted by works. It was not possible to find monitoring data to understand if this mitigation is currently in use.

It is anticipated that the proposed works may impact the same population of bats as have been licensed previously but the Project is not resulting in a loss of maternity roosts and due to the distance of works from these roosts, the Project is not thought likely to significantly impact these populations. The three breeding roosts identified (EPSM2009-1165, 2015-9990-EPS-MIT-1 and 2019-44295) are shown to be at least 1.5 km from Project (exact locations of roosts are not given on MAGIC), and it does not sever the roosts from high quality foraging habitat such as woodlands.

Chapter 16 Cumulative Effects Assessment (Application Document: 6.3), section 5 of the

Environmental Statement identifies 18 developments (including The London Resort) that have been identified as having likely moderate or greater residual cumulative effects when combined with LTC. This assessed the inter-project effects from the Project combined with other developments as neutral to slight adverse and not significant on terrestrial biodiversity. All developments identified were assessed as neutral except for development reference 19/00051/CV at land adjacent to Tilbury Power Station, Fort Road Tilbury which has slight adverse effects as LTC involves the removal of some of the land that would be used on development 19/00051/CV for mitigation.

Important Advice: locations of other bat mitigation sites that may have significantly impacted or are likely to significantly impact on the same population/s of bats as this application must be shown on Figure B2.2.

C Survey and site assessment (also see section 5 of the Bat Mitigation Guidelines)

C1 Pre-existing information on the bat species at the survey site:
Please undertake a historical data search within a 2km search radius and provide a summary of the results of this search. For example, records from local environmental records centres, local bat groups and previous survey work undertaken at the site is all relevant. Please briefly comment on the results in relation to your project/site

- Should no historical records be found from your search please state this – and specify what searches you undertook.
- Note that you must not include records from National Biodiversity Network (NBN) without first obtaining written permission from the relevant Data Provider.

A desk study was carried out in 2017 and subsequently updated in 2020 and 2022 that considered all protected species records since 2007 within 5 km of the Order Limits. For the purposes of this licence, only records within 2 km will be considered. Records were requested from Kent & Medway Biological Records Centre (KMBRC; 2022), Essex Wildlife Trust Biological Records Centre (EWTBRC; 2020), Essex Field Club (2022) and Greenspace Information for Greater London (2022).

The locations of designated sites of international, national and local importance for biodiversity were also obtained within 30km, 2km and 500m of the Order Limits, respectively. Citations for these sites, which provide information on the reasons for their designation, were reviewed to ascertain whether bats were included as interest features for any of the designated sites.

South of the River Thames (Kent)

Roosting data from KMBRC updated in 2022

Species	Roost type	Cumulative count of individuals recorded using the roost type since 2007	Distance from Project (m)	Likely to be impacted by scheme (Y/N)
Daubenton's bat	Hibernation	105	Within Order Limits	Y
Leisler's Bat	Maternity Roost (unknown type)	9	Within Order Limits and 225m/250m/500m/615m	Y
Brown long-eared bat	Hibernation Roost (unknown type) Maternity	76	Within Order Limits and 50m/180m/1.5km/2km	Y
Natterer's Bat	Hibernation	81	Within Order Limits and 1.5km	Y
Noctule Bat	Hibernation Maternity	2	Within Order Limits	Y
Common pipistrelle	Roost (unknown type)	55	750m/1.5km	N

	Maternity			
Soprano pipistrelle	Maternity	2	Within Order Limits	Y
Whiskered Bat	Roost (unknown type)	1	600m	N

Activity records were also provided for all of the above species within 2 km. The activity records also provided records of Nathusius' pipistrelle and Serotine.

Desk study records identified small numbers (<4) of brown long-eared bats and Natterer's bats hibernating within S328.

Statutory Sites:
No statutory designated sites for which bats were listed as a notifiable feature are present within 2 km of the order limits

Non-statutory designated sites:
A single non-statutory site for which bats were listed was identified during the desk study. Walderslade Woods Local Wildlife Site is designated in part for its use by bats.

North of the River Thames (Essex)

Desk study data from a 2 km radius of the Project, provided by the Essex Wildlife Trust Biological Records Centre (EWTBRC), identified 304 records of bats since 2006 (see Table below).

Roosting data from EWTBRC

Species	Roost type	Cumulative count of individuals recorded using the roost type since 2006	Distance from Project (m)	Likely to be impacted by scheme (Y/N)
Brown long-eared bat	Hibernation	5	400m	N
Common pipistrelle	Hibernation Day	20	670m	N
Daubenton's bat	Hibernation Day	67	670m	N
Natterer's bat	Hibernation	28	670m	N
Soprano pipistrelle	Hibernation Day Maternity	2	670m	N

In addition to the above records, it is worth noting the statutory and non-statutory designated sites to the north of River Thames that list bats within their citation. Some of these records were provided by Greenspace information for Greater London (GIGL).

Statutory sites:
Hangman's Wood and Deneholes SSSI, designated for ancient and semi-natural woodland and the most important underground bat hibernation site in Essex (Natural England, 1992). Brown long-eared bat, Natterer's bat and Daubenton's bat have been recorded using the series of medieval chalk mines that are present across the SSSI. Hangman's Wood and Deneholes SSSI is located approximately 500m to the west of the Order Limits.

Non-Statutory site
Six non-statutory designated sites (all Sites of Importance for Nature Conservation (SINC)) were located within 500m of the Order Limits:

- Stubber's Outdoor Pursuits Centre (SINC) – Part of this is located within the Order Limits but

the section within the Order limits is being used for ecological mitigation and enhancement. The southern part of the site (which is approximately 500 m from main works) includes a number of dead trees and woodland and has a large and important bat roost (data records does not confirm species) and an important foraging area for bats.

- Hall Farm moat, paddock and St Mary Magdalene Churchyard, North Ockenden (SINC) – located adjacent to the site primarily consists of three waterbodies. However, St Cedd's Well, a grotto located in a separate fenced area to the south-west, is housed in a small building. This and the church are identified as both potential bat roosts.
- Puddle Dock Angling Centre – located adjacent to the site consists of a variety of wildlife habitats including neutral grassland, marshy grassland and open water. A line of very old oaks with blackthorn below follows Clay Tye Road and is of potential interest for invertebrates and bats.
- Fairplay Farm (SINC) – located 69 m from the Order Limits. The site is designated in part for an unusually large number of ancient oak pollards, which are present in the hedges. These old oak pollards include fissures and dead limbs, and therefore the site is likely to be of value for bats
- Ingrebourne Valley (SINC) – located to the north of the Order Limits. The site is designated in part for Berwick Pond, which is important for foraging bats, with at least four species regularly present.
- HvL12 Parklands, Corbets Tey – located approximately 2 km west of the Order Limits. The lake is an important feeding site for bats, with large numbers of pipistrelles and smaller numbers of noctules and Daubenton's bats regularly seen throughout the summer.

C2 Status of the bat species: Detail conservation status at the local, county and regional levels. Please complete the following table, justifying your assessment, and add additional lines where necessary. If the status is unknown then please enter 'unknown'.

Species	**Conservation status assessment**		
	Local	**County**	**Regional**
Brown long-eared bat (Kent)	Common. Records provided hibernation roosts, unknown roost types and high level of activity.	Widespread but often under-recorded (Young et al, 2015). The most frequently captured species in woodlands during a BCT led survey in 2011.	Population considered stable since 1999 (BCT, 2018)
Common pipistrelle (Kent)	Common. Records provided maternity roosts, hibernation roosts, unknown roost types and high level of activity.	Common. Most abundant bat species in Kent. (Young et al, 2015)	Common. Population considered to have increased since 1999 in England (Bat Conservation Trust [BCT] 2021)
Common pipistrelle (Essex)	Common. Records provided maternity roosts, hibernation roosts, unknown roost types and high level of activity.	Widespread, occasionally common. Most frequently encountered bat in Essex. (Essex Bat Group, 2020 and Mammals of Essex, 2014)	Common. Population considered to have increased since 1999 in England (BCT, 2021)
Daubenton's bat (Kent)	Uncommon. Records provided hibernation roosts, a low level of activity and 'other' records.	Can be seen over most waterbodies. Very few summer roosts identified but one of two species most frequently recorded in winter using underground sites (KMBRC, 2020).	Common. Population in England considered to have been stable since 1999 (BCT, 2021)
Natterer's bat (Kent)	Uncommon. Records provided hibernation roosts, unknown roost types and high level of activity.	As one of two species most frequently recorded in winter using underground sites most records are from hibernating bats. 15 new	Evidence to suggest an increase since 1999 (BCT 2018)

		woodland sites found during BCT Bechstein's Bat Survey (BCT 2011).	
Leisler's (Kent)	Scarce. Records of hibernation and maternity roosts and a low level of activity.	Scarce. Have been more frequently recorded in recent years in parts of the south-east.	Uncommon but widespread throughout England (BCT, 2021)
Noctule (Essex)	Scarce, no roosts recorded within the desk study area.	Scarce, with only single individuals or small numbers seen occasionally. Only three tree roosts recorded in the last 10 years (KMBRC, 2020).	Widespread across England. Population in England considered to have been stable since 1999 (BCT, 2021)
Soprano pipistrelle (Essex)	Common but only one unknown roost recorded as well as activity and 'other' records.	Widespread, occasionally common. Essex Bat Group, 2020)	Population in England considered to have been stable since 1999 (BCT, 2021)
Soprano pipistrelle (Kent)	Common. Two maternity roosts and 13 unknown roosts recorded within the desk study area as well as records of activity and 'other'.	Widespread with most known maternity roosts near rivers. Average maternity colony size in Kent has declined (KMBRC, 2020).	Common. Population in England considered to have been stable since 1999 (BCT, 2021)

** *Please note that you can add more rows to the table: right click in any cell choose Insert > Insert rows below.*

C3 Objectives of the survey to inform this proposal: Please complete the following table, entering 'Yes', 'No' or N/A' to indicate the objective of your survey and provide comments/explanation where necessary:

Survey objective	Yes / No / N-A	Comments
Determine presence / absence of bats	Yes	An inspection of individual trees within the Order Limits plus a 50 m buffer was carried out to identify if they had bat roost suitability. Larger areas of woodland were also assessed for their value to bats separately. Structure assessments for suitability for roosting bats were undertaken for buildings and structures identified within the Order Limits plus a 50m buffer, that were considered likely to be subject to significant levels of additional disturbance, above and beyond that which they already experience, as a result of the Project. Roost inspection and ground assessments were undertaken prior to further survey effort of buildings and trees.
Determine bat usage of site (e.g. maternity, hibernation, night roosts in various structures (specify)).	Yes	Secondary surveys (endoscope inspections and emergence/re-entry surveys) were carried out on trees with suitable roost features assessed as being of moderate or high roost suitability. Emergence/ re-entry surveys were also carried out on structures categorised as low, moderate or high suitability for roosting bats. Hibernation surveys were conducted on the two Shorne Woods Air Raid Shelters (S49 and S328) to determine their use as hibernation roosts and establish internal humidity and temperature over the hibernation period to inform mitigation.
Identify foraging, commuting or swarming sites (explain)	Yes	Intensive transect activity, static monitoring and crossing point surveys were undertaken to identify key commuting and foraging routes throughout the Order Limits. A2/HS1 corridor surveys to determine if bats actively crossing the High Speed 1 Railway (HS1) and A2 road to move between habitats on either side of the A2.

		Swarming surveys at three locations (Muggins Hill Chalk Pit, East Tilbury Battery and Hangman's Wood and Deneholes SSSI) were carried out to determine if any are used as a swarming site.
Other (explain)	Yes	Woodland assessments of blocks of woodland including ground assessments, use of aerial photography and activity transects were undertaken to determine the level of roost resource of a woodland. All the above are expanded upon in section C5 and Technical Appendix 8.8: Bats (Application Document 6.3).

C4 Site/habitat description: Please provide:

- Brief descriptions of the site, including total size of the development site (ha) (most often within the red line planning boundary) and areas of the site with potential value to bats (ha).

The Project will provide a connection between the A2 and M2 in Kent, east of Gravesend, crossing under the River Thames through two bored tunnels, before joining the M25 south of junction 29. The A122 road will be 23km long, 4.25km of which would be in a tunnel. The licensable area covers the whole of this area as well as S14 and S39 and is represented by Figure C5a. The Project's Order Limits predominantly comprise arable land (1419ha). However, habitats of greater suitability for bats are present, such as semi-natural broadleaved woodland, plantation woodlands and coniferous woodlands covering an area of approximately 174ha. There were areas of dense scrub covering 47ha, grasslands covering 345ha (including improved grassland) and 11ha of ponds and lakes within the Order Limits. There were extensive areas of linear habitats comprising hedgerows and stream corridors throughout the Order Limits see the separate Phase 1 habitat Plan (Figure 8.2 Application Document 6.3) for all habitats and their locations.

- Brief descriptions of the structures on site indicating their roosting suitability (low, moderate or high), differentiating between **those surveyed** and **not surveyed**, with an explanation why. Ensure structures are referenced and consistently indicated on relevant figures and tables.

A total of 172 structures were identified within the Order Limits (317 when including those within a 50 m buffer of the Order Limits) to be assessed for bat roosting suitability. Of these, a total of 143 were initially assessed (250 when including assessments of structures outside the Order Limits) for roosting bats and 95 within the Order Limits were identified as having suitability (high, moderate, or low) for roosting bats or were confirmed roosts and therefore subject to further roost presence/absence surveys or roost characterisation surveys in line with standard guidance (Collins, 2016). Of the 95 buildings within the Order Limits requiring further roost surveys, 46 were fully surveyed and four were partially surveyed.

23 structures within the Order Limits did not receive Preliminary Roost Assessment (PRA) surveys and 20 structures that had potential for roosting bats did not receive roost surveys (presence absence/ roost characterisation surveys) because of access or scheduling constraints.

Hibernation surveys were only undertaken at the two known hibernation bunkers.

The majority of the trees with moderate or high potential received at least one direct inspection, but full presence absence roost surveys were not completed on all of these.

The buildings included residential houses, agricultural units, air raid shelters, bridges and a church. A full breakdown of the structure surveys is provided within Technical Appendix 8.8: Bats (Application Document 6.3), attached to the licence application, sections 4.2.68 – 4.2.74 (structures in south of the River Thames), sections 4.3.41 – 4.3.45 (structures in the north of the River Thames) and Annex D and E.

Tree assessments were undertaken on 994 trees throughout the Project. A total of 585 trees were assessed to be of high or moderate suitability. A full breakdown of the tree surveys is provided within

Technical Appendix 8.8: Bats (Application Document 6.3), attached to the licence application, sections 4.2.23 – 4.2.25 (trees in south of the River Thames), 4.3.23 – 4.3.26 (trees in the north of the River Thames).

The licensable roosts scheduled for demolition/removal are Tree 284, Tree 166, Tree 183, Tree 185, S2 (1 Longview Cottage), S25 (The Rosery Building 1 – Main building), S28 (Estate House Building 2 – House), S29 (1&2 Bridge Cottage), S42 (2 Grays Corner), S174 (Yellowstock Mews – Building 2 Mews 1), and S356 (Alde Cottage – Building 1 Brick Garage).

Additionally, although S14 (Marling Manor) and S328 (Shorne Woods Air Raid Shelter Bunker 2) are not being demolished, they are likely to be significantly impacted to a level in which roost desertion is likely. S14 is 11 m from works east of the roost and currently has the A2 immediately south as well as Gravesend/Singlewell immediately West. The construction of the road 11 m east of the roost will likely result in severance of foraging habitat (in the form of a large woodland block) to the east. Therefore, the roost is considered to be destroyed for the draft licence although green bridges are being installed north of the roost to help alleviate the severance. S328 is 1 m from main works and therefore significantly disturbance is likely to result in this roost being abandoned. Details of all licensable roosts are detailed in the below table.

In addition to the roost detailed below, the desk study returned a Leisler maternity roost in 1994. The grid refence for this roost was only accurate to 100m, and the location of the roost was adjacent to a roundabout immediately to the northeast of Ashenbank Wood within the Order Limits, where there are no mature trees. The actual location of the roost is likely to be within the mature woodland within Ashenbank Wood. The area of habitat where the roost is likely to be found is being retained for ecological mitigation, and is not being impacted or disturbed by construction. As there has been no further desk study records, and the roost was not located during the tree climbing surveys, this roost is considered as a retained roost within this licence. This area will be inspected during pre-construction surveys to ascertain if this is the location of this potential Leisler roost.
The noctule and soprano pipistrelle maternity roost, and the noctule hibernation roost, are all located within the same grid reference. The grid refence for this roost was only accurate to 100m, and plotting this grid reference shows the roost likely falls outside of the Order Limits, however it could occur within the Order Limits based on the 100m square area. The roost is located within Ashenbank Wood. The Order Limits in this area of Ashenbank Wood is included to upgrade an existing path into a tracked surface with no tree removal necessary, and is located over 250m from main construction activities, with HS1 also acting as a barrier. As such, these roosts will be retained and are not likely to be disturbed, and therefore are not considered further within this licence.

Licensable roost details

Roost Ref / Location (grid ref, address / nearest settlement)	**Roost Size / Condition**	**Construction Material / Tree height / condition / age**	**Suitable roosting feature**	**Surrounding habitat**
South of the River				
S328 - Shorne Wood underground Air Raid Shelter – Bunker 2 TQ67866978 DA12 3HB Thong	Records of two individuals, brown long-eared bat hibernation roost Single Daubenton's bat hibernation roost. 3x Natterers bat hibernation roost	Internally this bunker is 8.6m in length consisting of a sunken concrete arched room. The arched rooms are 2m wide and 2m in height mounded earth over a partially concrete structure.	The bunker has purposely built bat features within it, consisting of wooden boarding placed on the walls and hanging from the roof providing crevices for bats.	Situated within Shorne Wood but near the A2 to the south.
S14 - Marling Manor TQ66257039 DA12 5UD	Brown long-eared bat (day roost) (DNA analysis found	Brick house, pitched, tiled roof, wooden soffit and fascia boards. Internally the loft space	Main roof void with several access points by western gable end. Crevices within roof	Claylane Wood and arable land to the east. The north and west is

Watling Street, Gravesend	low number of droppings, <4 individuals) and one brown long-eared bat was seen potentially emerging common pipistrelle (day roost)	was of wooden construction with a lined roof.	void, behind wooden rafters.	an urban setting with residential and commercial areas. The A2 to the south.
S2 - Longview Cottage TQ66157028 DA12 5UD Gravesend	Common pipistrelle (day roost)	Brick house with rendered finish, pitched, tiled roof, wooden soffit boards. Internally, wooden rafters and sarking with no lining.	Main roof void presented features that were suitable.	Located between the A2, to the north and HS1 to the south. Beyond is grassland, scrub and woodland.
Tree T284, TQ67327012, DA12 3HB Thong	Single soprano pipistrelle day roost (peak count 3) Single brown long-eared day roost	Over mature pedunculate oak	Significant dead wood cavity in stem 5m above ground, SW aspect of stem	Located adjacent west of Shorne Wood. Arable to the west and north with the A2 to the south.
North of the River				
S29 - 1 and 2 Bridge Cottages TQ58208508 RM14 3QP Upminster	Single common pipistrelle (day roost)	Access restrictions, external inspection only, brick house, tiled pitched roof, wooden soffit and fascia boards	Five access points identified	Arable to the north and west. The A255 to the east with further arable land beyond.
S25 - The Rosary TQ5829585114 RM14 3QL Upminster	Common pipistrelle (peak count 4) (day roost) Soprano pipistrelle (day roost) (x1)	Pebbledash clad, pitched, tiled roof, wooden soffit and fascia boards.	Holes in soffit, lead flashing lifted, gap under soffit, crevices in wooden frame, gaps under coping stones. Three confirmed access points identified One emergence location for Soprano pipistrelle	M25 immediately east and arable immediately surrounding. Some large lakes and marsh habitat further west and woodland habitat further north.
S174 - Yellowstock Mews TQ5828085036 RM14 3PG Upminster	Common pipistrelle (peak count 2) (day roost)	Brick house, wood clad, pitched, tiled roof, wooden soffit and fascia boards.	Gaps in roof tiles and under coping stones, gap under soffit, broken wall cladding.	M25 immediately east and arable immediately surrounding. Some large lakes and marsh habitat further west and woodland habitat further north.
S42 - 2 Grays Corner TQ6366080421 Orsett RM16 3LP	Single common pipistrelle (day roost)	Brick house, wood clad, pitched, tiled roof, wooden soffit and fascia boards.	Gaps in roof tiles, gap under cladding, gap under soffit.	A1089 immediately west and A13 immediately north. Wider habitat arable
S28 – Estate House (Building 2) TQ5826885067 RM14 3PG	Single common pipistrelle (day roost)	Brick house, pitched, clay tiled roof, wooden soffit and fascia boards. Loft conversion with breathable roof lining.	Crevices under eaves, crevices under roof tiles, under soffit.	M25 immediately east and arable immediately surrounding. Some large lakes

Upminster				and marsh habitat further west and woodland habitat further north.
Tree T116 TQ6611679585 Thurrock RM18 8TR	Single noctule (day roost)	Pedunculate oak	Three suitable features, knot hole at 2 m northeast, tear out 4 m north west and a transverse snap 4 m south east	Arable land surrounding with a woodland and lake northeast.
Tree T183 TQ6702477841 Thurrock RM18 8QP	Single noctule, single Daubenton's bat and common pipistrelle (peak count 2) (day roosts)	Poplar	Knot hole 12 m north east as well as unknown locations on the tree.	Immediately adjacent to a lake bordering south and east side. Arable land in surrounding habitat.
Tree T185 TQ6699977848 Thurrock RM18 8QP	Single soprano pipistrelle (day roost)	Poplar	Transverse snap 12 m west facing.	Immediately adjacent to a lake bordering south and east side. Arable land in surrounding habitat.
S356 – Alde Cottage (Building 1 Brick garage) TQ6356080751 Orsett RM16 3NR	Common pipistrelle (peak count 1) (day roost)	Brick house, wood clad, pitched, tiled roof, wooden soffit and fascia boards.	Several splits in cladding, lead flashing lifted around chimney.	Surrounded on all sides by A13 and its slip roads. Small woodland block immediately easy and arable land in the wider area.

Drawing C5b shows the locations of all the known roost structures within the Order Limits as well as the roosts located outside of the Order Limits. The drawing also includes the buildings in which access was not possible to undertake any form of survey.

- A description of adjacent areas/offsite habitats, specifying any relevance to bats, including descriptions of habitat/s relevant to bat commuting/foraging behaviour.

Given the Project passes through a predominantly arable landscape, the habitats outside the Order Limits are similar to those within it. However, there are large areas of woodland predominantly associated with Shorne Wood Country Park to the south of the River Thames that provide extensive foraging and commuting habitat. Woodland assessments have been undertaken at 12 woodlands that fall within the Order Limits or that are directly adjacent to it. The woodlands are:

- Rochester and Cobham Golf Course Wood
- Ashenbank Wood
- Brewer's Wood
- Shorne Wood
- Woodland at the north west corner of Shorne Wood
- Woodland adjacent to Thong Lane
- Claylane Wood
- Cobham Hall Wood
- Gravelhill Wood
- East Tilbury Battery Woodland
- Rainbow Shaw
- The Wilderness Woodland

All these woodlands are deciduous, and each provided roosting resources and foraging/commuting

habitat within and outside the Order Limits. The habitats beyond the Order Limits to the north of the River Thames are predominantly agricultural and residential. The habitats of the wider area are shown on Figure C5b

- Please also include annotated (cross reference the structures) and dated photographs (showing both internal and external survey areas) as these are very useful as an assessment aid. These can be inserted below or submitted as a separate (referenced) document.

Photos of six of the structures that contain roosts that will be lost have been provided in Annex C4 attached.

C5 Field survey(s):

Surveys must be up to date and have been conducted within the current or most recent optimal season. Where a site/structure/tree has demonstrable hibernation potential appropriate surveys must be carried out. Surveys must be undertaken in accordance with the most up to date edition of the Bat Conservation Trust (BCT) *Bat Surveys for Professional Ecologists – Good Practice Guidelines* and the *Bat Mitigation Guidelines*.

C5a Justification for surveys that deviate from the best practice guidelines: Please provide full justification below if your surveys deviate from the aforementioned best practice guidelines, confirming how you have obtained a full appreciation of the bat species roosting at the site, and of the type and status of roosts they use on site and in the context of the immediate surrounding area. **Please note that inadequate survey information is likely to cause delays to your licence application and may result in a Further Information Request.**

It was not possible to survey all trees and structures that may support roosting bats due to access constraints. Due to these limitations, 23 structures within the Order Limits did not receive PRA and 156 trees were not surveyed as detailed within Table D.1 and Table D.2 in Annex D in Technical Appendix 8.8: Bats (Application Document 6.3).

Deviations occurred at the following surveys and assessments:

- Swarming surveys could not be undertaken at East Tilbury Battery due to access restrictions.
- Hibernation surveys of trees, building and structures not already known to be hibernation roosts were not undertaken
- The known roost within S29 was inspected externally only during the initial visit. This was owing to access constraints. One emergence survey was undertaken at the structure and a common pipistrelle was seen emerging from the building. No further survey work was undertaken at this property given access restrictions.
- Trees didn't receive full complement of presence absence surveys but all received at least one (see exceptions in the paragraph below). In total 548 trees received one presence/absence survey (some of these trees were then downgraded to low and negligible so wouldn't require further roost surveys), 116 of these trees received their full presence absence surveys.
- Tree 284, containing a soprano pipistrelle roost that was identified during an emergence survey, did not receive a third survey to confirm roost characterisation due to access restrictions
- 20 structures within the Order Limits that had been identified as having potential for roosting bats or were confirmed roosts were not surveyed due to access or scheduling constraints. Priority was given to those structures that were scheduled for demolition.

Access restrictions, weather conditions, health and safety constraints, technical issues, and removal of equipment by the public prevented a number of walked transect and/or automated static detector surveys being carried out or caused them to be cancelled mid survey. See Table F.1 and Table F.2 in Annex F within Appendix 8.8: Bats (Application Document 6.3) for detailed lists of constraints, transect and crossing point locations that were impacted.

The survey approach was deemed appropriate to collect sufficient baseline information for the draft licence application and ecological impact assessment, and provide confidence in the mitigation

approach to maintain FCS.
Further surveys will be undertaken prior to construction and prior to the full application being made.

C5b Please complete the following tables and add additional lines where necessary (*right click in any cell outside the grey box area. Choose Insert > Insert rows below)*. Please enter 'N/A' if the table is not applicable to your survey. Please ensure the information is consistent with Figure **C5b** (showing all buildings, structures and habitats that are within the survey area and distinguishing those that were surveyed and those that were not; indicate where surveyors were located):

Visual inspection

Date of each survey visit **(e.g. format 01/06/13)**	**Structure reference / location**	**Equipment used (e.g binoculars, endoscope)**	**Weather –** ***(Include temps, precipitation, Beaufort wind scale etc)***
Comments (to include # of surveyors used for each visit): Only surveys of confirmed roosts that are to be impacted are considered in the survey results section due to the number of surveys undertaken. Full survey results of structures and trees where no bats were identified or of roosts that will not be impacted can be found in Appendix 8.8: Bats Technical Appendix (Application Document 6.3).			
10/07/19	S14	Binoculars, Endoscope, mirrors and torch	Dry, 10 °C, strong breeze, and 4/8 cloud
Comments: 2 Surveyors:			
30/05/18	S29	Binoculars, Endoscope and torch	Dry, 17 °C, light breeze and 2/8 cloud
Comments: 2 Surveyors:			
11/07/19	S2	Binoculars, Endoscope and torch	Dry, light breeze and cloud 8/8
Comments: 2 Surveyors:			
08/03/18	Tree T284	Binoculars, Endoscope, mirrors and torch	Dry, 5 °C, breezy and 3/8 cloud
Comments: 2 Surveyors			
Unknown. Pre May 2021	S25	Binoculars, Endoscope and torch	No weather data recorded
Comments: 2 Surveyors			
03/04/2019	S28	Binoculars, Endoscope and torch	Dry 4°C, no breeze, 4/8 cloud.
Comments: 2 Surveyors			
25/06/2020	S42	Binoculars, Endoscope and torch	No weather data recorded
Comments: 2 Surveyors			
01/04/2019	S174	Binoculars, Endoscope and torch	Sunny 15°C, no rain
Comments: 2 Surveyors			
Unknown. Pre June 2021	S356	Binoculars, Endoscope and torch	No weather data recorded
Comments: 2 Surveyors			
21/02/2018	Tree T116	Binoculars, Endoscope and torch	Cloudy, light, dry 5oC
Comments: 2 Surveyors			
29/03/2018	Tree T183	Binoculars, Endoscope and torch	Patchy cloud, no wind, dry 6°C
Comments: 2 Surveyors			
29/03/2018	Tree T185	Binoculars, Endoscope and torch	Patchy cloud, no wind, dry 6°C
Comments: 2 Surveyors			
25/01/2021	S328	Endoscope and torch	No weather data recorded
Comments: 2 Surveyors			
23/02/2021	S328	Endoscope and torch	No weather data recorded
Comments: 2 Surveyors			

Please provide surveyors names *(including Class Licence registration number if applicable)* and ensure the <u>above</u> table states the number of surveyors used for each survey visit undertaken.

All surveys were conducted by suitably qualified bat surveyors and were conducted by or accredited under the following bat licence holders:
Marielle James (2019-39454-CLS-CLS)
Patrick James (2015-14826-CLS-CLS)
Ellen Quinton (2017-31734-CLS-CLS)
Nick Downs (2015-11591-CLS-CLS)

Dusk survey

Date of each survey visit **(e.g. format 01/06/13)**	**Start and end times and time of sunset**	**Structure reference / location**	**Equipment used (include make of bat detectors and logging equipment)**	**Weather –** ***(Include start and end temps, precipitation, Beaufort wind scale etc)***
15/05/19	20:28 – 22:43 (20:43)	S29	Batlogger M and Roland Recorders	Start: 13ºC, cloud 2/8, light breeze from NE. End: same apart from temperature 9ºC.
Comments (to include # of surveyors used for each visit): 5 surveyors				
14/062021	21:02– 22:47 (21:19)	S29	Batlogger M and Roland Recorders	Start: 28ºC, heavy rain, 8/8 End: same apart from temperature 22ºC.
Comments: 4 surveyors				
27/06/18	21:05 – 22:50 (21:20)	T284	Batlogger M and Roland Recorders	Start: 15ºC, clear skies, light south-westerly breeze. End: same apart from temperature 14ºC.
Comments: 2 surveyors				
13/09/18	19:06 – 20:50 (19:19)	T284	Batlogger M and Roland Recorders	Start: Calm, dry, 17ºC. End: same apart from temperature 13ºC.
Comments: 2 surveyors				
23/06/2021	21:05 – 22:58 (21:20)	T284	Batlogger M and Roland Recorders	Start: Dry, light wind, cloud 1/8, 19ºC. End: same apart from temperature 12ºC.
Comments: 2 surveyors				
17/06/2021	21:03– 22:48 (21:18)	S42	Batlogger M and Roland Recorders	Start: Drizzle, light breeze, 8/8, 19ºC. End: same apart from temperature 18ºC.
Comments: 5 surveyors				
10/06/2021	21:00 – 22:45 (21:15)	S356	Batlogger M	Start: Dry, light, 0/8, 25ºC. End: same apart from temperature 20ºC.
Comments: 3 surveyors				
07/09/2021	19:15 – 21:03 (19:33)	S356	Batlogger M and Roland Recorders	Start: Dry, light, 7/8, 21ºC. End: same apart from temperature 18ºC.
Comments: 2 surveyors				
16/05/2019	20:30 – 22:45	S28	Batlogger M and	Start: Dry, 1/8, light

	(20:15)		Roland Recorders	breeze, 13ºC. End: same apart from temperature 11ºC.
Comments: 6 surveyors				
12/05/2021	20:14 – 22:09 (20:29)	S28	Batlogger M and Roland Recorders	Start: Dry, calm, 1/8, 15ºC. End: same apart from cloud cover 8/8.
Comments: 3 surveyors				
31/08/2021	19:33 – 21:23 (19:48)	S28	Batlogger M	Start: Dry & drizzle, light, 7/8, 20ºC. End: same apart from temperature 19 ºC.
Comments: 3 surveyors				
11/10/2021	17:58 – 19:44 (18:14)	S28	Batlogger M	Start: Dry & drizzle, light, 7/8, 14ºC. End: same apart from temperature 12 ºC, cloud cover 0/8.
Comments: 3 surveyors				
27/05/2021	20:43 – 22:28 (21:05)	S14	Batlogger M	Start: Dry, light, 1/8, 15ºC. End: same
Comments: 4 surveyors				
02/09/2021	19:30 – 21:30 (19:43)	S14	Batlogger M	Start: Dry, light, 8/8, 20ºC. End: same apart from temperature 17ºC
Comments: 4 surveyors				
08/09/2021	19:15 – 21:15 (19:33)	S14	Batlogger M and Roland Recorders	Start: Dry, light, 5/8, 23ºC. End: same apart from temperature 20ºC
Comments: 6 surveyors				
04/10/2021	18:15 – 20:15 (18:30)	S14	Batlogger M	Start: Shower, wind, 6/8, 14ºC. End: same apart from temperature 12ºC
Comments: 2 surveyors				
14/10/2021	17:55 – 19:40 (18:07)	S14	Batlogger M and Roland Recorders	Start: Dry, light, 6/8, 16ºC. End: same apart from temperature 14 ºC, cloud 7/8.
Comments: 4 surveyors				
16/09/2021	19:57 – 20:43 (19:12)	S14	Batlogger M and Roland Recorders	Start: Dry, calm, 0/8, 19ºC. End: same apart from temperature 17ºC.
Comments: 3 surveyors				
19/05/2021	20:35 – 22:21 (20:51)	S25	Batlogger M and Roland Recorders	Start: Dry & mild, calm, 0/8, 14ºC. End: same.
Comments: 2 surveyors				
01/09/2021	19:30 – 21:30 (19:46)	S25	Batlogger M	Start: Dry, light breeze, 5/8, 20ºC. End: same apart from temperature 17ºC and moderate breeze.
Comments: 4 surveyors				
13/10/2021	17:54 – 19:39 (18:09)	S25	Batlogger M and Roland Recorders	Start: Dry, light breeze, 3/8, 14ºC. End: same apart from cloud cover

				0/8.
Comments: 4 surveyors				
14/05/2019	20:25 – 22:42 (20:10)	S174	Batlogger M and Roland Recorders	Start: Dry, 3/8, calm, 13ºC. End: Dry, calm, 2/8, 09ºC.
Comments: 6 surveyors				
20/05/2021	20:36 - 22:21 (20:51)	S174	Batlogger M and Roland Recorders	Start: Dry, strong breeze to fresh gale, 7/8, 15ºC. End: same apart from temperature 13ºC and cloud cover 1/8.
Comments: 2 surveyors				
13/09/2021	19:03 – 21:00 (19:18)	S174	Batlogger M and Roland Recorders	Start: Dry, light, 8/8, 18ºC. End: same apart from temperature 17ºC
Comments: 4 surveyors				
15/05/2018	20:28 – 22:17 (20:43)	T116	Batlogger M and Roland Recorders	Start: Dry, light, 0/8, 17ºC. End: same apart from temperature 15ºC.
Comments: 2 surveyors				
12/09/2018	19:06 – 21:12 (19:21)	T183	Batlogger M and Roland Recorders	Start: Dry, light, 5/8, 15ºC. End: same apart from temperature 12ºC and could cover 6/8.
Comments: 2 surveyors				
21/05/2019	20:37 – 22:22 (20:54)	T183	Batlogger M and Roland Recorders	Start: Dry, calm, 2/8 18ºC. End: same apart from temperature 13ºC.
Comments: 2 surveyors				
20/09/2018	18:45 – 20:33 (19:03)	T185	Batlogger M and Roland Recorders	Start: Light rain, moderate breeze, 8/8, 20ºC. End: same.
Comments: 2 surveyors				
18/06/2019	21:04 – 22:49 (21:20)	T185	Batlogger M and Roland Recorders	Start: Dry, light, 8/8, 17ºC. End: same apart from temperature 18ºC and calm wind.
Comments: 2 surveyors				
26/05/2021	20:43 – 22:27 (20:01)	S2	Batlogger M	Start: Dry, light, 4/8, 12ºC. End: same apart from temperature 15ºC.
Comments: 4 surveyors				
07/09/2021	19:15 – 21:10 (19:33)	S2	Batlogger M and Roland Recorders	Start: Dry, light, 1/8, 24ºC. End: same.
Comments: 2 surveyors				
15/09/2021	18:59 – 20:44 (19:14)	S2	Batlogger M and Roland Recorders	Start: Dry, light, 0/8, 18ºC. End: same apart from temperature 16ºC.
Comments: 2 surveyors				

Please provide surveyors names *(including Class Licence registration number if applicable)* and ensure the <u>above</u> table states the number of surveyors used for each survey visit undertaken.

S29 15/05/2019 – Surveys undertaken by Amy Harris, Ellen Quinton, Kora Kunzmann, Nick Downs and Patrick James

S29 14/06/2021 – Surveys undertaken by Libby Brooks, Mike Hoit, Eve Proudlove and Samuel Marles
T284 27/06/2018 – Surveys undertaken by Jon Carter and Patricia Sellam
T284 13/09/2018 – Surveys undertaken by Amy Harris and Ellen Quinton
T284 23/06/2021 – Surveys undertaken by Nick Downs and Eve Proudlove
S42 17/06/2021 – Surveys undertaken by Libby Brooks, Mike Hoit, Eve Proudlove, Samuel Marles and Ellen Quinton
S356 10/06/2021 – Surveys undertaken by Ellysia Lewis, Holly Blaquiere and Nick Downs
S356 07/09/2021 – Surveys undertaken by Nick Downs and Eve Proudlove
S28 16/05/2019 – Surveys undertaken by Amy Harris, Ellen Quinton, Danielle Eccelshall, Nick Downs and Patrick James
S28 12/05/2021 – Surveys undertaken by Nick Downs, Samuel Marles and Kora Kunzmann
S28 31/08/2021 – Surveys undertaken by Libby Brooks, Alexandra Efthymiou, David Marshall and Ellen Quinton
S28 11/10/2021 – Surveys undertaken by Eve Proudlove, Nick Downs and Alexandra Efthymiou
S14 27/05/2021 – Surveys undertaken by Libby Brooks, Mike Hoit, Mike Head and Thomas Webb
S14 02/09/2021 – Surveys undertaken by Libby Brooks, Eleanor Holloway and Tom Webb
S14 08/09/2021 – Surveys undertaken by Nick Downs, Eve Proudlove, Mike Hoit, Alexandra Efthymiou, David Marshall and Thomas Webb
S14 04/10/2021 – Surveys undertaken by Mike Hoit and Thomas Webb
S14 14/10/2021 – Surveys undertaken by Alexandra Efthymiou, Eve Proudlove, Nick Downs and Thomas Webb
S14 16/09/2021 – Surveys undertaken by Nick Downs, Eve Proudlove and Thomas Webb
S25 16/05/2021 – Surveys undertaken by Lottey Wren and Ellysia Lewin
S25 01/09/2021 – Surveys undertaken by Eleanor Holloway, Libby Brooks, Alexandra Efthymiou and David Marshall
S25 13/10/2021 – Surveys undertaken by Alexandra Efthymiou, Eve Proudlove, Nick Downs and Thomas Webb
S174 14/05/2019 – Surveys undertaken by Amy Harris, Eleanor Holloway, Danielle Eccelshall, Nick Downs and Patrick James
S174 20/05/2021 – Surveys undertaken by Lottey Wren and Ellysia Lewin
S174 13/09/2021 – Surveys undertaken by Eve Proudlove, Nick Downs, David Marshall and Eleanor Holloway
T116 15/05/2018 – Surveys undertaken by Nick Downs and Olivia Morris
T183 12/09/2018 – Surveys undertaken by Nick Downs and Kieran McGranaghan
T183 21/05/2019 – Surveys undertaken by Lottey Palmer and Mike Hoit
T185 20/09/2018 – Surveys undertaken by Dominic Wallace and Mike Head
T185 18/06/2019 – Surveys undertaken by Nick Downs and Mike Hoit
S2 26/05/2021 – Surveys undertaken by Libby Brooks, Mike Hoit, Mike Head and Thomas Webb
S2 07/09/2021 – Surveys undertaken by David Marshall, Mike Hoit, Thomas Webb and Alexandra Efthymiou
S2 15/09/2021 – Surveys undertaken by Eve Proudlove, Nick Downs, David Marshall and Thomas Webb

Dawn survey

Date of each survey visit (e.g. format 01/06/13).	**Start and end time and time of sunrise**	**Structure reference / location**	**Equipment used (include make of bat detectors and logging equipment)**	**Weather – *(Include start and end temps, precipitation, Beaufort wind scale etc)***
06/10/2021	05:22 – 07:22 (07:07)	S42	Batlogger M and Roland Recorders	Start: Dry, moderate breeze, 1/8, 10ºC. End: same.
Comments (to include # of surveyors used for each visit): 5 surveyors				
22/08/2018	03:55 – 05:55 (05:55)	T116	Batlogger M and Roland Recorders	Start: Dry, light breeze, 0/8, 18ºC. End: same apart from temperature 16ºC.
Comments: 2 surveyors				

Comments:				
Comments:				

Please provide surveyors names *(including Class Licence registration number if applicable)* and ensure the <u>above</u> table states the number of surveyors used for each survey visit undertaken.

S42 06/10/2021 – Surveys undertaken by Mike Hoit, Nick Downs, Libby Brooks, Eve Proudlove and Tom Webb
T116 22/08/2018 – Surveys undertaken by Nick Downs and Michael Smith

'Other' survey (please specify e.g. trapping, remote, etc)

Date of each survey visit **(e.g. format 01/06/13).**	**Start and end times**	**Structure reference / location**	**Equipment used (include make of bat detectors and logging equipment)**	**Weather – *(Include start and end temps, precipitation, Beaufort wind scale etc)***
Activity transect surveys, April – October 2018	15 mins before sunset to 1.5 – 2 hours after sunset / 2 hours before sunrise to 15 mins after sunrise	27 transect routes (see Figure C5b and Table A.2, Annex A of Appendix 8.8: Bats Technical Appendix (Application Document 6.3)	Batlogger M bat detectors, Roland voice recorder	Optimal weather conditions as per standard guidance
Automated detector surveys 5 consecutive days each month April to October 2018	Detectors set to record 30 mins before sunset to 30 mins after sunrise	56 locations (see Figure C5b and Annex A of Appendix 8.8: Bats Technical Appendix (Application Document 6.3)	Song Meter SM4BAT FS automated detectors with SMM-U1 microphones	Optimal weather conditions as per standard guidance
Crossing Point surveys 5 consecutive nights each month April to October 2018	Detectors set to record 30 mins before sunset to 30 mins after sunrise	21 crossing point locations, (see Figure C5b and Table 8-10 and Table 8-25 of Appendix 8.8: Bats Technical Appendix (Application Document 6.3)	Song Meter SM4BAT FS automated detectors with SMM-U1 microphones	Optimal weather conditions as per standard guidance
A2/HS1 corridor surveys (static and activity surveys) May and July 2019	15 mins before sunset to 1.5 – 2 hours after sunset / 2 hours before sunrise to 15 mins after sunrise. Detectors set to record 30 mins before sunset to 30 mins after sunrise	A2 Road between Shorne Wood Country Park and Rochester and Cobham Golf Course (see Figure C5b and Section 8.5 of Appendix 8.8: Bats Technical Appendix (Application Document 6.3)	Batlogger M bat detectors, Roland voice recorder	Optimal weather conditions as per standard guidance
Swarming surveys 1st and 28th October 2019 and August and September 2020.	1.5 hours after sunset and continue to 5 hours after sunset. Detectors set to record 30 mins	Hangmans Wood and Deneholes SSSI and Muggins Hill Chalk Pit (see Figure C5b and Section 8.5 of	Batlogger M bat detectors, Roland voice recorder. Song Meter SM4BAT FS automated detectors	Optimal weather conditions as per standard guidance.

	before sunset to 30 mins after sunrise	Appendix 8.8: Bats Technical Appendix (Application Document 6.3)	with SMM-U1 microphones	
Woodland assessments January to December 2019	Daylight hours	12 Sites (see Figure C5b and Section 8.5 of Appendix 8.8: Bats Technical Appendix (Application Document 6.3)	Ground assessments using binoculars, aerial photographs and walked activity transect equipment as above	Optimal weather conditions as per standard guidance

Please provide surveyors names *(including Class Licence registration number if applicable)* and ensure the <u>above</u> table states the number of surveyors used for each survey visit undertaken.

All surveys were conducted by suitably qualified bat surveyors and were conducted by or accredited under the following bat licence holders:
Marielle James (2019-39454-CLS-CLS)
Patrick James (2015-14826-CLS-CLS)
Ellen Quinton (2017-31734-CLS-CLS)
Nick Downs (2015-11591-CLS-CLS)

Please explain any constraints on the survey/s undertaken (time of year, cold weather, refused access, safety issues preventing access etc – justify as necessary and include evidence where required). If access was refused please provide evidence (letter/email) to demonstrate this.

Survey constraints included sub-optimal weather conditions (see Appendix 8.8: Bats (Application Document 6.3)), access restrictions (see section C5 for detail) and safety issues (e.g. surveyors were followed on one transect, poachers were present with guns on another and surveyors didn't feel safe on one survey so were told to leave the transect. This is detailed within Annex F of Technical Appendix 8.8: Bats. These constraints were fully addressed through survey design and rescheduling of cancelled surveys.

Also complete the following:

- If DNA analysis of droppings has been undertaken, please indicate below (Yes, No, N/A) and ensure that **Figure C5b** (if applicable – see below) details the locations where the samples were taken. Where long-eared bats are detected but cannot be identified to species level visually, DNA analysis of any droppings will be needed where grey long-eared bats may be present.

Droppings were recovered from 13 structures that had DNA analysis undertaken on them. Six structures were found to support brown long-eared bat, one of which is within the Order Limits (S14). S14 will be retained although due to its close proximity to works (11 m) and significant severance to foraging habitat it is precautionarily assumed the roost will be abandoned and therefore lost.
The remaining buildings outside of the Order Limits will not be impacted by the proposed work and are not included further within this licence.
The locations of all structures subject to DNA analysis are provided on Figure C6.
Five structures provided negative results with two structures providing inconclusive results. One of the inconclusive results was from S2, which is within the Order Limits. Structure S2 had a peak of three common pipistrelle emerge at a later date.

- Please confirm that a walk over survey/check has been carried out within 3 months *prior* to application submission by a suitably experienced ecologist to ensure that conditions have not changed since the most recent survey was undertaken. Provide details of any changes to conditions and habitats and/or structures on site since the surveys were undertaken.

Date of walkover survey/check	Monthly surveys during 2020 south of the River Thames, and work within the Order Limits north of the River Thames sufficient to determine any significant changes in habitat or its condition. No walkover survey/checks have been conducted in 2022 prior to the draft licence submission but will be required prior to the final NE

	mitigation licence submission.
Details of any changes to conditions and habitats and/or structures, if there are no changes please insert 'None'	None

C6 Survey results: Summarise your findings in the tables below and cross reference to **Figure C6** (which must also include flight lines, access points, dimensions of existing roosts etc). If you did not undertake a specific survey type please add N/A to the relevant table/s. Raw data is to be appended to the Method Statement (including sonograms, DNA analysis results etc).

Roost t*ypes to be referenced as:* *Day, Night, Feeding Perch, Transitional, Satellite, Maternity, Hibernation confirmed, Foraging Area, Commuting Route, Swarming Site, Other*. See end of document for "Definitions" of these roosts.

When completing "**Notes/observations" include** reference *to direct observations, extent and age of droppings, presence of field signs, emergence or re-entry, echolocation analysis. Also include DNA results if applicable and include nil results)*

Visual inspection results

Date (e.g. format 01/06/13)	**Species and numbers**	**Roost type** *(to be consistent with the above listed types)*	**Structure reference** *(consistent with relevant figures and other text)*	**Roost location**	**Access points (include # of them)**	**Dimensions of existing roosts or explanation of where the roost is (as appropriate)**
Only roosts to be impacted have been considered in this section. For full survey results please see the results section (Section 4) of Appendix 8.8: Bats Technical Appendix (Application Document 6.3)						
10/07/19	Brown long-eared bat	Day	S14	Crevices within roof void, below wooden rafters.	20 access points identified.	20 droppings identified below roof apex near the chimney breast. The main roof void had several access points by western gable end.
Notes/observations:						
30/05/18	-	-	S29	-	Five access points identified.	-
Notes/observations: Four gable apexes with gaps between facias and walls. Valley corner joints of porch gaps in joists.						
11/07/19	**-**	**-**	S2	**-**	**-**	**-**
Notes/observations: What was thought to be a dropping was sent for DNA analysis and it came back inconclusive. The dropping was identified within the loft space.						
08/03/18	-	-	T284	-	Three features identified	-
Notes/observations: Two knot holes and one snapped branch providing opportunities for bats. The tree was dead so unsafe to climb.						
03/04/19	No bats found	N/A	S28	No roosts found during survey	N/A	N/A
Notes/observations:						
Unknown – Pre 2021	No bats found	N/A	S42	No roosts found during survey	N/A	N/A

Notes/observations:						
Unknown – Pre 2021	No bats found	N/A	S174	No roosts found during survey	N/A	N/A
Notes/observations:						
Unknown – Pre 2021	No bats found	N/A	S356	No roosts found during survey	N/A	N/A
Notes/observations:						
21/02/2018	No bats found	N/A	T116	No roosts found during survey	N/A	N/A
Notes/observations:						
29/03/2018	No bats found	N/A	T183	No roosts found during survey	N/A	N/A
Notes/observations:						
29/03/2018	No bats found	N/A	T185	No roosts found during survey	N/A	N/A
Hibernation Survey Results						
25/01/2021	No bats found	N/A	S328	No roost found	1 grated door leading into bunker	Internally this bunker is 8.6m in length consisting of a sunken concrete arched room. The arched rooms are 2m wide and 2m in height mounded earth over a partially concrete structure.
Notes/observations: Two Tinytags were placed, one at the back of the bunker and one at the entrance of the bunker, both halfway between the ground and ceiling.						
23/02/2021	Single Daubenton's bat	Hibernation	S328	Within the first central ceiling wooden feature	See above	See above

Provide further (brief) comments/explanation if required:

There were 994 trees, 181 structures and 12 woodlands assessed within the survey area.

Data loggers were installed in S328 as part of the hibernation surveys to ensure similar conditions are recreated in the artificial roost.

The full results are provided within Appendix 8.8: Bats Technical Appendix (Application Document 6.3), Section 4, Annex D and Annex E.

Dusk survey results

Date (e.g. format 01/06/13)	**Start and end times**	**Species and numbers**	***Roost type*** *(to be consistent with the above listed types)*	**Structure reference** *(consistent with relevant figures and*	**Roost location**	**Access points (include # of them)**	**Dimensions of existing roosts or explanation of where the roost is (as**

				other text)			**appropriate)**
Emergence Surveys – Buildings and Trees More detailed survey results are presented in Table E.1 and E.2 in Annex E of Appendix 8.8: Bats Technical Appendix (Application Document 6.3).							
15/05/19	20:28 – 22:43	One common pipistrelle	Day	S29	Under the south -west gable end.	Between fascia and wall on gable.	3-5cm gap
Notes/observations: 2 surveyors identified the common pipistrelle emerging.							
14/04/21	21:02 – 22:47	No emergence	Day	S29	Under the south-west gable end.	Between fascia and wall on gable.	3-5cm gap
Notes/observations: No Bat emergence identified.							
27/06/18	21:05 – 22:50	No emergence	Day	T284	South side from top cavity - a broken trunk with a large cavity above the knot holes.	Three access points located	Unknown.
Notes/observations: No Bat emergence identified							
13/09/18	19:06 – 20:50	One soprano pipistrelle	Day	T284	South side from top cavity - a broken trunk with a large cavity above the knot holes.	Three access points located	Unknown.
Notes/observations: 2 surveyors identified the common pipistrelle emerging.							
23/06/21	21:05 – 22:58	One brown long-eared bat	Day	T284	Emerged from 1/3 up the tree, exact location not seen.	Unknown	Unknown
Notes/observations: Brown long eared bat identified by Nick Downs.							
17/06/21	21:03 – 22:48	One common pipistrelle	Day	S42	Emerged from wooden cladding on apex of western aspect of roof.	Unknown	Unknown
Notes/observations: 1 surveyor identified the common pipistrelle emerging.							
10/06/21	21:00 – 22:45	One common pipistrelle	Day	S356	Probable emergence from the garage area.	Unknown	Unknown
Notes/observations: 1 surveyor identified probable emerging common pipistrelle.							
07/09/21	19:18 – 21:18	No emergence	Day	S356	-	-	-
Notes/observations: 2 surveyors suspected common pipistrelle emergence from stable to northwest of property in neighbouring field.							
16/05/19	20:30 – 22:45	No emergence	Day	S28	-	-	-
Notes/observations: No Bat emergence identified							
12/05/21	20:20 – 10:09	No emergence	Day	S28	-	-	-

Notes/observations: No Bat emergence identified							
31/08/21	19:30 – 21:00	One common pipistrelle	Day	S28	Emergence from front of house from underneath possible loose tile on the roof.	Unknown	Unknown
Notes/observations: 1 surveyor identified common pipistrelle emerging.							
11/10/21	17:59 – 19:44	No emergence	Day	S28	-	-	-
Notes/observations: No Bat emergence identified							
27/05/21	20:43 – 22:28	No emergence	Day	S14	-	-	-
Notes/observations: No Bat emergence identified							
02/09/21	19:28 – 21:30	One brown long-eared bat	Day	S14	Emergence seen from the bottom right corner of garage on the north – east edge of building.	Unknown	Unknown
Notes/observations: 1 surveyor identified emergence.							
08/09/21	19:15 – 21:15	No emergence	Day	S14	-	-	-
Notes/observations: No Bat emergence identified							
04/10/21	18:15 – 20:15	No emergence	Day	S14	-	-	-
Notes/observations: No Bat emergence identified							
14/10/21	17:55 – 19:40	One common pipistrelle	Day	S14	Possible emergence. Not seen emerging from any of the surveyors. Social around building.	Unknown	Unknown
Notes/observations: Not seen by any of the surveyors.							
16/09/21	19:57 – 20:42	Two common pipistrelle	Day	S14	Emergence from front of building.	Unknown	Unknown
Notes/observations: 2 surveyors identified the common pipistrelle bats emerging.							
19/05/21	20:36 – 22:21	No emergence	Day	S25	-	-	-
Notes/observations: No Bat emergence identified.							
01/09/21	19:31 – 21:30	Four common pipistrelle	Day	S25	First and second bat emerged from apex of wooden fascia on west side of the building. Third bat emerged from the of the apex from the corner of the west side of building in	Unknown	Unknown

					hole in wooden fascia. Fourth bat emerged from under fascia at gable end of house facing north.		
Notes/observations: 2 surveyors identified the four bats emerging.							
13/10/21	17:54 – 19:39	One soprano pipistrelle	Day	S25	Possible emergence. Bat flying close to building and garden, calling for a mate throughout survey. Could have emerged from North facing rear of the house.	Unknown	Unknown
Notes/observations: 2 surveyor observed possible emergence.							
14/09/21		No emergence	Day	S174	-	-	-
Notes/observations: No Bat emergence identified							
20/05/21	20:36 – 22:21	Two common pipistrelle	Day	S174	Potential emergence from 1 Yellowstock Mews. Second potential emergence from similar area. Assumed to be from same building. Both followed same flight pattern.	Unknown	Unknown
Notes/observations: 1 surveyor observed potential emergences.							
13/09/21	19:03 – 21:00	No emergence	Day	S174	-	-	-
Notes/observations: No Bat emergence identified							
15/05/18	20:43 – 22:17	One noctule	Day	T116	Emergence heard not seen. Confirmed by both surveyors as unlikely to not be emergence.	Pruning injury on a limb 4m SE	Unknown
Notes/observations: 2 surveyors identified emerging noctule.							
12/09/18	19:06 – 21:12	One noctule and one Daubenton'	Day	T183	Possibly have emerged	Unknown	Unknown

		s bat.			from the close vicinity. Unlikely to have emerged from T183 but not impossible.		
Notes/observations: Potentially Daubenton's commuting towards the water. Emerging myotis is assumed to be Daubentons based on location, other species recorded and similar roosting preferences to noctule that was also recorded.							
21/05/19	20:37 – 22:22	Two common pipistrelle	Day	T183	Suspected emergence commuting west to east from tree.	Unknown	Unknown
Notes/observations:							
20/09/18	18:45 – 20:33	No emergence	Day	T185	-	-	-
Notes/observations: No Bat emergence identified							
18/06/19	20:50 – 22:49	One soprano pipistrelle	Day	T185	Emerged form tree and observed it flying towards the lake. Heard it echolocate 10 seconds before. Did not see emerge.	Unknown	Unknown
Notes/observations: 1 surveyors observed likely emergence.							
26/05/21	20:43 – 22:27	No emergence	Day	S2	-	-	-
Notes/observations: No Bat emergence identified.							
07/09/21	19:33 – 21:10	Three common pipistrelle	Day	S2	Three emergences from annex at back of the house. Two from west aspect and one from the east.	Unknown	Unknown
Notes/observations: 2 surveyors observed emergence.							
15/09/21	18:59 – 20:44	One common pipistrelle	Day	S2	Emergence from south-east aspect of outbuilding.	Unknown	Unknown
Full survey results of all structures are detailed in Annex E within Technical Appendix 8.8: Bats (Application Document 6.3).							

Activity Transect Surveys and Automated Detector Surveys							
April – October (seasons split between 2018-19)	As per standard guidance	South of the River common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, noctule, brown long-eared bat, *Myotis* spp. North of the River common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, noctule, brown long-eared bat.	N/A	N/A	N/A	N/A	N/A

Notes/observations: Survey results are detailed in Table 4.3, 4.4 and 4.5 for south of the river and Table 4.19, 4.20 and 4.21 for north of the river within Technical Appendix 8.8: Bats (Application Document 6.3).

Activity data is shown on Figure C6 and summarised below. In line with Technical Appendix 8.8: Bats (Application Document 6.3) high activity for static detectors was taken as greater than 500 passes (all species) averaged per night. And high activity of big bats and woodland bats was taken as 10 or greater passes averaged per night. All transects where these conditions were met are listed below with the month where this level was reached.

Category	Transect Statics
High overall activity	3 (May, June, July, August); 13 (April); 14 (April, October); 18 (September); 19 (April, May); 20 (August, September);
High big bat activity	1 (July); 2 (July); 3 (July, August, September, October); 4 (May, August); 5 (May, June, July, August); 6 (May, June, July); 7 (June, September); 10 (May, June, July); 11 (April); 14 (April); 17 (May, June, July); 19 (April, May); 21 (May); 22 (August); 25 (June, July); 26 (May, June); 8&9 (July, August).
High woodland bat activity	3 (August, September, October); 4 (August); 5 (June); 17 (August, September); 8&9 (September)

In line with the Technical Appendix high activity for walked transects was taken as greater than 10 passes (all species) averaged per hour. And high activity of big bats and woodland bats was taken as 5 or greater passes averaged per hour. All transects where these conditions were met are listed below with the month where this level was reached.

Category	Walked Transects
High overall activity	2 (May, October); 3 (May, June, August, September, October); 4 (May, July, August); 5 (May, June); 6 (June, July, October); 7 (June); 8&9 (June, August); 11 (June); 12 (May, June, July, August, September, October); 13 (April, September, October); 14 (April, May, July, August, October); 15 (May, June, August); 16 (April, May, October); 17 (April, May, July, August, October); 18 (April, May, September, October); 19 (April, May, August, September, October); 21 (July, August, September); 22 (July, August); 25 (June).
High big bat activity	2 (May); 6 (October);19 (May, August);

High woodland bat activity	-

Crossing Point surveys (using Automated Detectors)

April to October 2018	As per standard guidance	Pipistrelle group, big bat group and woodland bat species	N/A	N/A	N/A	N/A	N/A

Notes/observations: Survey results are detailed in Table 4.5 and 4.21, Technical Appendix 8.8: Bats (Application Document 6.3).
Survey locations can be found in Figure C5b and results on C6

The table below shows the crossing point results.

Crossing Point Location	Location description	Peak static Av. Passes/night/season.	Average passes/night/season across all statics at each CP
7	West of Brentwood Road (Footpath 79)	469	262
6	Hofford Lane	432	210
14	M25 railway east	381	306
7.5	Hornsby Lane	370	202
9.5	Mardyke	298	266
8	Green Lane	281	202
12	North of Ockendon landfill	206	163
9	Golden Sewer	151	129
12.5	North Road	119	89
13	M25 railway east	108	80
2	Gravesend Road	79	51
5	East of Hofford Lane	75	63
7.75	Stifford Clays Road	73	58
4.5	Muckingford Road	48	34
6.5	Brentwood Road	47	28
10	Mardyke	38	36
0.5	Immediately north of A2/M2	36	33
11	West of Mardyke	34	33
3	North Portal	31	27
1	Thong Lane north	28	22
4	North Portal	24	21

Using the same high activity for static threshold as the Technical Appendix, the following crossing points recorded high levels of activity.

Category	Crossing point location
High overall activity	6 (April, June); 7 (April, July); 7.5 (May, June, August, September); 8 (May); 12 (August); 14 (June, August).
High big bat activity	0.5 (July); 1 (July); 2 (June, July, August); 4.5 (July); 6 (July); 8 (May); 9 (May); 9.5 (May); 10 (April, May); 11 (May); 12 (April, May); 13 (May, June, July, August);
High woodland bat activity	-

South of the River

Crossing Point surveys were undertaken at three locations South of the River where the Project would sever

linear features. A different number of locations were surveyed at different crossing points and in total ten locations were surveyed.
Dusk / dawn activity peaks for pipistrelle group and big bat group indicating commuting to and from nearby roosts. Activity for big bat and woodland species consistent through the night indicating use of areas as a foraging / commuting resource.
Table 4.5 Technical Appendix 8.8: Bats (Application Document 6.3) describes bat activity at each crossing point location south of the river.

North of the River

Crossing Points surveys were undertaken at 18 locations North of the River where the Project would sever linear features. A different number of locations were surveyed at different crossing points and in total 48 locations were surveyed.
Dusk / dawn activity peaks for pipistrelle group and big bat group indicating commuting to and from nearby roosts. Activity for all three species groups (pipistrelle group, big bat and woodland species) consistent through the night depending on location, indicating use of areas as a foraging / commuting resource. The level of activity varied between locations.
Table 4.21 Technical Appendix 8.8: Bats (Application Document 6.3) describes bat activity at each crossing point location north of the river.
The crossing location over the A1089 following the Stanford Road leading from/to Hangman's Wood and Deneholes SSSI was not surveyed for bat activity due to the A1089 being considered to be a significant barrier to dispersal and commuting bats in this area. The reasoning behind this decision was that although there is a line of trees/hedgerow leading to the bridge over the A1089, this notably has gaps on the north side, and there is no hedgerow or line of trees on the south side of Stanford Road. The bridge crossing over the A1089 itself is over 50m long, with no raised barrier either side of the carriageway to provide a linear structure to follow. Additionally, the bridge is lit 24hrs a day, both from lighting columns on Stanford Road itself, and from lighting pillars rising up from the A1089 below. The key bat species using the hibernation roost in the SSSI (brown long-eared, Natterer's and Daubenton's) are known to be light adverse species, and the well-lit bridge was, as such, considered unsuitable for commuting bats from Hangman's Wood and Deneholes SSSI. If bats are commuting to/from Hangman's Wood and Deneholes SSSI from the eastern side of the A1089, it was considered more likely that they would be using the pedestrian culvert approx. 600m south of Stanford Road, or the pedestrian footbridge a further 1km south of the culvert. Neither of these southern two locations will be impacted by the Project and any flightline severed by the project would be picked up by the crossing structures with associated guide planting.
To ensure that this crossing location is fully assessed, pre-construction surveys will be carried out at all three locations (Stanford Road bridge, the pedestrian culvert and the pedestrian footbridge), to assess the levels of activity of each of these crossings, and therefore their importance to the bat population within Hangman's Wood and Deneholes SSSI. These pre-construction surveys will focus on the pre/post hibernation period, as this is likely when the crossing locations would be most important for bats hibernating in the underground spaces within the SSSI. A precautionary mitigation strategy for both scenario; of whether the Stanford Road bridge is used as a commuting route; or is not used as a commuting route, are described in section E below.

A2 / HS1 Survey (South of the River) Section 4.2.1 to 4.2.25. Appendix 8.8: Bats Technical Appendix (Application Document 6.3)							
May and July 2019	Start at sunset end two to three hours after sunset	Three Noctule and four soprano pipistrelle	N/A	N/A	N/A	N/A	N/A
Bats were seen crossing the HS1 and A2. However, the activity recorded does not represent the known high numbers of bats that have been recorded in the local area (i.e. Ashenbank Wood, Transect 3) and therefore there is not an obvious flightpath in which bats use to cross these linear structures.							

Swarming Surveys							
October 2019	Start time two hours after sunset end time five hours after sunset	Common pipistrelle	N/A	Muggins Chalk Pit	N/A	N/A	N/A
August 2020		No bats seen swarming or enter the structure	N/A	B1	N/A	N/A	N/A

September 2020		No bats seen swarming or enter the structure	N/A	B1	N/A	N/A	N/A

South of the River
No bats were recorded swarming, but one hibernating bat and a second unidentified flying bat were recorded within the entrance of Muggins Chalk Pit. Muggins Chalk Pit is over 130 m from the Order Limits and is not anticipated to be impacted by works.

No bats were seen swarming at B1. Static data recorded a small number of bats with noctule, common pipistrelle, soprano pipistrelle and Daubenton's bat recorded.

North of the River
Swarming survey at Hangmans Wood and Denesholes SSSI did not identify any bats swarming.

Provide further (brief) comments/explanation if required:

Dawn Survey results

Date (e.g. format 01/06/13)	**Start and end times**	**Species and numbers**	**Roost type** *(to be consistent with the above listed types)*	**Structure reference** *(consistent with relevant figures and other text)*	**Roost location**	**Access points (include # of them)**	**Dimensions of existing roosts or explanation of where the roost is (as appropriate)**
06/10/21	05:22 – 07:22 (07:07)	No bats emerged	N/A	S42	N/A	N/A	N/A
Notes/observations:							
22/08/2018	03:55 – 05:55 (05:55)	No bats emerged	N/A	T116	N/A	N/A	N/A
Notes/observations:							
Notes/observations:							
Notes/observations:							

Provide further (brief) comments/explanation if required:

'Other' results – please specify.

Date (e.g. format 01/06/13)	**Species and numbers**	**Roost type** *(to be consistent with the above listed types)*	**Structure reference** *(consistent with relevant figures and other text)*	**Roost location**	**Access points (include # of them)**	**Dimensions of existing roosts or explanation of where the roost is (as appropriate)**
Woodland Assessments						
January to December 2019	See below	See below	N/A	N/A	N/A	N/A
Notes/observations:						
Notes/observations:						

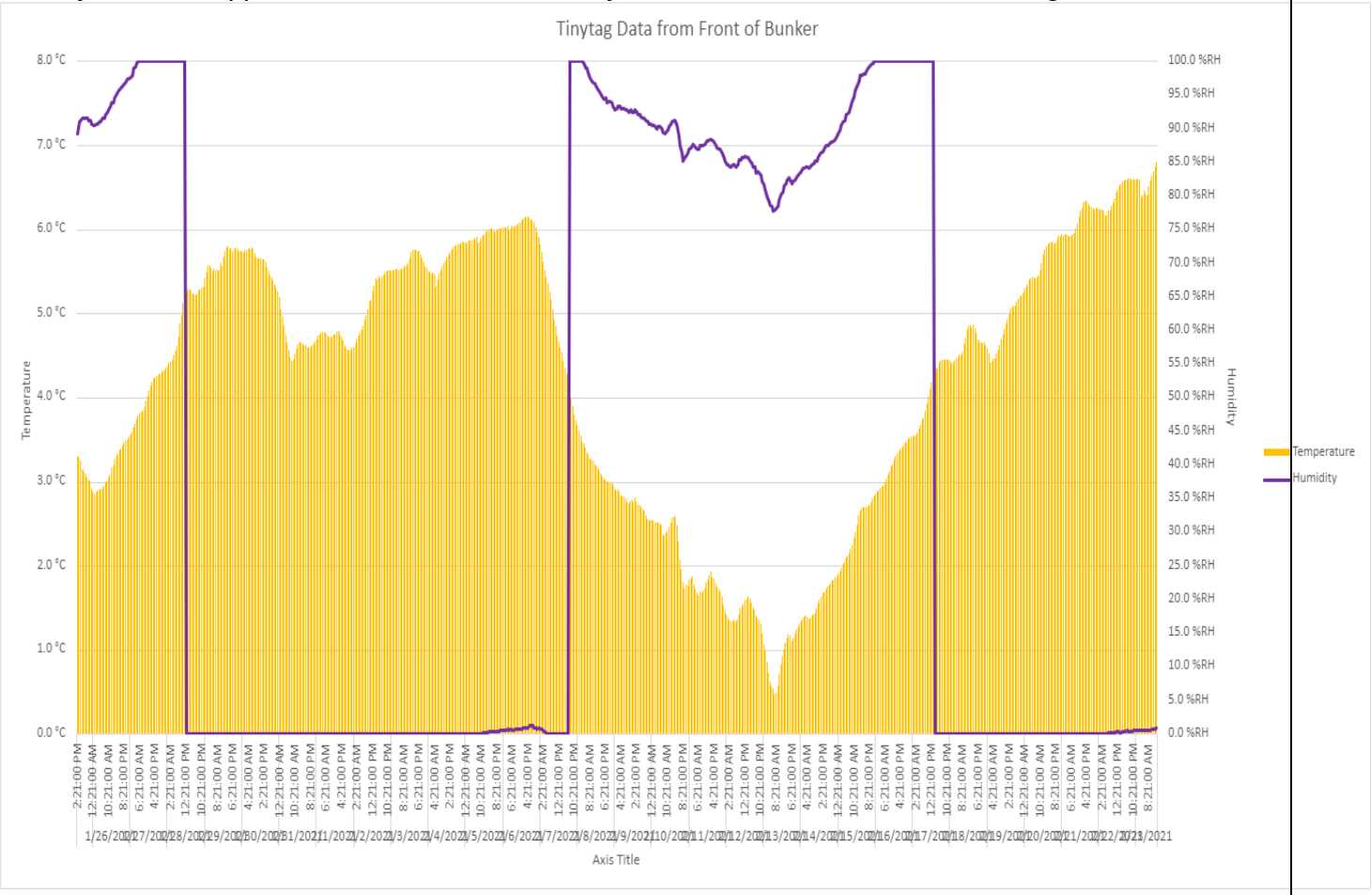
Notes/observations:						

Provide further (brief) comments/explanation if required:

A detailed explanation of the proposed alternative approach and associated reasoning for surveying and assessment of suitable roost features in trees within areas of woodland that could be affected, can be found in Technical Appendix 8.8: Bats (Application Document 6.3), sections 3.5.6 Annex C.

Of the twelve woodlands surveyed eight were identified as having a high value to roosting bats (Ashenbank Wood, Shorne Wood, Woodland at the north-western corner of Shorne Wood, Woodland adjacent to Thong Lodge, Claylane Wood, Cobham Hall Wood, East Tilbury Battery and Rainbow Shaw Woodland) whilst four were of a moderate value (Rochester & Cobham Park Golf Club, Brewers Wood, Gravelhill Wood, The Wilderness Woodland). The location of all woodlands assessed can be found in Figure C6.

Temperature data from inside S368. Recorded using a tinytag located at the front of the bunker close to the entrance. The humidity recording appears compromised as the immediate drop from 100% to 0% is unlikely to have happened. It is assumed it actually maintained a level over 75% throughout.



The average temperature over the period was 4.2°c and average humidity (excluding the abrupt drops to zero) was 74.6%. The minimum temperature was 0.5°c and max was 6.5°c. No external recordings were collected at this time for comparison to see how stable the internal temperatures were, but a bat was recorded in the bunker when the temperature probe was collected in February.

C7 Interpretation/evaluation of survey results (also see the Bat Mitigation Guidelines section 5.8 and Figure 4 for conservation significance of roost type): Please complete the following table:

Structure reference *(ensure*	**Species**	**Count / estimate of number of**	**Roost location**	**Site status assessment (e.g. maternity, feeding roost, swarming site,**	**Conservation significance of roost**

consistency with other text and Figures)		**individuals**		**hibernation confirmed etc)**	
S328	Brown long-eared bat	2	Within air raid shelter	Hibernation	Moderate
S328	Natterer's bat	3	Within air raid shelter	Hibernation	Moderate
S328	Daubenton's bat	1	Within air raid shelter	Hibernation	Moderate
S14	Brown long-eared bat	1	Within loft space	Day roost	Low
S14	Common pipistrelle	2	Unknown. Emergence location not confirmed	Day roost	Low
S29	Common pipistrelle	1	Under southwestern gable apex	Day roost	Low
S2	Common pipistrelle	3	Within loft space	Day roost	Low
T284	Soprano pipistrelle	1	Broken trunk with a large cavity above the knot holes	Day roost	Low
T284	Brown long-eared bat	1	Location 1/3 up tree exact location unknown	Day roost	Low
S25	Common pipistrelle	4	Apex of wooden fascia on west side of the building. Apex from the corner of the west side of building in hole in wooden fascia. Under fascia at gable end of house facing north.	Day roost	Low
S28	Common pipistrelle	1	Likely loose tile	Day roost	Low
S42	Common pipistrelle	1	Wooden cladding on apex of western aspect of roof.	Day roost	Low
S174	Common pipistrelle	2	Unknown	Day roost	Low
T116	Noctule	1	Pruning injury on a limb 4m SE	Day roost	Low
T183	Noctule	1	Unknown	Day roost	Low
T183	Daubenton's	1	Unknown	Day roost	Low
T183	Common pipistrelle	2	Unknown	Day roost	Low
T185	Soprano pipistrelle	1	Unknown	Day roost	Low
S356	Common pipistrelle	1	Garage area	Day roost	Low
LP4 Assumed presence across the scheme	Common & soprano pipistrelle; brown long-eared bat;	13; 9; 9; 9; 9, 9	Within trees impacted by the scheme	Day roost	Low

	Daubenton' bat; Natterer's bat; noctule, Leisler's				
LP4 Assumed presence of 2 roosts per species across the scheme	Daubenton's bat & noctule and Leisler's	20; 20, 20	Within trees impacted by the scheme	Maternity roost	Medium

If hibernation roost(s) were not identified in the survey, please indicate the hibernation roost potential of the site and/or structure(s) which will be impacted by the proposal by ticking the relevant box.	☐ **High** ☒ **Medium** ☐ **Low**

Provide details on the assessment and rationale of the hibernation roost potential.

Where a site/structure/tree has hibernation potential and/or hibernation roosts have been confirmed, Natural England expects any works which may impact on hibernating bats, or their roosts, to be undertaken outside of the hibernation period.

Hibernation surveys have only been undertaken on the air raid shelters in Shorne Woods (S49 and S328) to confirm the presence of the roost and to measure baseline temperature and humidity conditions to inform future mitigation.

Hibernation surveys or assessments have not been undertaken on other structures and trees. This will be captured in future surveys prior to the final licence application.

It is likely that there are small hibernation roosts on site due to the sheer number of structures and trees. However, no high-quality hibernation roosting habitat, such as large cave complexes, are within the survey area hence why the hibernation roost potential on site has been precautionarily assessed as medium.

Provide further (brief) comments / explanation if required:

All suspected emergence/re-entries have been classified as confirmed roosts as a precaution for the licence.

The inconclusive droppings found at S2 have been assumed to be common pipistrelle following the peak emergence of three common pipistrelle from the building.

Important Advice:

Survey maps that must be included in this section of the Method Statement, or as separate documents if preferred, are listed in *section I "Map checklist" at the end of this document.*

Insert survey figures, photographs etc below here if not submitting them as separate documents

D Impact assessment <u>in absence of mitigation or compensation for each species / roost type</u>

(also see section 6 of the Bat Mitigation Guidelines). Where appropriate you must take into consideration cumulative impacts of your proposals on the bat species and populations identified in your survey in each section.

Guidance on quantifying roosts for the purpose of licensing: *To be considered the same roost, the locations need to have the same **functional** and **qualitative** (e.g. physical) characteristics, be used by the **same species** for the **same purpose** (e.g. day roosting) and be within the **same building / structure**. If the physical characteristics are different (e.g. one roost is in external crevices in the wall and the other is in the roof void against internal timbers) then they should be considered different roosts - because they offer bats different roosting opportunities. If the physical characteristics are similar and provide the same functional characteristics, used by the same species for the same purpose (e.g. transitional roost) but with different individual roosting locations within the overall building / structure, that could be considered one transitional roost. If two species are using an area which provides the same characteristics, for the same function, it is still two roosts - as there are two species.*

D1 Initial impacts: The impact/s of activities undertaken on site pre-development and during works must be considered and explained. **Consider disturbance** (such as human presence, noise, vibration, dust, lighting, access obstruction due to scaffolding and plastic sheeting etc), **temporary damage and temporary loss of roosts and injuring/killing.**

E.g. Unsupervised contractor removing roof tiles has the potential to crush 3 common pipistrelle bats using the roof tiles as day roosts. Major negative impact at a site level; Demolition of an extension to a building will take place adjacent to a maternity roost of common pipistrelle bats situated under the soffit board of the retained building. Potential for significant disturbance if demolition works are undertaken during the maternity period through vibration, noise and dust. Medium negative impact on a local level.

Unsupervised, non-sensitive demolition has the potential to kill and injure common pipistrelles, soprano pipistrelles, brown long-eared bats, noctule and Daubenton's bat roosting in Structures S2, S25, S28, S29, S42, S174, S356 and Trees T284, T116, T183 and T185. Additionally, permanent roost abandonment may occur at S14 and S328 due to the close proximity of works and severance from foraging habitat effects. These roosts contain brown long-eared bats, common pipistrelle, Daubenton's bat and Natterer's bat.

Applying LP4, there are an additional potential 58 day roosts of common & soprano pipistrelle, brown long-eared bats, noctule, Leisler's, Daubenton's bat and Natterer's bat, and 2 maternity roosts of Daubenton's bat and 2 maternity roosts of noctule bats and 2 maternity roosts of Leisler's bats.

The construction of the Project would result in the permanent loss of twenty confirmed roosts, considered to be a moderate adverse impact at a county level in the absence of mitigation.

Including the LP4 potential roosts, this would be a moderate negative impact at the county level (assuming the maternity roosts are present).

South of the River Thames, the construction of the Project would result in loss of foraging and commuting habitat of limited value for bats, owing to the land within the Order Limits being lost predominantly consisting of arable (342.53ha), amenity grassland (37.31ha), species-poor semi-improved grassland (60.87ha), semi-improved neutral grassland (20.01ha) and improved grassland (20.60ha); this is considered suboptimal habitat. The grassland habitat onsite being of limited value to bats is confirmed by, amongst other data, bat activity data at Transect 7 automated static locations. Transect 7 automated static locations were situated within the largest block of arable/grassland to be impacted by works and recorded the lowest average level of bat passes south of the River Thames per night, although it is noted that there are seasonal peaks in both June and September, suggesting it could be seasonally used by foraging bats.

There are areas of greater importance to the local bat population which includes Ashenbank Wood, Shorne Woods, Gravelhill Wood, Claylane Wood as well as a mature hedgerow west of Shorne Woods and the three crossing point surveyed locations (crossing 0.5, 1 &2). Relatively moderate to high levels of bat activity were recorded in these areas. These areas would be impacted by vegetation removal within them and would partly account for the 5.35ha of ancient woodland, 7.67ha of semi-natural broadleaved woodland, 34.87ha of plantation woodland and 4.23ha of scrub habitat to be lost south of the River Thames.

North of the River Thames crossing, the construction of the Project would result in the permanent irreversible loss of foraging and commuting habitat of limited value for bats, predominantly consisting of arable (1054.73ha), semi-improved neutral grassland (60.47ha), species-poor semi-improved grassland (69.87ha), improved grassland (41.83ha) and amenity grassland (11.82ha).

Woodland habitat north of the River Thames is also being lost with the loss of 1.57ha of ancient woodland, 8.75ha of semi-natural broadleaved and mixed woodland, 64.80ha of plantation woodland and 24.72ha of scrub. This habitat is of particular use to the woodland bat species which are the rarest group of bats recorded onsite. Areas of woodland surveyed such as the Wilderness Woodland (classified as having a moderate value to bats) would lose approximately half of its woodland habitat still only recorded relatively low levels of bat activity averaging just 1.5 passes per night on automated static detectors within the woodland (Transect 22).

Generally, activity was highest at transects that were relatively close to large water bodies (Transect 14, 18, 19 and 20).The majority of these habitats fall outside the Order Limits and are therefore

retained, with only 1.04ha of standing water (reservoirs and lakes) being lost.

The loss of foraging and commuting habitat would be moderate negative impact at the local level. Fragmentation effects are considered in the section below.

Consent for works impacting the SSSI will be disapplied as part of the application for a DCO. In the absence of mitigation, the construction of the Project will result in the fragmentation of bat commuting routes between roosts and foraging habitats to the south of the River Thames. The commuting and foraging route identified to the north of the A2 was utilised by bats between Shorne and Claylane Woods. Loss of these habitats will have a slight adverse impact at a local level.

Due to a reduction of foraging habitat and severance of foraging grounds, bats may be displaced and leave the local area.

Noise produced by machinery during the construction of the scheme has the potential to cause a significant disturbance to bats in and around their roosts. In order to quantify these impacts, noise modelling data for the scheme has been used.

A review of the available scientific literature was undertaken which found six relevant peer reviewed papers with data on the topic of noise levels of acoustic disturbance in bats (Barber, Crooks, Fristrup (2009), Bennett and Zurcher (2013), Finch, Schofield and Mathews (2020), Luo, Siemers and Koselj (2015), Schaub, Otswald & Siemers (2008) and Siemers & Schaub (2010)). Traffic noise has been shown to contain both sonic and ultrasonic components so contains a range of sounds in frequencies which bats are most sensitive to (Finch, Schofield and Mathews (2020)). Of all the papers reviewed the lowest level of sound shown to disturb bats was 68 db. This was in Luo, Siemers and Koseli (2015) where traffic noise played back between 68-84 dB (average 76 dB) was shown to have a significant effect on foraging success. Therefore, for the purpose of this licence, 68 dB is the threshold value above which a bat may be disturbed by noise. This estimate is deemed to be conservative as threshold noise levels in other comparable studies of free flying bats were deemed to be over 80 dB (e.g Bennet and Zurcher (2013)). There is also likely to be a higher background noise level tolerance for bats in roosts due to the acoustic shielding the roost surroundings provide (e.g the tiles of a structure or wood of a tree).

Some roosts were found to occur in areas where the baseline noise level is already above 68 dB. In these cases, for the purpose of the licence, it was considered that a bat may be disturbed if noise levels increased by one decibel or more outside a roost.

Most of the machinery used for construction use diesel engines that emits noise at frequencies predominantly below 1kHz and often less than 500Hz. However, small items of plant, such as chainsaws, mainly used during vegetation clearance as part of enabling works, emit noise at higher frequencies as a consequence of being fitted with small two stroke or four stroke petrol engines. Therefore, noise disturbance to bats is more likely to occur during activities using small items of plant such as chainsaws, as these high frequencies are more likely to be within the most sensitive hearing range of bats which has been shown in multiple studies to be tuned to the frequencies at which bats emit their social and echolocation calls (Geipel et al. (2021) and Russ, Jones, and Racey (2005) and Lattenkamp et al. (2020)).

For the purpose of this licence, a roost was considered likely to be disturbed if:

- Noise levels at the roost location increased from below 68 dB to more than 68 dB as a result of construction noise; and/or
- If a roost location has a baseline noise level of 68 dB or over, the construction noise increases the overall noise level by 1 dB or greater from the baseline level.

A review of all retained roosts (roosts to be lost were not included as it is assumed they will have been removed before main construction work commences) revealed that no roosts fall into these criteria as shown below.

Retained Roost	Baseline	Change in Noise	Precautionary impact

	level (dB)	Level during Construction (dB)	thresholds exceeded?
Manor Farm Building 13 - Manor Farm House	57.6	0 - 0.7	No
Manor Farm Building 12 - Manor Farm Barn	57.6	0 - 0.4	No
St Mary Magdalene Church, North Ockendon	63.2	0 - 0.1	No
Structure 28 - Benton Farmyard Building 15B - Workshop	48.6	0 - 0.6	No
Structure 28 - Benton Farmyard Building 12 - Barn	48.6	0 - 0.5	No
St Marys Church	54.1	0 - 0.7	No
Marling Manor Main Building - Brick House	64.3	0 - 1.8	No
Shorne Wood Underground Air Raid Shelter	68.3	0 - 0.1	No
Shorne Wood Underground Air Raid Shelter – Bunker 2	68.3	0 - 0.2	No
1003	47.7	0 - 0.3	No
1015	47.7	0 - 0.5	No
1036	47.7	0 - 2.7	No
911	68.3	0 - 0.2	No
Desk study Leisler roost (similar distance from construction as T911 above	68.3	0 - 0.2	No

Muggins Chalk Pit was not included in the noise review so will need including during the final licence application. However, it is in the same part of the scheme as Shorne Wood sites and is much further from the DCO boundary so the assumption is that noise impacts would be even lower at this location and would not be licensable.

Confirm number of roosts to be damaged: Twenty

D2 Long-term impacts: Consider and explain the impacts of the proposed works on the different species populations at a site, local, regional, and national level**.**

D2.1. Roost modification: e.g. changes to roosts/access points, new entrances (including human access e.g. for servicing/maintenance etc), change in size of roost space, changes in air flow, temperature and humidity, light etc. Please detail the access points into each roost and the type/s of roosts which will be modified.
E.g. Non-mitigated changes to the roof structure, which requires replacing, will lead to the modification of 3 access points into a common pipistrelle maternity roost which will result in bats being unable to enter or exit the roost. Moderate negative impact on a local level.

No roost modifications are proposed.

Confirm number of roosts to be modified: Zero

D2.2. Roost loss: Loss or deterioration of roosting sites, access points, habitat, etc must be considered. Please detail the access points into each roost and types of roost/s which will be lost.
E.g. Demolition of building reference X in June will lead to the loss of a night roost in the porch used by 1 lesser horseshoe bat and the loss of a maternity brown-long eared bat roost in the loft space. This will lead to the death and/or injury of bats including dependent young and permanent destruction (loss) of both roosts. Moderate negative impact at a site level for lesser horseshoe bats and moderate negative impact at a local level for brown-long eared bats.

The twenty confirmed roosts will all be lost or be subject to such disturbance that the roost is permanently abandoned.

The felling of tree T284 will lead to the loss of a day roost on the south side of the tree in a large cavity on the broken trunk used by one soprano pipistrelle. It will also result in the loss of a day roost for one brown long-eared bat, the exact location of the roost could not be identified. This will lead to the death and/or injury of two adult bats and permanent destruction (loss) of both roosts. A low negative impact at the site level for both species is predicted.

The felling of tree T116 will lead to the loss of a day roost in a pruning wound on a limb at 4 m facing

southeast used by one noctule. This will lead to the death and/or injury of one adult bat and permanent destruction (loss) of a roost. A low negative impact at the site level is predicted for noctules.

The felling of tree T183 will lead to the loss of a day roost used by one noctule, a day roost used by one *myotis* sp. and a day roost used by two common pipistrelle. This will lead to the death and/or injury of four adult bats and permanent destruction (loss) of three roost. The exact location of the roosts are unknown. A low negative impact at the site level for noctules, *myotis* sp. and common pipistrelle is predicted.

The felling of tree T185 will lead to the loss of a day roost used by one noctule in an unknown location on the tree. This will lead to the death and/or injury of one adult bat and permanent destruction (loss) of a roost. A low negative impact at the site level is predicted for noctules.

The demolition of S2 will lead to the loss of a day roost within the loft space used by three common pipistrelle. This will lead to the death and/or injury of three adult bats and permanent destruction (loss) of a roost. A low negative impact at the site level for common pipistrelles is predicted.

The proximity and location of the proposed road to S14 (between the roost and likely foraging grounds) will lead to the loss of a day roost used by two brown long-eared bats within the loft space and one common pipistrelle in an unknown location. This will lead to the permanent loss of both roosts. A low negative impact at the site level for both species is predicted.

The demolition of S25 will lead to the loss of a day roost under fascia boards used by four common pipistrelle and one soprano pipistrelle. This will lead to the death and/or injury of five adult bats and permanent destruction (loss) of both roosts. A low negative impact at the site level for both species is predicted.

The demolition of S28 will lead to the loss of a day roost, likely under a loose tile, used by one common pipistrelle. This will lead to the death and/or injury of one adult bat and permanent destruction (loss) of a roost. A low negative impact at the site level for common pipistrelles is predicted.

The demolition of S29 will lead to the loss of a day roost below the southwestern gable end with the entrance between the facia board and gable used by one common pipistrelle. This will lead to the death and/or injury of one adult bat and permanent destruction (loss) of a roost. A low negative impact at the site level for common pipistrelles is predicted.

The demolition of S42 will lead to the loss of a day roost under the wooden cladding on the apex of the western aspect of the roof used by one common pipistrelle. This will lead to the death and/or injury of one adult bat and permanent destruction (loss) of a roost. A low negative impact at the site level for common pipistrelles is predicted.

The demolition of S174 will lead to the loss of a day roost in an unknown location used by two common pipistrelle. This will lead to the death and/or injury of two adult bats and permanent destruction (loss) of a roost. A low negative impact at the site level for common pipistrelles is predicted.

The demolition of S356 around the garage area will lead to the permanent loss of a day roost used by one common pipistrelle and potentially the death and/or injury of the bat. A low negative impact at the site level for common pipistrelles is predicted.

The proximity of works to S328 (approximately 1 m) will lead to the loss of a hibernation roost used by brown long-eared bats, Daubenton's bats and Natterer's bats (peak count less than four per species). The roost is a former air raid shelter and the only clear bat access point is via the entrance as it is blocked by a steel-barred gate. This will lead to the permanent loss of three roosts. A moderate negative impact at a county level for all three species is predicted.

The majority of trees within the woodlands that are being impacted have received at least one presence/absence survey. Further survey effort will ensure that full effort is achieved in line with best practice guidelines (BCT, 2016).

Currently, it is estimated 431 trees (111 high suitability; 164 moderate suitability; 156 low suitability) are within a 20m buffer of the vegetation clearance areas and will be directly or indirectly impacted. LP4 is being applied in lieu of the full survey details. Based on the indicative ratio set out, a further 49 day roosts and 4 maternity roosts may be lost or disturbed as within 20m of the tree clearance. Uncontrolled felling works would lead to the loss of these potential roosts and the physical harm of any bats occupying them at the time. This would be a moderate negative impact at the county level (assuming the maternity roosts are present). It should be noted that there is a REAC commitment (LV001) to "*Detailed design for the Project, including diverted utilities, will aim to reduce the removal of trees and vegetation as far as reasonably practicable, and in accordance with the LEMP and the Environmental Masterplan (Figure 2.4, Application Document 6.2)*.".

Following the final surveys, this estimate will likely be significantly lower, however, the mitigation matrix demonstrates that any new roosts can be adequately compensated.

Confirm number of roosts to be destroyed: Twenty confirmed roosts;

D2.3. Fragmentation and isolation: Will the proposed works results in these impacts? E.g. loss of linear features such as hedges, tree lines, increased lighting, severance of flight lines by roads/rail lines, separation of breeding/hibernation sites from feeding grounds, etc.
E.g. In addition to the removal of common pipistrelle day roosts in trees along the proposed road, removal of hedgerows, shown on Figure D, and the construction of the new road will fragment a significant commuting and foraging route for a lesser horseshoe maternity roost. This may cause a reduction in the long term success of the breeding colony of lesser horseshoes by restricting existing foraging range or killing bats on the road. Potentially major negative impact at a site and local level.

In the absence of mitigation habitat clearance required prior to construction will result in the loss of linear features (hedgerows and tree lines) shown to be used by bats. No specific linear features were identified during surveys as being regularly used by the woodland species (non-pipistrelle or big bat species).

All bat species on site are likely to be impacted by fragmentation and isolation however woodland bat species will be disproportionately impacted as they are more dependent on the woodland and hedgerow habitat that is impacted by works. Relatively low numbers of woodland bat species were recorded on site and six woodland bat species roosts are identified in this licence as being impacted.

As a result of works bat species may have to seek alternative foraging areas and expend more energy in reaching them. Fragmentation and isolation is likely to be more of an issue to the south of the River Thames were large sections of woodland could be severed from individual bats foraging territories.

Crossing point surveys were undertaken as shown in figure C6. Bats were recorded at all crossing points with the averages given below.

Crossing Point Location	Location description	Peak static Av. Passes/night/season.	Average passes/night/season across all statics at each CP	Impact
7	West of Brentwood Road (Footpath 79)	469	262	Permanent severance
6	Hofford Lane	432	210	Permanent severance
14	M25 railway east	381	306	Temporary impact from pylon restringing
7.5	Hornsby Lane	370	202	Permanent severance
9.5	Mardyke	298	266	Permanent severance
8	Green Lane	281	202	Permanent severance
12	North of Ockendon landfill	206	163	Permanent severance
9	Golden Sewer	151	129	Permanent severance
12.5	North Road	119	89	Permanent severance
13	M25 railway east	108	80	No impact
2	Gravesend Road	79	51	No impact

5	East of Hofford Lane	75	63	Permanent severance
7.75	Stifford Clays Road	73	58	Permanent severance
4.5	Muckingford Road	48	34	Permanent severance
6.5	Brentwood Road	47	28	Permanent severance
10	Mardyke	38	36	Permanent severance
0.5	Immediately north of A2/M2	36	33	Permanent severance
11	West of Mardyke	34	33	Permanent severance
3	North Portal	31	27	Temporary impacts from construction
1	Thong Lane north	28	22	Permanent severance
4	North Portal	24	21	Temporary impacts from construction

The route of the proposed scheme will sever these flightlines with the greatest impacts at the crossing points that received the greatest activity (shown in highlight above). Impacts of the severance will disrupt access to foraging areas and seasonal movements directly impacting availability and access to habitat.

For a full assessment of the A1089 crossing point see section C above.

In the absence of mitigation, the effects of fragmentation and severance of linear routes is expected to have a moderate negative impact on the bat populations at the county level.

D3 Post-development interference impacts: e.g. extra street lighting or other external lighting, use of loft space as storage, increased noise. Please also consider other direct or indirect post development impacts which may include disturbance/ injuring/killing.
E.g. Security lighting being installed will shine on the brown-long eared bat maternity roost access points which may affect emergence patterns and lead to a reduction in foraging times. This may cause a reduction in the long term success of the breeding colony or cause the roost to be abandoned. Moderate to high negative impact at a site and local level.

In the absence of mitigation, the Project will result in an increase noise, light and traffic in the area, all of which have been shown to have an effect on bat activity.

Operational noise impacts to roosts are not predicted as the acoustic modelling shows the previous stated thresholds are not exceeded.

Changes in operational noise levels are not considered to be licensable for free flying bats in the area. This is because baseline levels of noise in areas surrounding the road are already high (with existing bats habituated to this) and overall noise pollution will be reduced in the landscape as a quieter road surface is to be laid.

The creation of a new road would result in bat fatalities due to collisions with vehicles.

In the absence of mitigation, the effects of post-development interference impacts are expected to have a moderate negative impact on the bat populations at the local level.

D4 Predicted scale of impact of this development/activity on species status (also see section 6.5 of the Bat Mitigation Guidelines and the BCT's Bat Survey Good Practice Guidelines): Please complete the following table to explain what this is likely to be at the site, local/county and regional levels for each roost type and species. Add additional lines when necessary

Roost types to be referenced as: Day, Night, Feeding Perch, Transitional, Satellite, Maternity, Hibernation confirmed, Foraging Area, Commuting Route, Swarming Site, Other.

Species and Numbers	**Roost type**	**Predicted scale of impact *(place X in relevant column)***	**Notes** (include impact on roost – damage / destruction /modification etc)

(which will be affected at the time works will be undertaken)		**Site**	**County**	**Regional**	
Soprano pipistrelle (1)	Day	X			Tree T284 – Destruction
Brown long-eared bat (1)	Day	X			Tree T284 - Destruction
Noctule (1)	Day	X			Tree T116 - Destruction
Noctule (1)	Day	X			Tree T183 - Destruction
Daubenton's bat (1)	Day	X			Tree T183 - Destruction
Common pipistrelle (2)	Day	X			Tree T183 - Destruction
Soprano pipistrelle (1)	Day	X			Tree T185 – Destruction
Common pipistrelle (3)	Day	X			S2 – Destruction
Brown long-eared bat (1)	Day	X			S14 – Significant disturbance resulting in abandonment of the roost
Common pipistrelle (2)	Day	X			S14 – Significant disturbance resulting in abandonment of the roost
Common pipistrelle (4)	Day	X			S25 – Destruction
Soprano pipistrelle (1)	Day	X			S25 – Destruction
Common pipistrelle (1)	Day	X			S28 – Destruction
Common pipistrelle (1)	Day	X			S29 – Destruction
Common pipistrelle (1)	Day	X			S42 – Destruction
Common pipistrelle (2)	Day	X			S174 – Destruction
Common pipistrelle (2)	Day	X			S356 – Destruction
Brown long-eared bat (4)	Hibernation	X			S328 – Significant disturbance resulting in abandonment of the roost
Daubenton's bat (4)	Hibernation		X		S328 – Significant disturbance resulting in abandonment of the roost
Natterer's bat (4)	Hibernation		X		S328 – Significant disturbance resulting in abandonment of the roost
Pipistrellus (common/soprano) (13); Brown long-eared bat (9); noctule (9); Daubenton's bat (9); Natterer's bat (9), Leisler's bat (9)	Day	X			LP4 – Assumed presence of day roosts in trees impacted by the scheme
Daubenton's bat (0)	Maternity		X		LP4 – Assumed presence of maternity roosts in trees impacted by the scheme
Noctule (0)	Maternity		X		LP4 – Assumed presence of maternity roosts in trees impacted by the scheme
Leisler's bat (0)	Maternity		X		LP4 – Assumed presence of maternity roosts in trees impacted by the scheme

* ****Please note*** *that you can add more rows to the table: right click in any cell outside the grey box area. Choose Insert > Insert rows below.*

Provide further comments/explanation as required (this helps understand how the impacts will be mitigated or compensated for when assessing section E):

No additional pressures on roosting bats are anticipated during the operation of the Project.

In addition to the loss of roosts, the Projects will lead to removal of woodland and hedgerow habitats which may cause the displacement of small number of foraging or commuting bats from the immediate area. However, habitats lost during construction are typical of the wider area so represent only a small reduction in the available habitats during construction. The habitats are well connected to the wider landscape via a network of hedgerows and watercourses so fragmentation during construction will be limited in extent and once the landscaping had established it will provide a greater area of suitable habitat which has strong links both along the Project and out into the wider landscape.

Mitigation provided during operation of the Project for suitable roosting features lost during construction will result in a net increase of roosting availability in the area. Suitable roosting features exist in the wider landscape, such as in the extensive urban areas and trees. The increase in roost availability will therefore be slightly beneficial at the local scale.

The main route alignment will result in fragmentation of habitats, although this will be mitigated by the landscape planting, provision of green bridges and other suitable crossing structures, which will create links between retained hedgerows and woodland.

Important Advice:
Please ensure that a separate 'Impact map' is provided (Figure D) which must show all structures or habitats (clearly referenced) that will be disturbed, damaged or destroyed, detailing where the roosts and access points are etc. Also *see section I "Map checklist" at the end of this document*.

E Mitigation and Compensation (please also see section 7 and 8 of the Bat Mitigation Guidelines)

E1 Please explain why this design was chosen over other potential solutions - set out what other designs were considered and why they were not feasible (*e.g. if the proposal is to construct a new stand-alone roost, explain why it is not possible to retain the roost in the existing structure etc).* The mitigation solution being proposed in the method statement should be the one that delivers the 'need' with the least impact on the bat population.

The Project has been through a number of iterations to ensure that the selected route option meets the objectives of the Project which include reducing/minimising the impact on the wider environment. The Project has been designed to minimise the number structures to be lost and includes the creation of seven green bridges, three viaducts and one culvert large enough for commuting bats at carefully devised locations supported by ecological survey data. There will be environmental barriers (earth bunds and noise barriers) to reduce noise levels and extensive landscape planting to enhance the local area equating to 1164ha of habitat (with a net gain of semi-natural habitats of 768ha). There are 54 ponds, as well as additional wetland habitats, proposed that will provide additional foraging areas for bats.

The Project's design will result in the unavoidable loss of 17 day roosts and three hibernation roosts. Five roosts are being retained within the Order Limits (T1003, T1015, T1036, S49, and the Leisler desk study maternity roost). T1003, T1015 and the Leisler desk study maternity roost are within bat mitigation areas, T1036 is within retained ancient woodland at Rainbow Shaw and S49 is outside of construction works and noise assessments have shown it not to receive significant disturbance.

The Project design includes the construction of a hibernation bunker to mitigate for the impacts to S328. The existing bunker will not be destroyed but will be heavily disturbed due to its proximity to construction works, and depending on timing of works, may require exclusion to prevent bats using over winter then being disturbed. The design for the compensation bunker replicates a replacement hibernation roost that was constructed for High Speed 1. The location for the replacement bunker is approximately 1.5 km from S328, due to suboptimal or unsuitable habitat being located within closer proximity. Numerous options were considered prior to this selection, which were:

- Option 1 within the SSSI at the closest point to the previous locations
- Option 2 within the field to the east of Claylane Wood north of the A2

- Option 3 within the field adjacent to Brewers Wood north of the A2

It was decided that Option 1 within the SSSI would not be a suitable approach owing to the damage caused within a SSSI. It is considered that to provide mitigation in this location would have greater significant adverse impacts on established bat habitat than looking at another nearby location and would consequently be counterproductive to maintaining the bat population in the area. The Order Limits within the SSSI is near the proposed development. This could increase the collision risk of any bats using the hibernation bunker. Option 1 was dismissed due to the potential disturbance to a SSSI and to the species being affected.

Option 2 was the closet location to the lost bunker outside of the SSSI and within the Order Limits at approximately 620m west of the existing structure. The option was not selected as the location due to the proximity of the Project and the embankment works proposed in this location. The disturbance would be increased in this area and as such the option was not selected.

Option 3 was at least 1.5 km east of the existing structure and is located on the periphery of Brewer's Wood, within an existing proposed habitat creation/enhancement area. The location is situated sufficiently away from the Project to minimise any disturbance and collision risk to the resident bat population. In addition to this, significant planting between the new roost creation area and suitable bat habitats will be provided which will enhance existing habitat present and provide suitable opportunities and connectivity for the bats to find the newly created roost. It was consequently decided that Option 3 was the most likely to be successful.

E2.2 Capture and release (if applicable):

Please confirm that you agree to undertake the following procedures for the capture and exclusion of bats, where these are applicable:

a. The use of endoscopes, artificial light from torches, destructive search by soft demolition (see Definitions), temporary obstruction of roost access, temporary or permanent exclusion methods (including installation) and use of static hand held nets must only be undertaken or directly supervised by the Named Ecologist, or an Accredited Agent.

b. Where capture and/or handling of bats are necessary, only the Named Ecologist, Accredited Agent, or an Assistant directly supervised by the Named Ecologist may do so. Capture/handling/exclusion of bats must only be undertaken in conditions suitable for bats to be active.

c. Where bats are discovered and taken (excluding unexpected discoveries during adverse weather conditions) they must either be relocated to an alternative roost (see Definitions) suitable for the species, or where bats are held this must be done safely and bats released on site at dusk in, or adjacent to, suitable foraging/ commuting habitat in safe areas within or directly adjacent to the pre-works habitat.

d. Endoscopes and hand held nets are only to be used to assist with the locating and capture of bats.

e. Temporary and permanent exclusion must be carried out using techniques specified in the most up to date edition of the '*Bat Workers Manual*'. If one-way exclusion devices are to be used, each device must remain in position for a period of at least 5 consecutive days/ nights throughout a spell of suitable weather conditions, or remain longer until these conditions prevail.

f. Prior to destructive works, an inspection using torches and/or an endoscope must be performed internally to search for the presence of bats. If any licensed vesper bat species is found and is accessible, each will be captured by gloved hand or hand-held net, given a health check and then each placed carefully inside a draw-string, calico cloth holding bag or similar for transport. If any licensed horseshoe bat species is found, the capture methods outlined in (h) will only be used after it has been shown that overnight dispersal or exclusion are no longer practicable methods.

g. Following inspection and exclusion operations, the removal of any feature with bat roost potential, will be only performed by hand in suitable weather conditions and under direct ecological supervision. Where applicable, materials will be removed carefully away and not rolled or sprung to avoid potential harm to bats. The undersides of materials will be checked by the Named Ecologist or Accredited Agent for bats that may be clung to them before removal.

h. For sites where the presence of horseshoe species has been confirmed, the following exclusion method will be used: prior to work commencing, the Named Ecologist or Accredited Agent will conduct a thorough

internal inspection for the presence of horseshoe bats. Only after the void is shown to be unoccupied will the destructive search commence, or all apertures into that void be closed and sealed (windows, doors, etc) by use of boarding, sealed tarpaulin or similar.

If a horseshoe bat is encountered, it will be left undisturbed during daylight. After all bats have dispersed overnight, the void will be sealed as described above. If all bats have not emerged, the Named Ecologist will either use torchlight and non-tactile human presence to disturb the bat to encourage it to emerge and disperse, during night only, or through use of a hand held net. Only after all bats have emerged from the building or void will it be sealed.

Yes, I agree / No, I don't agree
Yes

If NO, please provide justification below. Please use this text box to describe any additional information on protocols to be employed if bats are found during works. Non-standard capture and exclusion apparatus must be shown on **Figure E2**.

Tree Inspections
All trees recorded with suitability will receive a pre-felling check during the active season (April-October inclusive). The features will be inspected using endoscopes, cameras, mirrors as appropriate by experienced and licensed ecologists working as agents under the licence. Only trees that have been fully inspected and obstructed can be felled outside this timeframe. Trees that have not been inspected or fully obstructed before the end of October, must be left until April the following year. Such trees would need to be protected from other felling activities around them to avoid accidental damage (felled trees falling into it) and avoid disturbance where hibernating bats may be present. Where possible, trees will be felled outside the main hibernation period (November to February), unless they do not possess any PRF's, or are within areas that need to be cleared in winter (for example are within dormouse habitat that is scheduled for winter habitat clearance). Felling of trees adjacent to trees with maternity or hibernation roosts will avoid the peak maternity and hibernation period to provide a buffer for those trees.

Obstructing features
Where there is certainty that the feature has been fully inspected and bats confirmed as absent, the feature will be removed immediately. Where the feature isn't felled immediately, the feature will be blocked by stuffing the cavity with a suitable material e.g. bubble wrap, newspaper, cloth, Then the opening and the stuffing inside will be secured by fixing a suitable material (e.g. metallic mosquito screen, heavy duty tape, plastic wrap, cloth wrap) over the top. All obstructions will need checking for integrity prior to felling to ensure they are still in place.

One-way exclusions
Where a feature cannot be fully inspected or doubt remains as to whether a complete inspection has been made, a one-way excluder will be fitted to the feature. The excluder will remain in place for at least 5 nights under suitable conditions. The one-way excluder will be a bespoke design to fit the tree feature but will comprise of a tube and a flap to prevent bats flying or crawling into the tube.

The feature will then be re-inspected and assuming no signs of bat are found the feature felled or the feature will be obstructed in the manor described above to await felling. If the one-way excluder has become detached, the 5 night period would restart.

Soft-felling
Where a tree can not be inspected by rope access or mechanical means, it will need to be subject to a dusk survey followed by a dawn survey on the morning of the planned felling. The agent will then discuss with the felling team how to safely remove and lower features of interest. These should be cut well above and below of the potential entry point, lowered to the ground where the agent will inspect. Such features that cant be fully inspected on the ground will either be attached (using strapping) to a tree outside of the impact area to allow

any bat to disperse. Or the feature will be moved to an area outside of the impact area and left with the feature facing up for at least 5 nights before the feature is removed from site.

Bat found during works
If during the inspection bats are found in a feature, the agent will decide through consultation with the named ecologist on the next step. If the species and roost type are all covered by the licence and the bats are in a suitable location and could be retrieved by hand or hand net, they will be and moved to a “rescue” bat box, positioned near by to act as a safe place to move bats to for them to disperse overnight. If bats can not be moved by hand, a one-way excluder will be fitted to the feature following the method described above. The feature will be filmed using IR cameras to confirm bats have left through the excluder and the feature will then be removed. If bats have not left after 5 nights, the excluder must be removed, the bats given the opportunity to disperse overnight, and the feature checked the following day. If bats are still present the feature will need to be very carefully removed and lowered, then moved to an adjacent tree outside the impact area from where the bats can disperse.

Unexpected finds
Where a species or roost type or greater number of individuals are found than the licence provides cover for, work must stop and the named ecologist report this to Natural England as soon as possible (same day). An amendment to the licence may be required before works can resume.

Table below is copied from the following section as there is a formatting issue that is preventing the table being populated.

Species	Expected number of bats to be captured at the time works will be undertaken. Note this may be different to the number of bats using the roost at its optimum time as timings for works will be at a time when bats are least likely to be present
Common pipistrelle	16 or fewer. Two common pipistrelle in S214 are anticipated to leave on their own accord. With LP4 up to an additional 13 within day roosts.
Soprano pipistrelle	3 or fewer. With LP4 up to an additional 13 within day roosts
Noctule	2 within day roost. Works will be timed to avoid hibernating bats. With LP4 up to an additional 9 within day roosts but maternity roosts would not be impacted while they were in use.
Brown long-eared bat	1. Works will be timed to avoid hibernating bats in S328. Bats may be removed from the day roost in T284. . With LP4 up to an additional 9 within day roosts
Natterer’s bat	0. Works will be timed to avoid hibernating bats. With LP4 up to an additional 9 within day roosts
Daubenton’s bat	1 within day roost. Works will be timed to avoid hibernating bats. LP4 up to an additional 9 within day roosts but maternity roosts would not be impacted while they were in use.
Leisler’s bat	1 within day roost. Works will be timed to avoid hibernating bats. LP4 up to an additional 9 within day roosts but maternity roosts would not be impacted while they were in use.

Should your proposals include capture (taking) please specify numbers of each species that will be affected <u>at the time the works are to be undertaken</u>:

Species	**Expected number of bats to be captured at the time works will be undertaken**. *Note: this may be different to the number of bats using the roost at its optimum time as timings for works will be at a time when bats are least likely to be present*.

** * Please note that you can add more rows to the table: right click in any cell outside the grey box area. Choose Insert > Insert rows below.*

E3 Bat roost and access point retention, modification and creation: Please detail how all impacts to each species (as identified in sections C and D) will be mitigated. If not applicable to your proposals please state 'N/A' in the relevant text boxes.

Please note, if the use of non-bitumen coated roof membranes is necessary, you must include a certificate that proves the roofing membrane has passed a 'snagging propensity test'. For further details please see: https://www.gov.uk/government/publications/bats-apply-for-a-mitigation-licence

You do not need a certificate for bitumen 1F felt that has a non-woven, short fibre construction.

Please confirm: N/A

E3.1 Retention of existing roost(s) – *Works may include, for example, maintenance works that result in no material changes to the roost but may cause disturbance or temporary damage e.g. t*emporary *exclusion of a roost to allow investigative and repair works to a bridge*. Provide details of all works including:

- Number and description of roosts to be retained, with an explanation of how they will be retained. Confirm dimensions to be retained.

Five roosts are being retained within the Order Limits (T1003, T1015, T1036, S49 and the Leisler desk study maternity roost). T1003, T1015 and the Leisler desk study maternity roost are within bat mitigation areas, T1036 is within retained ancient woodland at Rainbow Shaw and S49 is outside of construction works and noise assessments have shown it not to receive significant disturbance.

S328 (the hibernation bunker) will be physically retained but its proximity to the works means it is likely to be functionally lost during construction. Once construction has been completed in this area, the roost will be available for use again however operational noise may reduce its suitability.

- Number of access/entrance points to be retained and how this will be achieved. If enhancements to the roosts will be provided, such as through crevice provision, please detail.

Roosts are retained in their original condition and unmodified

- Mitigation for any other impacts e.g. new lighting at the site.

The lighting design will follow best practice (see Code of Construction Practice (Application Document 6.3)) REAC Ref TB024 - In line with the obligations within the CoCP regarding lighting, construction site lighting will comply with the Institute of Lighting Professionals' Guidance Notes for the Reduction of Obtrusive Light GN01/20 (2020) and the provisions of BS EN 12464-2:2014 Light and lighting – Lighting of workplaces Part 2: Outdoor workplaces (British Standards Institution, 2014), where applicable.
The contractor will consult the Environmental Clerk of Works over the application of these guidance and standards to avoid adverse effects on sensitive ecological receptors including retained bat roosts and watercourses.).

During the operational phase of the Project, the lighting design has been designed to decrease the impact of light on adjacent habitats and biodiversity features (for full details refer to Appendix 8.15: Construction and Operational Light Spill Calculations (Application Document 6.3)). Where the Project is lit, the lighting will include downlighting and a range of different sized columns to reduce light spill (see the Design Principles (Application Document 7.5) Clause no. LST.02). The lighting assessment has shown that the lux level falls to 0.5 lux within 30m of the route (please refer to Appendix 8.15: Construction and Operational Light Spill Calculations (Application Document 6.3).

Current predictions show that the known roosts that are retained will not be adversely impacted by noise (taken to be an increase above 68dB or an increase of 1dB where baseline is already at or

higher than 68dB). However, should new roosts be found before construction this will be kept under review and temporary and permanent acoustic barriers could be deployed to reduce the impact at these roosts. Small items of plant, such as chainsaws, mainly used during vegetation clearance as part of enabling works, emit noise at higher frequencies as a consequence of being fitted with small two stroke or four stroke petrol engines. In addition, cutting metal and concrete is also known to produce ultrasonic noise. Therefore, noise disturbance to bats could occur during these activities around retained roosts. This will have to be kept under review for the final licence where the full roost locations will be known but these activities could be controlled through timings, restricted in location extent or the use of acoustic barriers to mitigate further.
A noise and vibration management plan (NVMP) or equivalent would be prepared for each part of the construction works (see CoCP (Application Document 6.3) REAC Ref. NV002) as well as other noise and vibration mitigation measures (see CoCP (Application Document 6.3) REAC Ref. NV001, NV003, NV005, NV006, NV007, NV009, NV010, NV011, NV012, NV013, NV014, NV015, NV016 and NV017).

The Project will employ suitable qualified and experienced Ecological Clerks of Works (ECoW) through the construction phase to supervise implementation of environmental mitigation and protection commitments (see CoCP (Application Document 6.3) REAC Ref. TB006).

E3.2 Modification of existing roost(s) - *Works may include, for example, reduction in roof void height, change of tiles and roof lining (stating the type of membrane that will be used), alteration of access point through replacement of soffits etc.* Please provide the following:

- Dimension details of modified roosts: clearly state what the original roost dimensions were and what the dimensions of the modified roost will be.

N/A

- Dimension details of modified access points: clearly state how the access points are being modified.

N/A

- Details of any other modifications to be made to roosts.

N/A

- Mitigation for any impacts of lighting on the modified roost/s if appropriate.

N/A

E3.3 New roost creation (including bat houses, cotes and bat boxes etc).

Note – creation of compensation for high impact cases (e.g. loss of a maternity roost) must be protected in the long term. Any bat boxes or roost structures that are part of a licence proposal which do not show signs of bats must be retained for a minimum of 5 years from date of completion of the development/works. Typically this will be around 5 years for low conservation status roost compensation (e.g. bat boxes) and longer for other significant roosts (e.g. bat houses, lofts etc). The exact time period will be specified in any licence issued. For high conservation status roost loss, the compensation roost/s must still be protected in the long term by another means (such as a s106 agreement), which is particularly important if the structure is likely to change ownership.

E3.3a Please complete the table below for the species and roost types listed. For all other species and roost types please provide information under **E3.3b**.

Species & Roost type for which new roost creation will be provided Select 'yes' for those	**New roost creation**
	Compensation should be in line with the *Bat Mitigation Guidelines*. Where compensation is being provided, there should be at least **one compensation feature, suitable for the species concerned, per roost and per species to be impacted**, OR If a proposal impacts more than one bat species and / or roost type then cumulative

species impacted or 'N/A' if not applicable to this application	impacts must be considered when designing the compensation; this should always be in line with the species and / or roost type which will be subject to the greatest impact and ensure that the requirements of all species impacted are met.		
	Compensation Feature	**Quantity**	**Location of Compensation Feature** (as shown on Figure E3)
Common pipistrelle ☒ Yes ☐ N/A *Day roost* *Night roost* *Feeding* *Transitional/Occasional*	☒ Bat box ☐ Integrated bat box/ bat brick/ bat tube ☐ Bat tile (including ridge tile) ☐ Other (specify): ☐ None	18	☐ In same building ☐ In other existing building on site ☐ In new building ☒ Other (specify): On retained trees within the Order Limits
Soprano pipistrelle ☒ Yes ☐ N/A *Day roost* *Night roost* *Feeding* *Transitional/Occasional*	☒ Bat box ☐ Integrated bat box/ bat brick/ bat tube ☐ Bat tile (including ridge tile) ☐ Other (specify): ☐ None	6	☐ In same building ☐ In other existing building on site ☐ In new building ☒ Other (specify): On retained trees within the Order Limits
Whiskered ☐ Yes ☒ N/A *Day roost* *Night roost* *Feeding* *Transitional/Occasional*	☐ Bat box ☐ Integrated bat box/ bat brick/ bat tube ☐ Bat tile (including ridge tile) ☐ Other (specify): ☐ None		☐ In same building ☐ In other existing building on site ☐ In new building ☐ Other (specify):
Brandt's ☐ Yes ☒ N/A *Day roost* *Night roost* *Feeding* *Transitional/Occasional*	☐ Bat box ☐ Integrated bat box/ bat brick/ bat tube ☐ Bat tile (including ridge tile) ☐ Other (specify): ☐ None		☐ In same building ☐ In other existing building on site ☐ In new building ☐ Other (specify):
Daubenton's ☒ Yes ☐ N/A *Day roost* *Night roost* *Feeding* *Transitional/Occasional*	☒ Bat box ☐ Integrated bat box/ bat brick/ bat tube ☐ Bat tile (including ridge tile) ☐ Other (specify): ☐ None		☐ In same building ☐ In other existing building on site ☐ In new building ☒ Other (specify): Myotis roost in T183 assumed to be Daubenton's bat. On retained trees within the Order Limits
Natterer's ☐ Yes ☒ N/A *Day roost* *Night roost* *Feeding* *Transitional/Occasional*	☐ Bat box ☐ Integrated bat box/ bat brick/ bat tube ☐ Bat tile (including ridge tile) ☐ Other (specify): ☐ None		☐ In same building ☐ In other existing building on site ☐ In new building ☐ Other (specify):
Brown long-eared ☒ Yes ☐ N/A *Day roost* *Night roost* *Feeding* *Transitional/Occasional*	Note: boxes for this species will only be acceptable in certain circumstances, where this is justified on an ecological basis ☒ Bat box, justification Solitary day roosts, bat boxes will provide similar function to roosts lost ☐ Other (specify): ☐ None	6	☐ In same building ☐ In other existing building on site ☐ In new building ☒ Other (specify): On retained trees within the Order Limits

Serotine ☐ Yes ☒ N/A *Day roost* *Night roost* *Feeding* *Transitional/Occasional*	Note: bat boxes are not suitable for this species. Compensation should replicate, as closely as possible, the existing roost: ☐ Bat tile ☐ Bat brick ☐ Other (specify):		☐ In same building ☐ In other existing building on site ☐ In new building ☐ Other (specify):
Lesser Horseshoe ☐ Yes ☒ N/A *Day roost* *Transitional/Occasional*	A proportionate number of bat features suitable for the species. The provision of one feature, suitable for the species concerned (eg void) per roost to be impacted will be considered appropriate: Specify:		☐ In same building ☐ In other existing building on site ☐ In new building ☐ Other (specify):

E3.3b For all species and roost types not covered in the above table please provide the following:

- New roost dimension details or features (to include bat tiles/boxes as applicable).

Due to the lack of suitable locations to install compensation boxes, there is no compensation provided within close proximity to S2.

The two noctule day roosts will be mitigated through the provision of bat boxes, see below. The Natterer's, Daubenton's and brown long-eared bat hibernation roosts are covered below:

Replacement Hibernation Roost

The creation of a new bunker adjacent to Brewers Wood will maintain and enhance the hibernation opportunities for bats in the local area due to its slightly larger size and extra roosting features. The loss of S328 will result in the loss of a hibernation roost known to support brown long-eared Daubenton's bat and Natterer's bats.

It is proposed that a new hibernation roost is created to replace the three hibernating roosts in S328 due to it being impacted during construction. Conditions within the new hibernation roost will aim to replicate the current condition in S328. The bunker will be partially set into the ground with dimensions of 4 m in height x 2 m width x 9 m in length and will be made from precast concrete culvert sections, be brick lined inside and will have brick partition walls. The design is slightly larger than S328 and will have wooden crawl boards installed and other features such as gaps in mortar, to provide additional roosting opportunities. The brick work will have a rough finish to help bats grip to the wall and the layout of the bunker creating multiple rooms will result in different microclimates. Access into the bunker will be from the open doorway that will have a security grill on the front (details below), which will deter human interference but still allow bats into the bunker. Figure E3a shows the proposed design of the bunker and Figure E3 shows the location, within the compensation and enhancement area adjacent to Brewers Wood approximately 1.5 km east of the current bunker. To aid any bats that will lose their hibernation roost as a result of the development, a band of planted woodland, species-rich grasslands and scrub are to be planted within the Order Limits linking the two areas and providing connectivity along that northern boundary. The planting will additionally reduce any fragmentation with Shorne Wood and Brewers Wood.

Bat Boxes

Bat boxes will be used to compensate for the loss of tree roosts and suitable roosts in other structures. Where possible, the type of bat box used will be selected based on its similarity in size and function to the roost being lost. There is a commitment to moving veteran trees and re-siting within retained woodland to preserve some of the existing resource, as well as planting specimen trees to offset their loss (see CoCP (Application Document 6.3) REAC Ref. LV031 - Where removal of veteran trees is required, the intact hulks of felled veteran trees would be relocated in close proximity to a nearby

veteran tree or placed within a parkland area.
Where tree removal is required within ancient woodland, then timber will be retained and placed in log piles and left to decompose naturally. These measures accord with standing advice prepared by Natural England and the Forestry Commission (2022)., LV032 - A minimum of 30 individual specimen trees would be planted as replacement for lost veteran trees. Fifteen such trees would be planted to the south of the River Thames and 15 to the north of the River Thames.

In addition to compensation for the loss of roosts, bat boxes will be provided to compensate for the loss of trees with suitable features as these could be part of future roosting resource within the area.

The minimum ratio of bat box compensation is provided below.

Species and roost type	Minimum compensation ratio (roost/tree loss: replacement features)
Annexe II species. All roost types	1:4
All species Maternity, hibernation, mating, unknown	1:4
Non-annexe II species. Any roost type excluding maternity, hibernation or mating.	1:3
High suitability tree*	1:1
Moderate and low suitability tree*	1:1

* If judged by the named ecologist that there is already sufficient roosting resource within retained woodlands and the inclusion of bat boxes may be counterproductive, the ratio for non-roost compensation may be varied. Decisions will be recorded with justification and reported to NE.

Bat boxes will be installed within the Order Limits within identified areas of retained woodland.

The same mitigation approach will apply if a single feature is needed to be removed from a tree but the tree does not require felling (e.g. a bat box will be installed as mitigation if a limb with a high suitable feature has to be removed but the tree can be left in situ).

Where bat boxes are the selected compensation for roost loss, the table below identifies suitable models of box that have been shown or reported to provide suitable compensation for the roost type and species. Various styles of box will be used where appropriate to allow more varied roosting habitat.

Species	**Roost Type**	**Bat box type (Green = paper shows preference of this box, black = records of use)**	**Recommended bat box style**
Barbastelle	Maternity	Modified Greenaway box[12] Stratmann FS1 type boxes[5]	Crevice - Large
	Hibernation	No scientific literature found	*
	Day roost	Modified Greenaway box[12] Stratmann FS1 type boxes[5]	Crevice - Large
	Mating roost	Modified Greenaway box[12]	Crevice - Large
Brown long-eared bat	Maternity	1FS[6] 2FN[6] 1FF[8]	Crevice - Large

	Hibernation	No scientific literature found	*
	Day roost	1FS[6] 2FN[6, 11, 8] 1FF[6] 2F[6] Stebbings and Walsh box[2] Stratmann[7]	Crevice or cavity boxes can be used with different preferences throughout the season, partially suspected to be due to competition with birds[6]. Therefore, a mixture of boxes is recommended.
	Mating roost	1FS[6] 2FN[6]	Large box, either crevice or cavity.
Common pipistrelle and soprano pipistrelle	Maternity	1FF[8] 2FN[8] BCI[10] Stratmann FS1 type boxes[5]	Crevice - Large
	Hibernation	No scientific literature found	*
	Day roost	2FN[6, 11] 1FF[8, 11] 2F[11] Kent Personal records Modified Greenaway box[12]	Predominantly crevice boxes however a low number of cavity boxes should be used to increase roosting habitat variety (approximately 4:1)
	Mating roost	Kent Personal records 2F Personal records Chillon Personal records Modified Greenaway box[12]	Both medium sized crevice and cavity boxes.
Daubenton's bat	Maternity	2FN[8]	Cavity - Large
	Hibernation	No scientific literature found	*
	Day roost	Wedge[11] 1FF[11] 1FS[11] 1FW[11] 2F[11] 2FN[11] SW[11] Modified Greenaway box[12]	Cavity - Medium
	Mating roost	No scientific literature found	*
Leisler's bat	Maternity	2FN[8]	Cavity - Large
	Hibernation	2F[1]	Literature non-extensive and only study was conducted in Spain therefore a small cavity box should not be relied upon.
	Day roost	2FN 1FF[8]	Cavity - Large
	Mating roost	2F[1]	Lack of literature means confidence cannot be given in recommendation however cavity boxes of various sizes would likely be suitable.
Nathusius' pipistrelle	Maternity	Stebbings and	Cavity - Medium

		Walsh box[3, 13]	
	Hibernation	No scientific literature found	*
	Day roost	Stebbings and Walsh box[2,3, 13] Stramann[7] Modified Greenaway box[12]	Cavity - Medium
	Mating roost	Stebbings and Walsh box[2]	Cavity - Medium
Natterer's bat	Maternity	2F[6] 2FN[6, 4]	Cavity - Large
	Hibernation	No scientific literature found	*
	Day roost	2F[6, 11, 8] 2FN[6, 8] 1FS[6] 1FF[8]	Cavity – various sizes
	Mating roost	2F[6] 2FN[6] 1FS[6]	Cavity – various sizes
Noctule	Maternity	2FN Personal records	Cavity - Large
	Hibernation	No scientific literature found	*
	Day roost	1FW[11] 2FN[11] Stebbings and Walsh box[2] Stratmann[7]	Cavity - Large
	Mating roost	Stebbings and Walsh box[2] Stratmann FS1 type boxes[5]	Cavity – Large and medium
Serotine	All	Generally, non-tree roosting species however one was found roosting in a modified Greenaway box[12]	Highly unlikely to be used. If found a bespoke decision will be made by the named ecologist. Decisions will be recorded with justification and reported to NE.
Small myotis (whiskered Brandt's, Alcathoe)	Maternity	No scientific literature found – Maternity roosts found in buildings.	*
	Hibernation	No scientific literature found	*
	Day roost	2FN[9] Modified Greenaway box[12] Stratmann FS1 type boxes[5]	Large box both crevice and cavity.
	Mating roost	No scientific literature found	*

* If a roost of this type is to be lost, then details of the roost will be recorded, and the named ecologist will decide on appropriate mitigation. Decisions will be recorded with justification and reported to NE.

The literature used to identify what boxes were suitable for each roost were as follows:

1. Alcalde, J. T., Ibanez, C., Anton, I. & Nyssen, P., 2013. First case of migration of a Leisler's bat (Nyctalus leisleri) between Spain and Belgium. *Le Rhinolophe,* Volume 19, pp. 87-88.

2. Baranauskas, K., 2007. Bats (Chiroptera) found in bat boxes in Southeastern Lithuania. *Ekologija,* 53(4), pp. 34-37.

3. Baranauskas, K., 2009. The use of bat boxes of two models by Nathusius' Pipistrelle (Pipistrelle nathusii) in Southeastern Lithuania. *Zoologica Lituanica,* Volume 19, pp. 3-9.

4. Bilston, H., 2014. *Maximising occupation of bat boxes in an ancient woodland in Buckinghamshire: A summary of recent research,* s.l.: BSG Ecology.

5. Chytil, J., 2014. Occupancy of bat boxes in the Dolni Morava Biosphere Reserve (southern Moravia, Czech Republic). *Vespertillio,* Volume 17, pp. 79-88.

6. Dodds, M. & Bilston, H., 2013. A comparison of different bat box types by bat occupancy in deciduous woodland, Buckinghamshire, UK. *Conservation Evidence,* Volume 10, pp. 24-28.

7. Lesinski, G., Skrzypiec-Nowak, P., Janiak, A. & Jagnieszczak, Z., 2009. Phenology of bat occurrence in boxes in central Poland. *Mammalia,* Volume 73, pp. 33-37.

8. McAney, K. & Hannify, R., 2015. *The Vincent Wildlife Trust's Irish bat box schemes,* s.l.: The Vincent Wildlife Trust.

9. Meddings, A. et al., 2011. managing competition between birds and bats for roost boxes in small woodlands, north-east England. *Conservation Evidence,* Volume 8, pp. 74-80.

10. Michaelsen, T., 2011. BCI bat houses pay off in Norway. *Bats,* Volume 29, pp. 9-11.

11. Poulton, S. M., 2006. *An analysis of the usage of bat boxes in England, Wales and Ireland for the Vincent Wildlife Trust ,* s.l.: Vincent Wildlife Trust.

12. Rachwald, A., Gottfried, I., Gottfried, T. & Szurlej, M., 2018. Occupation of crevice-type nest-boxes by the forest-dwelling western barbastelle bat (Barbastella barbastellus (Chiroptera: Vespertilionidae). *Folia Zoologica,* 67(3-4), pp. 231-238.

13. Rueegger, N., 2016. Bat Boxes - A review of their use and application, past, present and future. *Acta Chiropterologica,* 18(1), pp. 279-299.

The table below shows the boxes that were identified in a literature review to be used by bats and a description of these boxes.

Bat box	Type	Description
BCI	Crevice – Large	Multi chambered square bat box. Multiple slit entrances at the bottom of the box with square vent entrance at the back. Dimensions: Height 60cm x width 45 cm
Chillon	Crevice – Medium	A narrow box with one entrance running the entirety of the bottom of the box. Dimensions: Height 44cm x width 29cm x depth 9cm
Modified Greenaway box	Crevice – Large	Wooden box. Simplified version of those designed by F. Greenaway. Crevice width 2cm. Dimensions: Height 80cm x width 16cm. Board thickness 2.5 cm.
Schwegler 1FF	Crevice - Medium	Wooden back panel with narrowing internal ridge. Entrance is a long slit along the entire bottom of the box Dimensions: Height: 43cm x width 27cm
Schwegler 1FW	Cavity – Large	Large hibernation box. Dimension: Height 50cm x diameter 390 cm
Schwegler 1FS	Crevice – Very large	Has a flat top and even larger internal volume than 2FN. Three wooden panels inside result in crevices.

		Has one entrance approximately 5cm wide on the front of the box. Dimensions: Height: 44cm x diameter 38cm
Schwegler 2F	Cavity - Small	Woodcrete box with conical top One entrance hole on the front of the box approximately 5cm wide Dimensions: Height: 33cm x diameter 16cm
Schwegler 2FN	Cavity – Large	Domed top with large internal volume compared to 2F. Has two entrance holes, one of which runs along the front face of the box at the bottom and the other is a smaller hole at the back of the box on the bottom panel. Dimensions: Height: 36cm x diameter 16cm
Stebbings and Walsh box	Cavity - Medium	Wooden bat box. Entrance on the bottom of the box forming a strip along the back. Shaped like a traditional bid box. Internal dimensions of the boxes were 25 cm × 15 cm × 10 cm, with entrance 15 × 2 cm and walls 2.5 cm thick
Stratmann FS1 type boxes	Crevice – Large	Wooden boxes made from rough boards 20 mm thick. Shaped like a very long vertical letter box. Dimension: inner space 68cm × 24cm × 4 cm with the entrance at the bottom. The back side of the box was 5 cm longer to ensure safe landing of bats
Stratmann boxes	Crevice - Small	Wooden boxes internal volume 25x25x7cm
Wedge	Cavity – Medium	Wooden box wedge shaped Dimensions: Height 45cm, Width 20cm, Depth 15cm at base
Wooden 'Apex' bat box	Cavity – Medium	Wooden square box with a triangular top. Entrance runs the width of the box on the bottom panel at the back. Dimensions: Height: 40cm x width 12cm

Alternative tree roost compensation measures.
The tree roost compensation ratios will also apply to other measures including veteranisation, monoliths and totems. For the purpose of this licence these are defined as the following:

- Veteranised tree – otherwise healthy tree has suitable features for bats created within it or is wounded in such a way that PRF are likely to develop.
- Monolith – where a tree reduction is needed to such an extent the tree will likely die. Branches and crown removed, features created directly in the remaining tree and more develop as the tree dies and decays.
- Totem – where dead wood or felled trees are erected in a new location. As with monolith, the remaining tree is enhanced with crevices and other develop as the tree naturally decays.

Where appropriate the above measures will be used as part of the overall compensation provision (1 tree feature = 1 bat box) to ensure a range of different features and opportunities are created that will benefit the bat species recorded. All the above measures must be designed with input from an arborist to ensure they are appropriate for the tree species, tree age and location. Consideration should also be given to the method of monitoring to ensure safety.

Bat Houses
Based on the roost types currently identified, there is no requirement to provide a compensation bat house. However, should a roost be confirmed during further survey work, of a species and type that requires the provision of a bat house (e.g. brown long-eared maternity roost), allowance within the Project design has been made to accommodate such features in suitable locations across the route (see Figure 2.4 Environmental Masterplan (Application Document 6.3) Section 2 Sheet 13, Section 2

Sheet 20, Section 9 Sheet 17, Section 10 Sheet 4, Section 12 Sheet 2, Section 12, Sheet 20 and Section 13 Sheet 4 and Figure E3c.

Mitigation Matrix
The suitable bat box table, compensation ratios and inclusion of land for bat houses if needed, are collectively what is being referred to as the mitigation matrix. They are intended to provide a robust and informed approach to compensation to ensure FCS will be maintained, particularly in the absence of full survey data. It is acknowledged that full roost presence/absence surveys have not been completed for some structures/buildings and for trees, but further surveys will be completed prior to the full licence submission. The matrix is intended to demonstrate that should new roosts, including types not currently found are identified during pre-construction surveys, there is a commitment to a strategy to provide species- specific compensation.

- Access points and size of access points.

The access point will only be the doorway into the bunker. A steel access grilled gate will be installed to keep humans out but allow bats in with a 150mm spacing. The grilled gate will be securely locked, with the licensed ecologist holding the key.

- Location details (including an 8-figure grid reference for bat houses or bat lofts relating to the structure. 8-figure grid references are not required for positions of individual boxes, tiles etc).

Bat boxes will be installed as part of the mitigation for lost roosts as well as enhancement at 18 locations to enhance roosting opportunities across the Project. Boxes that are used as mitigation for the lost roosts will be situated as close as practicable to the lost roosts within the nearest area of value for bats that will not be disturbed by works. For more specialist species, locations will be fine-tuned to ensure they are within habitat that is and will be used by the target species. The location of these areas is on Figure E3; however, central grid references are as follows:

- TQ57768437
- TQ68277025
- TQ60378316
- TQ67496959
- TQ61308357
- TQ60478457
- TQ62998404
- TQ68057701
- TQ63598169
- TQ63478340
- TQ66248054
- TQ66648032
- TQ66247983
- TQ66407751
- TQ67757106
- TQ68307078
- TQ68907063
- TQ69757100

The hibernation bunker will be within a habitat creation/enhancement area at TQ69276977. The bunker will be connected to Shorne and Brewers Wood and the green bridges over the new A122 Lower Thames Crossing and the A2 providing connectivity to Claylane Wood and Ashenbank Wood respectively. The location of this bunker is on Figure E3.

- Aspect. Explain how the internal conditions of the roost will be created.

The bunker will be made from precast concrete culvert sections, brick lined inside and will have brick partition walls to create several smaller rooms. The rooms will be linked so bats can move between them to take advantage of differences in internal microclimates. The design of the bunker would result in stable low temperatures and high humidity as the bunker is partially set into the ground and has one

entrance resulting in limited air flow. There will be wooden crawl boards and other features such as gaps in mortar, to provide additional roosting opportunities.

- Details of the materials to be used e.g. timber, sarking, felt etc.

Brick constructed with block work covering. Internally there will be additional brick work and use of timber boarding approximately 150 x 75 mm on angles within the bunker allowing access behind them for bats, in addition to some of the brickwork internally comprising of bat bricks on each wall. There will be 20 bat bricks installed in the walls.

- Justification for any variation from the original roost and/or deviations from recommendations in the Bat Mitigation Guidelines. (*Diagrams of widely available standard bat box designs are not required; just refer to bat box name and reference number, e.g. Schwegler 1FF*).

There will be no variation from the Bat Mitigation Guidelines.

- Mitigation for any impacts of lighting if appropriate.

The lighting design will not have an impact on the retained or newly created roosts. This is a result of the downlighting and varied height of the columns to the south of the River Thames and the large unlit areas to the North of the River Thames, with lighting primarily around junctions. Construction lighting is designed to minimise light spill into adjacent habitats and over known roosts, and will be informed by advice from the ECoW (see CoCP (Application Document 6.3.) REAC Ref: TB024 - In line with the obligations within the CoCP regarding lighting, construction site lighting will comply with the Institute of Lighting Professionals' Guidance Notes for the Reduction of Obtrusive Light GN01/20 (2020) and the provisions of BS EN 12464-2:2014 Light and lighting – Lighting of workplaces Part 2: Outdoor workplaces (British Standards Institution, 2014), where applicable.
The contractor will consult the Environmental Clerk of Works over the application of these guidance and standards to avoid adverse effects on sensitive ecological receptors including retained bat roosts and watercourses.).

- Structures for access for monitoring / maintenance purposes (if applicable)

The bunker created will have a doorway into it for access. The doorway will be gated under lock and key so maintenance and monitoring can be undertaken. Additionally, bat boxes (and any additional tree features) installed will be monitored and maintained with replacements, if they are no longer fit for purpose.

E3.4 Other habitat re-instatement or creation (e.g. retention of existing flight lines, retention or creation of appropriate vegetation around roost entrances where applicable) – please include details of:

- Habitat replacement (following works resulting in temporary impacts) or creation not covered by sections E2 to E3 such as hedgerow/woodland planting or enhancement. State the length of hedgerow planting and areas (ha) of other planting to be provided such as woodland and anticipated establishment period etc.

The Design Principals for the Project (Application Document 7.5) inform the landscape design illustrated in Figure 2.4: Environmental Masterplan (Application Document 6.2) so planting will link into the retained habitats outside of the Order Limits. The outline Landscape and Ecology Management Plan (Application Document 6.7) details the management and monitoring proposals for all bespoke landscape and ecological mitigation across the Project. This covers the period post-planting and five years establishment for the period of the operation of the road (i.e. in perpetuity). This document includes the provision of a steering group, including representatives from Natural England, local authorities and other relevant organisations, whose role it is to advise on the management of these sites towards their objectives. The proposed planting details are on Figure E3 and include the creation of hedgerows, scrubland, woodland, ponds and grasslands, all of which will provide benefits to the bat population throughout the Project.

- Creation of flight lines/routes of connectivity.

There are 7 green bridges that have been designed to accommodate bat commuting. In addition to these there are other crossing structures that while the structure itself is not specifically designed for the purpose, the approach landscape planting is designed to funnel bats toward, and the structure is suitable for bats to use. Each crossing point that was surveyed is listed below with the mitigation where it is required.

CP Location	Location description	Peak static Av. Passes/night/ season.	Average passes/night/ season across all statics	Impact	Mitigation
7	West of Brentwood Road (Footpath 79)	469	262	Permanent severance	Foot bridge at this location over the road in cutting. Footbridge is 8.5m above the level of the road. Structure has closed fencing along it at 2m high and is 2.5 wide. No lighting. Planting will deflect bats from original route and lead to the structure that can be used to cross the road.
6	Hofford Lane	432	210	Permanent severance	Hofford Lane green bridge. Supporting planting to direct bats to the crossing
14	M25 railway east	381	306	Temporary impact from pylon restringing	Reinstatement of hedgerow planting post construction
7.5	Hornsby Lane	370	202	Permanent severance	Planting leads to Footpath 79 (crossing point 7) 350m to the east
9.5	Mardyke	298	266	Permanent severance	Road on viaduct above habitat below so bats can commute beneath the road.
8	Green Lane	281	202	Permanent severance	Green Lane green bridge. Supporting planting to direct bats to the crossing
12	North of Ockendon landfill (Footpath 136)	206	163	Permanent severance	Farm track bridge at this location over the road. Bridge is 9.5m above the level of the road. Structure has closed fencing along it at 2m high and is 3.5m wide. No lighting. Planting has been designed to deflect bats from the original route of the existing farm track and lead to the new structure that, although not specifically designed as a bat crossing, can be used to cross the road. Planting is also designed to lead bats to the Mardyke viaduct approx. 800m to the east, which will allow bats to pass underneath the new road.
9	Golden	151	129	Permanent	Golden Sewer viaduct. Road

	Sewer			severance	in viaduct allowing crossing below.
12.5	North Road	119	89	Permanent severance	North Road green bridge. Supporting planting to direct bats to the crossing
13	M25 railway east	108	80	No impact	N/a
2	Gravesend Road	79	51	No impact	N/a
5	East of Hofford Lane	75	63	Permanent severance	Hofford lane green bridge approx. 350m to west, planting to deflect and lead to green bridge
7.75	Stifford Clays Road	73	58	Permanent severance	Road bridge across this location. Planting does lead to Green Lane green bridge approx. 500m north
4.5	Muckingford Road	48	34	Permanent severance	Muckingford green bridge. Supporting planting to direct bats to the crossing
6.5	Brentwood Road	47	28	Permanent severance	Road bridge across this location. Planting does lead to Hofford Lane green bridge (1km to the east) and footpath 79 (400m to the west)
10	Mardyke	38	36	Permanent severance	Mardyke viaduct. Road in viaduct so continued bat access below.
0.5	Immediately north of A2/M2	36	33	Permanent severance	Woodland planting on west side leading to Thong Lane north green bridge
11	West of Mardyke	34	33	Permanent severance	Planting leads to Mardyke viaduct 200m to the west
3	North Portal	31	27	Temporary impacts from construction	No permanent severance, replanting to replace lost hedgerow
1	Thong Lane north	28	22	Permanent severance	Thong Lane north green bridge. Supporting planting to direct bats to the crossing
4	North Portal	24	21	Temporary impacts from construction	Crossing point doesn't actually cross the road, replanting of hedgerow to maintain commuting line

The green bridges and the landscape design provide connectivity to the retained and created roosts, as detailed on Figure E3, and the detailed design is shown on Figure E3b. The planting on the green bridges will comprise hedgerow and grassland planting, providing connectivity to known commuting and foraging routes.

Flight lines and connectivity will be enhanced by the creation of the seven mixed-use green bridges. A summary of the specifications of each green bridge is provided below and details are provided within the Design Principles (Application Document 7.5), and Figure 2.4 of the Environmental Masterplan (Application Document 6.2).

Green Lane (TQ62438169) and Hoford Road (TQ66037944) are both mixed-use green bridges which are situated along existing bat commuting routes and are designed to provide mitigation and enhancement of important bat flight lines to ensure functional connectivity across the Project is

retained. Both these green bridges consist of a single farm track with an enhanced double hedgerow on either side of the track. (See Book of Plans 2.13. Structures Plans: Volume B Pages 52 and 32 respectively.)

Both bridges have been designed to retention of commuting routes where at least six species identified as using them with relatively moderate or higher levels of activity. The green verges have been designed to have a strong hedgerow character with open grassland planting, allowing a sheltered corridor across the Project and in this instance mitigate the habitat fragmentation for these areas.

The remaining green bridges described below, have been designed to enhance existing bat connectivity across the proposed development.

North Road (TQ59608375) mixed use green bridge has been designed with green verges to the east and west of a two-lane road and walker, cyclist and horse rider (WCH) route. (See Book of Plans 2.13. Structures Plans: Volume B Page 57.)

Muckingford Road (TQ66537866) mixed use green bridge has been designed with green verges to the north and south of a two-lane road and WCH route. These sheltered crossings would allow bats to commute across the bridges by enhancing existing hedgerows and flight lines leading to the green bridges and providing safe crossing points across the Project. (See Book of Plans 2.13. Structures Plans: Volume B Page 31.) This green bridge will include hedgerows to link into the landscape planting either side of the green bridge and ensure there is a continuous linear feature for bats to follow.

Thong Lane North (TQ67187115) green bridge is a heavy-duty mixed-use green bridge, consisting of a two-lane road with large southern and northern green verges. Both these green verges would include a WCH route, grassland areas and hedgerow planting. The hedgerow planting would connect to woodland planting located either side of the route alignment providing opportunities for bats to move across the proposed development. (Book of Plans 2.13. Structures Plans: Volume B Page 26.)

Thong Lane South (TQ67356984) mixed-use green bridge has been designed with a green verge to the west, and a smaller green verge to the east of a two-lane road. This western green verge would be planted with a double hedgerow character with grassland planting in between the hedgerows. The eastern green verge would be a single hedge line. This green bridge would allow bats to cross over the A2/M2 from Shorne Woods SSSI to the north to Ashenbank Woods SSSI to the south, providing connectivity to S328, and the newly created bunker. (Book of Plans 2.13. Structures Plans: Volume B Page 21.)

Brewers Road (TQ68266964) mixed-use green bridge has been designed with a green verge to the east and west of a two-lane road. The western green verge has been designed to have a double hedgerow character with grassland planting in between the hedgerows. The eastern verge would consist of an WCH route and an area of grassland planting with a single hedge line. This green bridge would allow bats to cross from the woodland to the north of the A2/M2 to the parkland to the south of the A2/M2. (Book of Plans 2.13. Structures Plans: Volume B Page 20.)

Additionally, the creation of viaducts and associated planting at three locations near Tilbury Lake (TQ 67067775), Golden Bridge Sewer (TQ62558278) and the Mardyke (TQ61978353) as well as a large (2.8m wide and 4m high) 46m long culvert (TQ67297673) will maintain connectivity of commuting and foraging routes for bats, allowing safe passage beneath the Project.

The landscape planting around crossing points 6.5 and 7 have been designed to funnel bats to these crossing locations from the wider environment, using a hedgerow and scrub planting planted along the north and south boundary of the Project. The new bridges themselves will be unlit, dark crossings, with crossing point 7 (footpath 79), in particular being a dark pedestalised crossing location. This bridge will be 3.5m wide and have 2m high barriers which will link into the landscape planting on either side of the crossing location. The landscape planting on both the north and south side of the crossing has been designed to funnel bats to this crossing and avoid bats flying straight over the Project following the existing hedge line.

If pre-construction surveys find that the Stanford Road bridge over the A1089 is important for bats

commuting to/from Hangman's Wood and Deneholes SSSI, then the following mitigation is proposed:

- The planting leading to the bridge will be strengthened to ensure that there is a continuous line of hedgerow/trees leading to the newly aligned Stanford Road bridge.
- The bridge itself will have raised, approx. 2m high, solid barriers on either side of the carriageway to provide a linear feature over the bridge. These barriers will be tied into the linear features on either side of the A1089 using planting ensure a continuous linear feature.
- On the eastern side of the A1089, the planting will be designed to lead bats away from the additional two new crossings created by the construction of the Project. This planting will take the form of a double hedgerow planted in parallel to the west of the new dual carriageway which will be designed to move bats to the south of the Project.
- Bats will then be led to the crossing locations at Footpath 79 (crossing point 7) using landscape planting, which is more suitable for bats crossing the Project, and away from the new A13/LTC junction.

If the pre-construction surveys find the Stanford Road crossing is not being used by bats to commute to/from the SSSI, then the planting to the west of the A1089 will be strengthened to lead bats away from the crossing either north or south. The replacement bridge will then have the same characteristics as the existing bridge, along with bright lighting, to deter bats using it as a crossing.

- Foraging area enhancements, etc

The Project includes 1164ha of habitat creation comprising woodland planting, open mosaic habitat creation, hedgerow planting, wildflower meadows and wetland areas (attenuation ponds). The addition of these more varied habitats in the predominantly agricultural landscape will increase foraging opportunities for bats.

- Mitigation for any impacts of lighting if appropriate.

As discussed above, the lighting design will include downlighting and varied height of the columns to the south of the River Thames and large areas of no lighting to the North of the River Thames, with junction lighting only. Construction lighting is designed to minimise light spill into adjacent habitats and over known roosts, and will be informed by advice from the ECoW (see CoCP (Application Document 6.2.) REAC Ref: TB024 - In line with the obligations within the CoCP regarding lighting, construction site lighting will comply with the Institute of Lighting Professionals' Guidance Notes for the Reduction of Obtrusive Light GN01/20 (2020) and the provisions of BS EN 12464-2:2014 Light and lighting – Lighting of workplaces Part 2: Outdoor workplaces (British Standards Institution, 2014), where applicable.
The contractor will consult the Environmental Clerk of Works over the application of these guidance and standards to avoid adverse effects on sensitive ecological receptors including retained bat roosts and watercourses.).

E3.5 Wider biodiversity gains:
Please indicate if enhancements, over and above what is necessary to mitigate the impact of the activity of the licence proposal, are being provided. Please indicate if enhancements are included to satisfy the requirement of a planning permission, and if so state the relevant planning condition, or other consents in your response below. Please also state if an applicant wishes to provide more than is typically required to mitigate for the impacts. Enter N/A if this is not applicable to your application.

Note: *Any licence granted will only cover mitigation and compensation required to fulfill licensing requirements, but will acknowledge additional biodiversity enhancements*.

The Project includes landscape planting which will result in a net increase in high quality bat habitat and will strengthen connectivity between reinstated and existing woodland and hedgerows, although this will not be realised as a resource for bats until the operational phase of the Project and once the landscaping is sufficiently established.

Important Advice:
Scaled maps/plans of mitigation/compensation must be provided as separate maps/figures (also ***see section I "Map checklist" at the end of this document)***:

- **Figure E2** if non-standard capture and exclusion apparatus is proposed please include diagrams/photographs.
- **Figure E3** to show specifications for mitigation / compensation to be provided and annotate where it will be provided. Should the scheme be large or complicated it may be necessary to submit more than one figure.

NOTE: It must be possible to compare these with the survey results plan (**Figure C6**) and 'Impacts' Figure (**D)**.

E4 Post-development site safeguard: Further guidance and explanation on post-development monitoring requirements are included within our 'How to get a licence' document http://www.naturalengland.org.uk/Images/wml-g12_tcm6-4116.pdf. Also see Section 8.7 of the Bat Mitigation Guidelines.

E4.1 Habitat/site management and maintenance: Is any specific post-development habitat management and site maintenance planned? If 'No; state 'N/A'. If 'Yes' include the following:

- The period (years and months) for which habitat management and maintenance will take place. Ensure that this is consistent with the post development works detailed in section **E5b** of the **Work Schedule document, WML-A13-a-E5a&b**.

Habitat management and maintenance will be the responsibility of National Highways as part of their operational commitments. The period of management is in perpetuity.

- Details of what will be undertaken in terms of site maintenance required to ensure long-term security of the affected population (e.g. maintain, repair or reinstate access points; maintain and repair heaters and /or data loggers; maintain, repair or restore bat feature / bat loft in good condition; repair or replace inspection hatches; management and maintenance of lighting regime, or bat boxes etc).

The bat boxes will be checked following the first full maternity season installed, by the named ecologist/accredited agent, anticipated to be 2026, and then 2028 and a visit once the scheme is operational in 2032. Any boxes that require maintenance/repair/replacement will only be moved once they have been inspected by the named ecologist/accredited agent to ensure no bats are disturbed.

The hibernation bunker created will receive an annual maintenance check for 10 years covering construction and operational phases to ensure it is fit for purpose. Any issues will be logged, assessed and should they need remedial actions, these will be implemented.

The general suitability of the habitats for bats in the vicinity of the bat boxes and bat bunker will be recorded during the maintenance visits but the management of these areas will be covered under the Outline Landscape and Ecology Management Plan (Application Document 6.7).

An annual inspection of the green bridges will record any issues relevant to the bats usage of these structures. As above the general suitability of the habitats for bats on and linked to the green bridges will be recorded during the maintenance visits but the management of these areas will be covered under the Outline Landscape and Ecology Management Plan (Application Document 6.7).

The maintenance is shown on Figure E4.

- Details of what will be undertaken in terms of habitat management (e.g. planting cover around roost structure, hedgerow management regime, checking establishment of habitat creation; reduction of shade around roosts, woodland management to maintain species and structural diversity etc). Ensure this relates to the relevant map.

In relation to the immediate habitats surrounding the roosts, any diseased, damaged, dead or otherwise unsuccessful planting will be replaced like for like in the next planting season. In the long term any trees identified for removal or limb surgery will be subject to a roost assessment by a suitably qualified ecologist to inform the works accordingly.

The green bridges will be subject to monitoring using filming surveys (infra-red or Thermal Imaging) with paired detectors situated on either side of the bridge collecting data simultaneously. This methodology will allow determination of the number and species of bats which are using the green bridges and successfully crossing the proposed development. An appropriate monitoring regime will be determined in order to provide robust information that is required to inform any necessary remediation or enhancement should the monitoring find the green bridges are not providing effective

mitigation as designed.

Note – for phased or multi-plot developments a separate habitat management and maintenance plan is required, which must be submitted with the master plan: see guidance on phased developments.

Important Advice:
Please include **Figure E4** as a separate figure to show which structures and habitats will be managed, maintained and monitored post development as part of your proposal – also *see section I "Map checklist" at the end of this document)*.

E4.2 Population monitoring, roost usage etc: This should be in line with the monitoring requirements detailed in the Bat Mitigation Guidelines section 8.7 and Figure 4.

E4.2a Please complete the table below for the species and roost types listed. For all other species and roost types please provide information under E4.2b.

Species	**Roost type**	**Post-development monitoring requirement**
Common pipistrelle **Soprano pipistrelle** **Whiskered** **Brandts** **Daubenton's** **Natterer's** **Brown long-eared**	*Day roost* *Night roost* *Feeding* *Transitional/Occasional*	☐ None. There is no post-development requirement for proposals affecting bat roosts supporting up to any 3 species indicated, of the roost types listed, where they are used by low numbers of each species. ☐ A single presence / absence survey at an appropriate time of year is to be undertaken. This should not take place in the first year following completion of development. Timing (year): ☒ Other (specify): Bat boxes (and created tree features) will be checked following the first full maternity season installed, by the named ecologist/accredited agent, programmed to be 2026, 2028 and during operation in 2032
Serotine	*Day roost* *Night roost* *Feeding* *Transitional/Occasional*	☐ A single presence / absence survey at an appropriate time of year is to be undertaken. This should not take place in the first year following completion of development. Timing (year): ☐ Other (specify):
Lesser Horseshoe	*Day roost* *Transitional/Occasional*	☐ A single presence or absence survey at an appropriate time of year to be undertaken in year 2 post development plus a check of the condition and suitability of the roost. ☐ Other (specify):

E4.2b For all species and roost types not covered in the above table please include details of:

- Timing – state the years and months post development monitoring or other will be undertaken. Ensure that is consistent with the post development works detailed in section **E5b** of the **Work Schedule document WML-A13-a-E5a&b**.

The hibernation bunker created will be monitored for bat occupancy during the hibernation period between January to February beginning the year of the bunker completion (2026), and every year in years 1-5 until 2031, then in year 7 (2033) and in year 10 (2036). A review of the monitoring data will be conducted in Year 5 and in Year 10 to determine the need for changes or any further monitoring. The retained S328 bunker will be monitored over the same period, commencing in the first winter where it is available for use (any exclusion removed).

Internal environmental conditions will be recorded via loggers such as TinyTag that will record as a minimum for the full winter season (Nov-Feb inclusive) every year for the duration of the monitoring.

The tag can be downloaded outside the hibernation season.

An indication of the temperature profile within the existing structure has been obtained through monitoring in Jan and Feb 2020. There were some anomalies in the data therefore it is recommended to be repeated to get full baseline temps and humidity readings through the hibernation season. Recordings outside the bunker will also allow comparison to see how stable the existing environment is. The bunker should provide different conditions with some area being stable and others a bit more liable to fluctuation to allow bats to select preferred locations. In general, the temp profile should be between 1-8 0c with high humidity e.g. 80% and over. If no bat use is found and temperature profiles are fluctuating beyond these levels, or rapid changes are detected over short periods, then further modifications may be required to the bunker to adjust airflow/solar gain/humidity. Should bats be using the structure then modifications will be carefully judged to ensure they don't ultimately discourage use by bats.

The original bunker S328 will not be demolished but may be excluded during construction work. When it is reopened, it will be monitored over winter for the same period as the compensation bunker.

The bat boxes that will mitigate the lost noctule roosts will be checked following the first full maternity season installed, by the named ecologist/accredited agent, programmed to be 2026, 2028 and during operation in 2032.

- The type of monitoring which will be undertaken – include survey methods and equipment to be used. If it is expected any bats are to be taken or disturbed during this period please state anticipated numbers per species against each licensable activity.

Compensation hibernation bunker
Monitoring will be in the form of one external and internal visual inspection of the bat bunker(s) in January and one in February to look for bats or evidence of use (presence of bats, urine stains, droppings, scratch marks etc.). Droppings found will be sent for DNA analysis to confirm species. There will also be full spectrum automated bat detectors left in the hibernation bunker for a minimum period of two weeks during the hibernation period.

Temperature and humidity data loggers will be used inside the bunker to monitor the environmental conditions. Data should be collected for the full hibernation period as a minimum and the data downloaded annually to identify any issues that need to be remedied.

Bat Boxes
The bat boxes (and any additional tree compensation measures) will be checked via direct inspections in September 2026, 2028 and 2032. Any boxes that require maintenance/repair/replacement will only be moved once they have been inspected by the named ecologist/accredited agent to ensure no bats are disturbed.

Green Bridges
Activity surveys will be undertaken at the green bridges in the first full year post-construction, and at alternate years following this: 2028, 2030, 2032, 2034, and 2036. Monitoring will employ the most effective methodology available at this time. The current approach would be using filming surveys (infra-red or Thermal Imaging) with paired detectors situated on either side of the bridge collecting data simultaneously. Detailed crossing point monitoring design will consider the methodology described in Defra Bats and Roads Guidance (Altringham and Berthinussen, 2015).

- Specify which compensation/mitigation measures will be subject to monitoring (as referenced on Figure E4).

The hibernation bunker and the bat boxes installed throughout the Project as well as the green bridges.

Please note that it will be a requirement of the licence to undertake remedial action should monitoring identify that further management/maintenance is required of any compensation/mitigation provided, to ensure that mitigation/compensation measures are working effectively and are fit for purpose.

Important advice: Please always consider whether any *post development* monitoring effort should be staggered over alternate years in cases where use of the compensation measures may not occur in the same year of provision.

E4.3 Mechanism for ensuring safeguard of mitigation/compensation and post-development management, maintenance and monitoring works:
Please explain what mechanism is in place to ensure safeguard of mitigation/compensation provisions (e.g. Restrictive Covenant, clause to relinquish future development rights in S106 agreement, NERC Act agreement, explicit recognition of site in local planning documents, designation as County Wildlife Site or similar.) The need for this, and the type of mechanism, will vary with the scheme and impact. For substantial impact schemes (e.g. destruction of a significant maternity roost, or important hibernation site), some mechanism is always required. If you offer no specific mechanism, explain how you believe the population will be free of threats as far as can be reasonably determined (**the expectation of the granting of a licence should not be used for this purpose**).

The mitigation measures are within the Order Limits and will be owned and managed by National Highways. National Highways are not accountable for any works on structures with roosts which are outside the Order Limits.

Explain how all post-development works (management, maintenance (including remedial action) and monitoring, as appropriate) will be ensured? Include a commitment that the monitoring, habitat management and maintenance work will be undertaken. Mechanism/s for ensuring delivery must be in place before applying for a licence (also see Section F).

National Highways will be responsible for all management, maintenance and monitoring of essential mitigation provided as part of the Project, which is a requirement of the DCO.

E5 Timetable of works: Please complete the **work schedule document WML-A13-a-E5a&b found on the 'bat' application form web page and append to your application pack.**

Important Advice: *Please note that from end of March 2014 a separate work schedule is a mandatory requirement to support a new bat licence application when using this template.*

F Declarations

If the mitigation/compensation area/s is/are not owned by the applicant, you must have consent from the relevant land owner(s). You must have also secured details of how any measures to maintain the population in the long term will be achieved (e.g. a legal agreement).

F1 Declaration Statement(s) – You must <u>include</u> the following declarations within your Method Statement and include the appropriate answer (Yes/No/Not applicable):

F1.1 **Re: section E1 -** I confirm that relevant landowner consent/s has/have been granted to accept bats into roosts or access into roosts on land outside the applicant's ownership:

N/A

F2.2 **Re: section E2 -** I confirm that landownership consent/s has/have been granted to allow the creation of the proposed compensation on land outside the applicant's ownership

N/A

F2.3 **Re: section E3** - I confirm that consent/s has/have been granted by the relevant landowner/s for monitoring, management and maintenance purposes on land outside the applicant's ownership

N/A

Comments if applicable:

BCT (2021) The National Bat Monitoring Programme Annual Report. Accessed October 2021. https://cdn.bats.org.uk/uploads/pdf/Our%20Work/NBMP/National-Bat-Monitoring-Programme-Annual-Report-2021.pdf?v=1655151480

Important Advice:

Unsecured consents statement:

If you have been unable to secure consents for any of the three declarations please explain why and detail any plans you have in place to obtain the consent(s) or provide details of any right(s) or agreement(s) that will enable the lawful implementation of the proposed mitigation, compensation and monitoring. Failure to provide the appropriate landowner consents means that the Method Statement is unlikely to meet the requirements for the FCS test to be met. It is therefore in your interest to ensure that the appropriate consents have been secured *before* applying for a licence.

G References: List any references cited, and include credits for source information.

H Annexes (supporting documents please append to your application pack)

H1 Pre-existing survey reports;

H2 Raw survey data.

I Check list of figures to be submitted with each Bat Method Statement

With your Method Statement and supporting documents please submit the following maps/figures – see table below. Note that some can be included within the Method Statement itself (if preferred) and others must be submitted individually (i.e. separate documents)**.** Maps/Figures must include the title, site name as referenced on your application form, date and figure reference. If a grid reference is more applicable (e.g. a bat house is being provided please included this). Include a scale bar (appropriate to the situation e.g. 100m on site maps, 1km on location maps) and direction of North etc.

Additional maps, photographs or diagrams should be included where necessary to adequately explain the scheme.

Figure reference	Mandatory as will be included in the annexed licence, if applicable	Mandatory for assessment purpose only, but will not be included in the annexed licence	What it must show (also see details above on site reference, dating and naming).
Figure B2.1	-	Yes, if the application is part of a phased or multi-plot development	**Master plan overview-** note – this is not the same as a master plan document, for which you should follow the guidance as stated in section B2.1.
Figure B2.2	-	Yes, if applicable	**Locations of other nearby bat licensed sites, or sites which will be impacted on by future development.**
Figure C5a	-	Yes	**Location map** at an appropriate scale for the application (often 1:50,000 or 1:25,000)
Figure C5b	-	Yes	**Survey area** showing all buildings, structures and habitats that are within the survey area and distinguishing those that were surveyed and those that were not. Indicate where surveyors were located for each of the surveys and their respective field of view. Aerial photographs should be provided where possible (ensure you have permission to use copy righted maps). If automated detectors and/or transect routes were used, ensure that these are indicated (as appropriate).
Figure C6	-	Yes	**Survey results -** provide clear, annotated and cross-referenced maps/plans/photographs to show the survey results (access points, location of roosts, flight lines, results of activity surveys where DNA samples were taken etc). Ensure the Figure is at a suitable scale to show the results. If presenting

			multiple survey results on a single Figure, ensure the results are clearly differentiated.
Figure D	**Yes**	**-**	**Impacts plan –** map/figure which must show all structures or habitats (clearly referenced) that will be disturbed, damaged or destroyed, detailing where the roosts and access points are.
Figure E2	**Yes** – but only if applicable to the application	**-**	**Non-standard capture and exclusion apparatus.** If these are proposed please include diagrams/photographs.
Figure E3	**Yes**	**-**	**Specifications for mitigation / compensation** (including all dimensions for bat lofts/houses/stand-alone structures and materials to be used etc and 8-figure grid reference). Mitigation / compensation (must show all habitat creation, restoration, boxes). It may be necessary to submit more than 1 figure if the proposal is large or complicated.
Figure E4	**Yes** – when monitoring and maintenance will be included in the licence	**-**	**Monitoring, management and maintenance map.** Please indicate the specific structures and habitat that are to be managed, maintained and monitored as part of this licence proposal. Ensure that they are correctly referenced and are consistent with other parts of the Method Statement and figures.

Definitions of roost types to be included in the application (further detail can also be found in the Bat Mitigation Guidelines and the BCT's "Bat Surveys Good Practice Guidelines"):

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a. **Day roost**: a place where individual bats, or small groups of males, rest or shelter in the day but are rarely found by night in the summer.

b. **Night roost**: a place where bats rest or shelter in the night but are rarely found in the day. May be used by a single individual on occasion or it could be used regularly by the whole colony.

c. **Feeding roost**: a place where individual bats or a few individuals rest or feed during the night but are rarely present by day.

d. **Transitional / occasional roost**: used by a few individuals or occasionally small groups for generally short periods of time on waking from hibernation or in the period prior to hibernation.

e. **Swarming site**: where large numbers of males and females gather during late summer to autumn. Appear to be important mating sites

f. **Mating sites**: sites where mating takes place from later summer and can continue through winter.

g. **Maternity roost**: where female bats give birth and raise their young to independence.

h. **Hibernation roost**: where bats may be found individually or together during winter. They have a constant cool temperature and high humidity. Sites where hibernating bats have been confirmed by appropriate survey effort should be classed as '**hibernation confirmed**'.

i. **Satellite roost**: an alternative roost found in close proximity to the main nursery colony used by a few individual breeding females to small groups of breeding females throughout the breeding season.

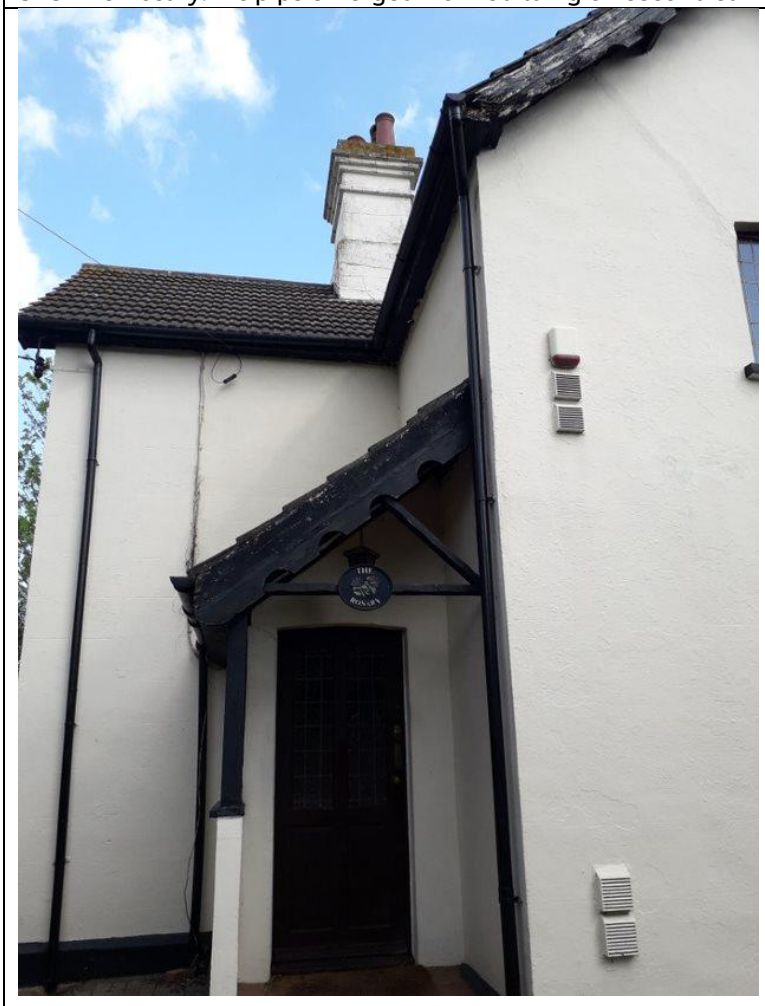
j. Other – please explain what the roost type is if not one of the above (we recognise that roost types are interchangable and not always easy to classify according to the nuances of certain species).

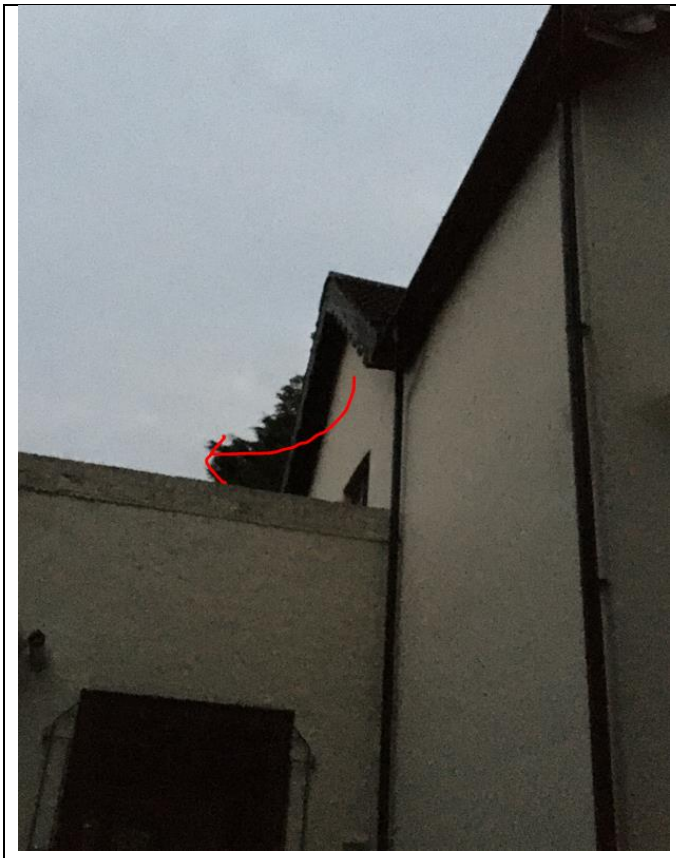
k. An **'alternative roost'** shall include: a purposely installed bat box; an existing roost which will not be impacted by the works; or other new/enhanced roosting opportunities. Any alternative roost must be suitable for the species, within or close to the existing roost and free from additional disturbance or development pressure.

Annex C4 – Photographs of confirmed roosts to be impacted
Tree 116 No photo
Tree 183 No photo
Tree 185 No photo
Tree 284 No photo
S2 1 Longview Cottage: Three common pipistrelle seen emerging. Suspected dropping was analysed as inconclusive.


S14 Marling Manor: Pile of (after DNA analysis) brown long-eared bats droppings. No bats were seen within the building. Bats have since been seen emerging

S25 The Rosary: 4 c pips emerged from building on second survey, see below.





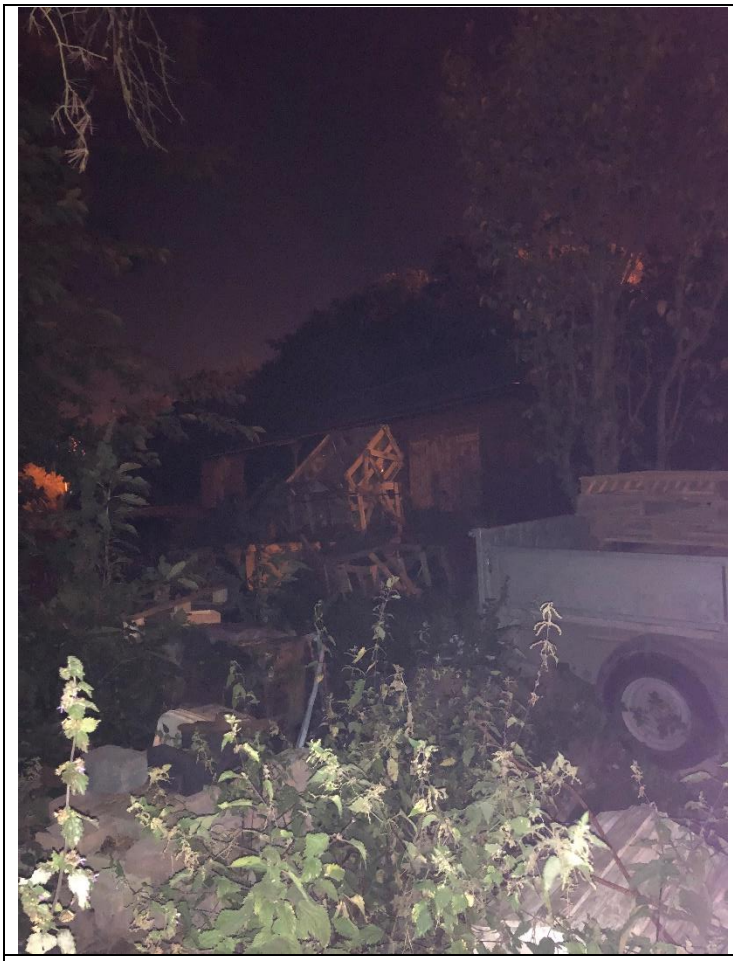
S28

S29 1 + 2 Bridge Cottages: Emergence was identified under the gable end, fascia boards on the southwestern gable.

S42 2 Gray's Corner: No photo

S174 Yellowstock Mews: No photo

S356 Alde Cottage: 2 common pipistrelle emerged



S328 Shorne Woods Air Raid Shelter Bunker 2: Internal inspection identified one hibernating Daubenton's bat. The local bat group have confirmed it as a hibernation roost for brown long-eared and Natterer's as well.

Section 9 Addendum

Application Subject	Bats	Bats	
Species	Natterer's	Brown long-eared bat	Leisler's bat
Activity	Disturb Destroy resting place	Capture Take Disturb Transport Destroy resting place	Capture Take Disturb Transport Destroy resting place
Method of Field Technique	Temporary exclusion Endoscopes By hand	Disturbance by noise or vibration Permanent exclusion Destructive search by soft demolition Mechanical demolition By hand By static hand-held net Endoscopes Temporary exclusion	Permanent exclusion Destructive search by soft demolition Mechanical demolition By hand By static hand-held net Endoscopes Temporary exclusion
Maximum number of bats to be licensed at the time that works are proposed	3 + 9 (estimated from LP4)	4 + 9 (estimated from LP4)	9 (estimated from LP4)
Number of breeding sites to be impacted	0	0	2 (estimated from LP4)
Number of resting sites to be impacted	1 + 9 (estimated from LP4)	3 (2 day roosts, one underground/hibernation roost) + 9 (estimated from LP4)	9 (estimated from LP4)
Expected roost type affected	Confirmed hibernation	Day Confirmed hibernation	Day Maternity

WML-A13a-E5a&b – WORK SCHEDULE FOR BAT

ANNEXED LICENCE

Site name and address (as stated on the application form or licence granted): Lower Thames Crossing

Please ensure that the work schedules are S.M.A.R.T and appropriate timescales are provided for each activity, to fit with order of events. Complete these schedules to show timings for all categories of work (mitigation and compensation measures), and to show the main construction period. The most common activities are listed here, and you can add up to 6 more if needed. Leave blank if not applicable. Enter timing by stating **start and end dates, to nearest month and year** (see first lines for examples). Enter comments if you need to clarify timings. For very complex schemes (e.g. high impact or phased development schemes) if additional lines are needed please do add in. This work schedule will form part of any annexed licence.

E5a

PLEASE INCLUDE DATE OF SUBMISSION (e.g. 01 July 2016). This will be referenced in the annex →		**October 2022, updated Novemebr 2023**
Activity	**Timing**	**Comments**
Pre- development activity		
Example: Bat house creation (in advance of licence)	***Sept-14 to Nov-14***	***Also put up 3 bat boxes before end of December 2015, in advance of works commencing***
Creation of standalone bat feature/s (state completed and fit for purpose if created before licensable works due to commence)	Nov-24 to Sept-27	Construction of a bat hibernation roost/bunker to be completed and fit for purpose prior to works that may disturb S328 over winter
Installation of bat boxes pre-development works (state completed and fit for purpose if created before licensable works due to commence)	Nov-24 to Sept-27	A minimum of 51 bat boxes will be installed as mitigation for the roosts to be lost. Final total is likely to be significantly higher to account for the lost of suitable tree roosting features (1:1 ratio of high suitability trees to bat boxes and 1:1 ratio of moderate suitability

		trees to bat boxes). Any future roosts discovered will be compensated for following the compensation ratios in the mitgation matrix.
Permanent exclusion measures (e.g. use of one-way excluders prior to permanent blocking of access points or destruction of roost)	April 2027 - Oct 2027	Relevant to all roosts except S14 and any future roosts discovered during works. Where possible, roosts will be permanently excluded prior to construction, however vegetation clearance will occur in multiple phases across the Project and this permanent exlcusion could occur during construction.
Habitat creation	2025 - 2032	Compenation woodland, hedgerows, ponds and grassland habitat to be created as part of main construction works
Mid-development activity		
Example: Capture exercise (e.g. by hand /hand-held nets, etc)	***Sept-2016***	***By hand***
Pre-works inspection by Named Ecologist or Accredited Agent	Sept-26 to Oct-25	All roosts except S14 roosts (retained but heavily disturbed) will be climbed and internal endoscope inspections post installation of exclusions, or emergence and dawn survey on day of roost removal if unsuitbale to be climbed.
Installation of protective measures (e.g. separation membranes whilst working in lofts)		
Disturbance by noise, illumination or vibration (please specify)	2024 - 2032	Best practice construction measures will be followed as detailed in section 8.4 of Chapter 8: Terrestrial Biodiversity (Application Document 6.1), and the Code of Construction Practice (Application Document 6.3). Roost S14 will be disturbed by noise, illumination and potentially vibration due to its proximity to the works and new road layout.
Temporary exclusion measures (e.g. use of one-way excluders with access re-instated following works)	April 26 to Oct-26 and reopening of roost up to	The S328 hibernation roost will need to be checked and excluded outside the hibernation period, if works that are to disturb bats start

	2032 (depednednt on construction)	during the hibernation period. If works continue from the active to hibernation season and bats use the structure, it is assumed that bats are not being disturbed as they are choosing to roost there while construction is taking place. Rather than completely losing the existing roost, this is judged to be a better solution. This temporary exclusion would occur until no likelikhood of siturbance will occur, and could be as late as 2032.
Permanent exclusion measures (e.g. use of one-way excluders prior to permanent blocking of access points or destruction of roost)	April-Oct 2026-2027	One way excluders will be installed on features within trees and structures that cannot be fully inspected prior to demolition. This will only be undertaken outside of the hibernation period.
Capture exercise (e.g. by hand / hand-held nets, etc – please state)	May-Oct 2026 - 2027	Undertaken during site clearance works. Capture will be undertaken by hand and with hand-held nets.
Destructive search by soft demolition	May-Oct 2026 - 2027	Undertaken during site clearance works. Destruction search by soft demolition may be required on all structures with roosts within them with the exception of S14 and S328 (not being demolished)
Habitat enhancement and creation	2025 - 2032	Landscaping works will be continuous during construction with early stage mitigation sites being created at the start of construction, and wider landscape planting occurring as soon as practicable within the construction programme
Soft felling of trees	May-Oct 2026-2027	Any trees with confirmed roosts or potential roost features that cannot be climbed due to health and safety reasons or accessed with a MEWP will need to be soft felled following a emergence and re-entry survey on the tree that finds no evidence of bats using the tree. Any roosts that have potential maternity roosts will not be soft felled between the period 1 May until 30 Sept.

Tree felling	Jan - Dec 2027	Tree that's have had fetaure permanently exlcuded will be felled at any point during the year.
During development		
Example: Mechanical demolition	***Oct-2016***	***Buildings X and Y will be knocked down after sign off from Named Ecologist***
Mechanical demolition of all or part of structures (once declared free of bats by Named Ecologist or Accredited Agent) – please state	May-Nov 2026 - 2027	All structures with roosts in (with the exception of S14 and S328) will be demolished after sign off from the Named Ecologist
Construction period start and end dates	2024 - 2032	Preliminary works proposed once DCO granted (assumed 2024) with Main Construction starting in 2025. Road opening programmed for 2030.
Site checks and maintenance during construction	Mar-2025 to Sept-2032	The bat boxes and hibernation bunker once installed will be checked on alternate years during construction.
Construction of structures to mitigate fragmentation impacts	2026 - 2032	Construction and planting of seven green bridges (three south and four north of the River Thames). Three viaducts all north of the River Thames Box culvert of Tilbury Main Work will be phased during main works construction period.
Post construction mitigation/compensation on 'development' site or other (provide details below)		
Example: Installation of access points and bat boxes	***Feb-2017***	***Access points will be installed after completion of new roof structure; remaining 3 x bat boxes installed by end of this month.***
Creation of mitigation/compensation post development (e.g. installation of bat tubes, bricks, boxes, access points, etc – specify in comments section)		
Habitat reinstatement or restoration (following temporary impacts)	2030 - 2032	Once construction compounds and areas have been decomissioned. Landscaping works to be undertaken as soon as practicable within the construction programme

Hedgerow or woodland planting (please specify)	2025 - 2032	All planting to occur as early as practicable within the construction programme.

E5b) Post-development works - type a "Y" where each activity will occur for a given year and leave blank for no activity.

Year:	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Monitoring										Y	Y	Y
Habitat management										Y	Y	Y
Site maintenance										Y	Y	Y

Year:	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Monitoring	Y	Y	Y		Y			Y				
Habitat management	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Site maintenance	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

2016-21327-EPS-MIT

2021-51011-EPS-MIT

2018-34833-EPS-MIT

2019-43863-EPS-MIT-2

2015-7929-EPS-MIT

EPSM2012-4625

0 0.4 0.8 1.2 1.6 KM

Legend

- Order Limits
- Bat Licence Number

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
P01	S9	07/03/2023	DCO Examination	CD	SM	BF

Client: national highways

Project: LOWER THAMES CROSSING

Status	DCO APPLICATION
Original Size	A3
Revision	P01
Application Document Number	TR010032/APP/6.2
Scale	1:40,000

Drawing Title: Figure B2.2 - Location of other nearby bat licence sites

Page 1 of 3

Drawing Number: HE540039-CJV-EBD-SZP_EGNE00000000-DR-LE-60116

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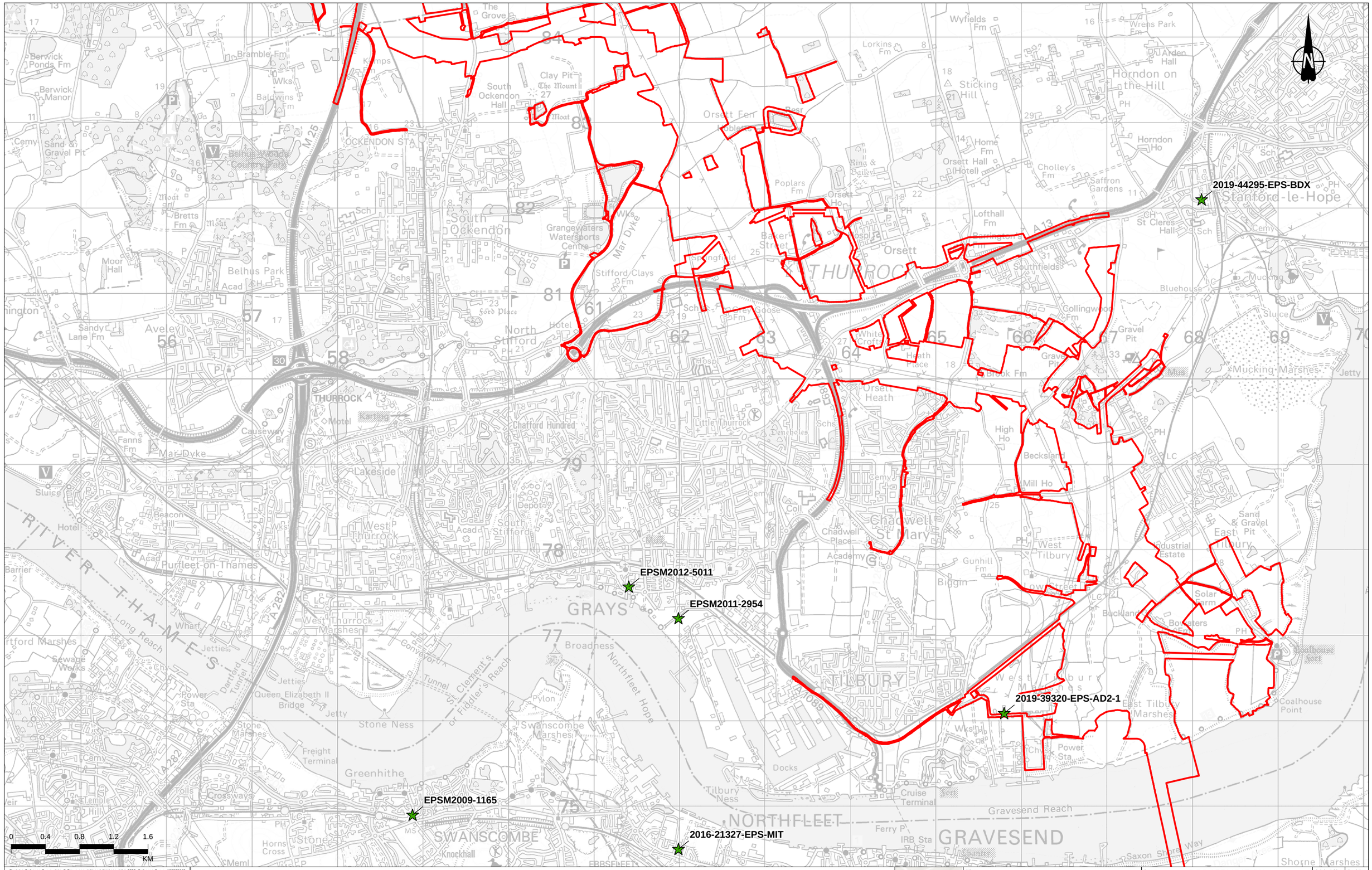

Legend

- Order Limits
- Bat Licence Number

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
P01	S9	07/03/2023	DCO Examination	CD	SM	BF

Client: national highways

Project: LOWER THAMES CROSSING

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Scale	1:40,000

Drawing Title: Figure B2.2 - Location of other nearby bat licence sites

Page 2 of 3

Drawing Number: HE540039-CJV-EBD-SZP_EGNE00000000-DR-LE-60116

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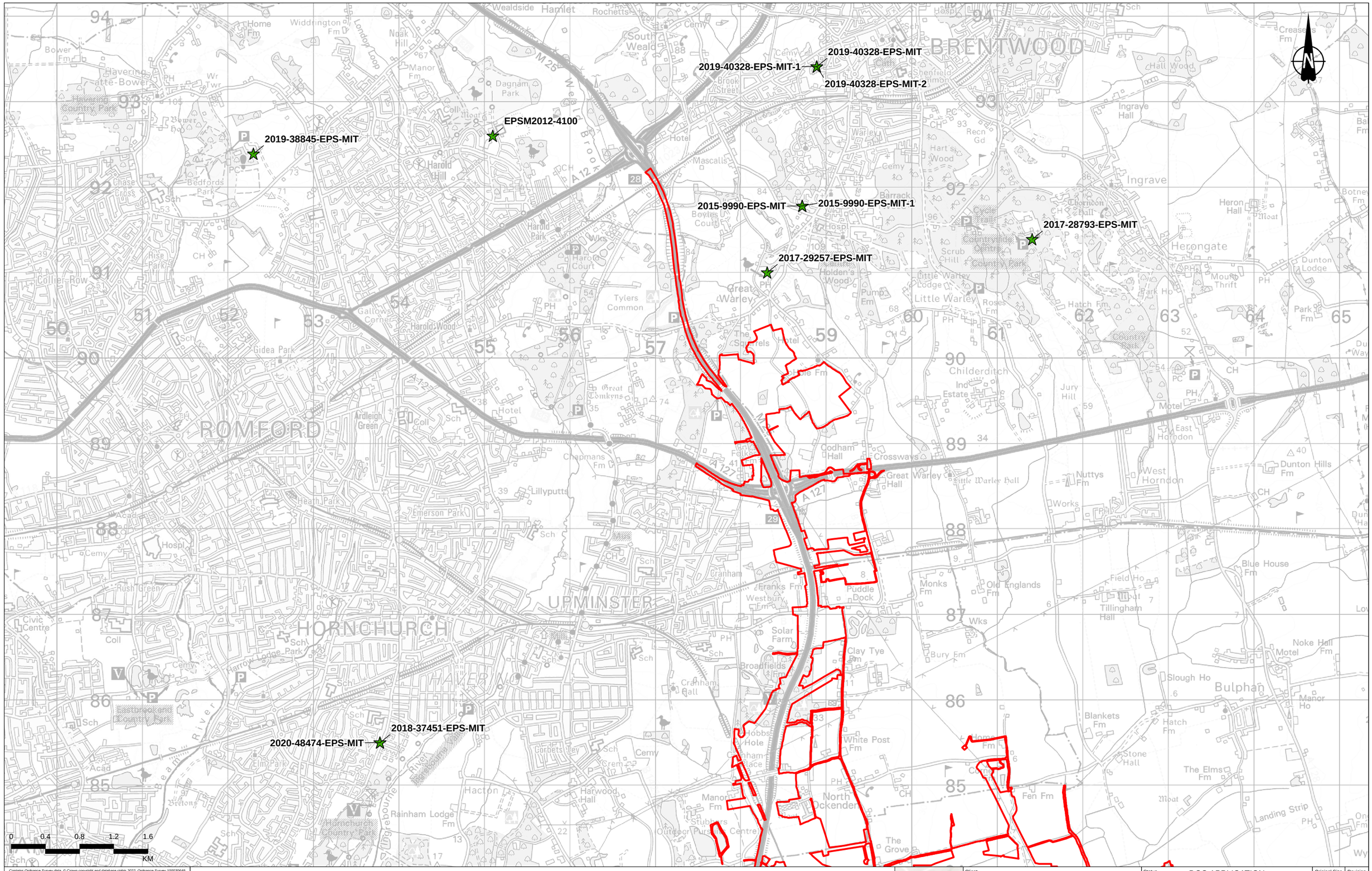

Legend

- Order Limits
- Bat Licence Number

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
P01	S9	07/03/2023	DCO Examination	CD	SM	BF

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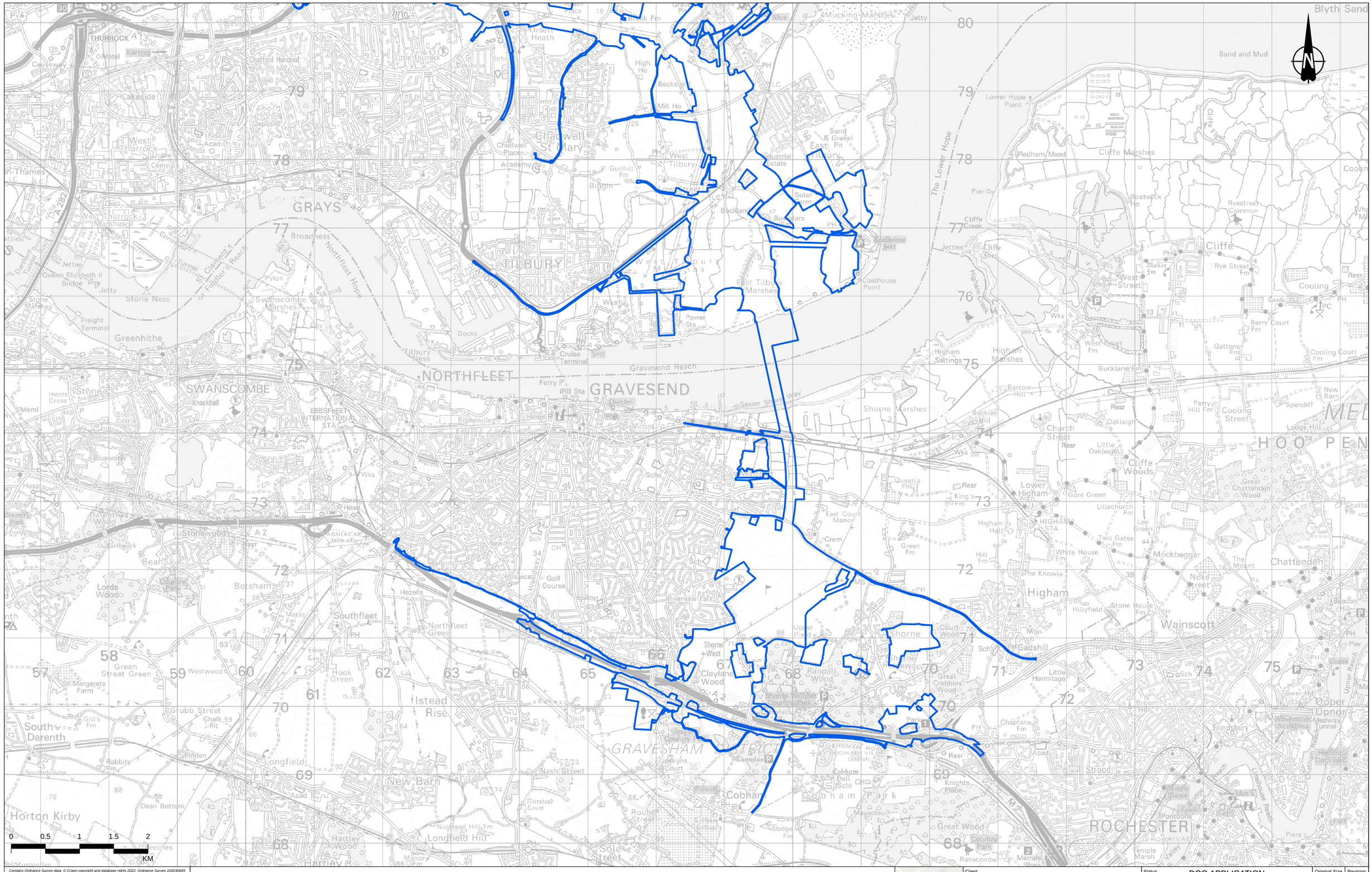

Legend

Licence area comprising Order Limits plus Building S14 and S39

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
P02	S8	19/10/2022	DCO Application	CD	SM	BF

Client: national highways

Project: LOWER THAMES CROSSING

Status	DCO APPLICATION
Original Size	A3
Revision	P02
Application Document Number	TR010032/APP/6.2
Scale	1:50,000

Drawing Title: Figure C5a - Location Map

Drawing Number: HE540039-CJV-EBD-SZP_EGNE00000000-DR-LE-60112

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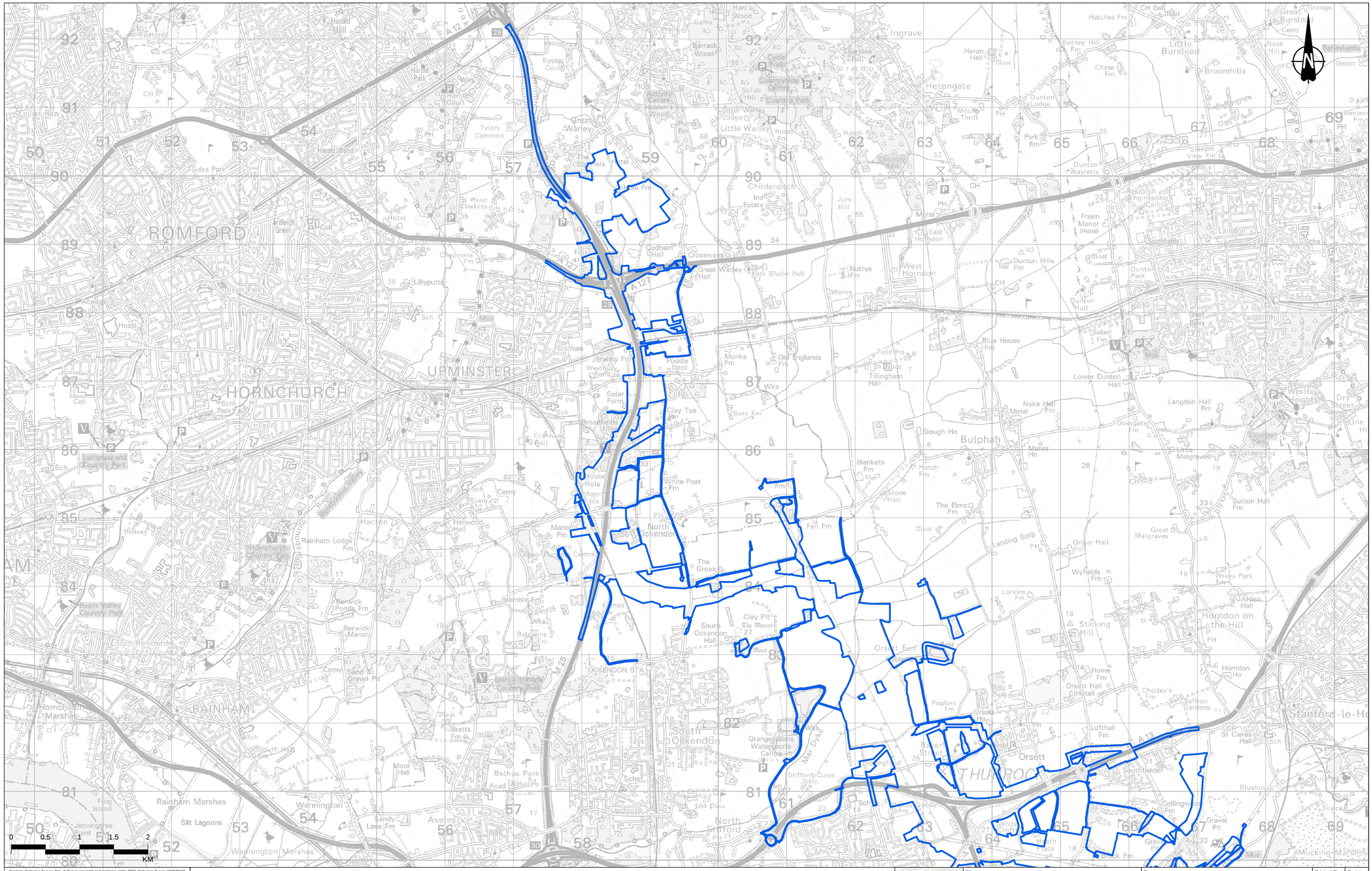

Legend

Licence area comprising Order Limits plus Building S14 and S39

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
P02	S8	19/10/2022	DCO Application	CD	SM	BF

Client: national highways

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Application Document Number	TR010032/APP/6.2
Scale	1:50,000

Drawing Title: Figure C5a - Location Map

Drawing Number: HE540039-CJV-EBD-SZP_EGNE00000000-DR-LE-60112

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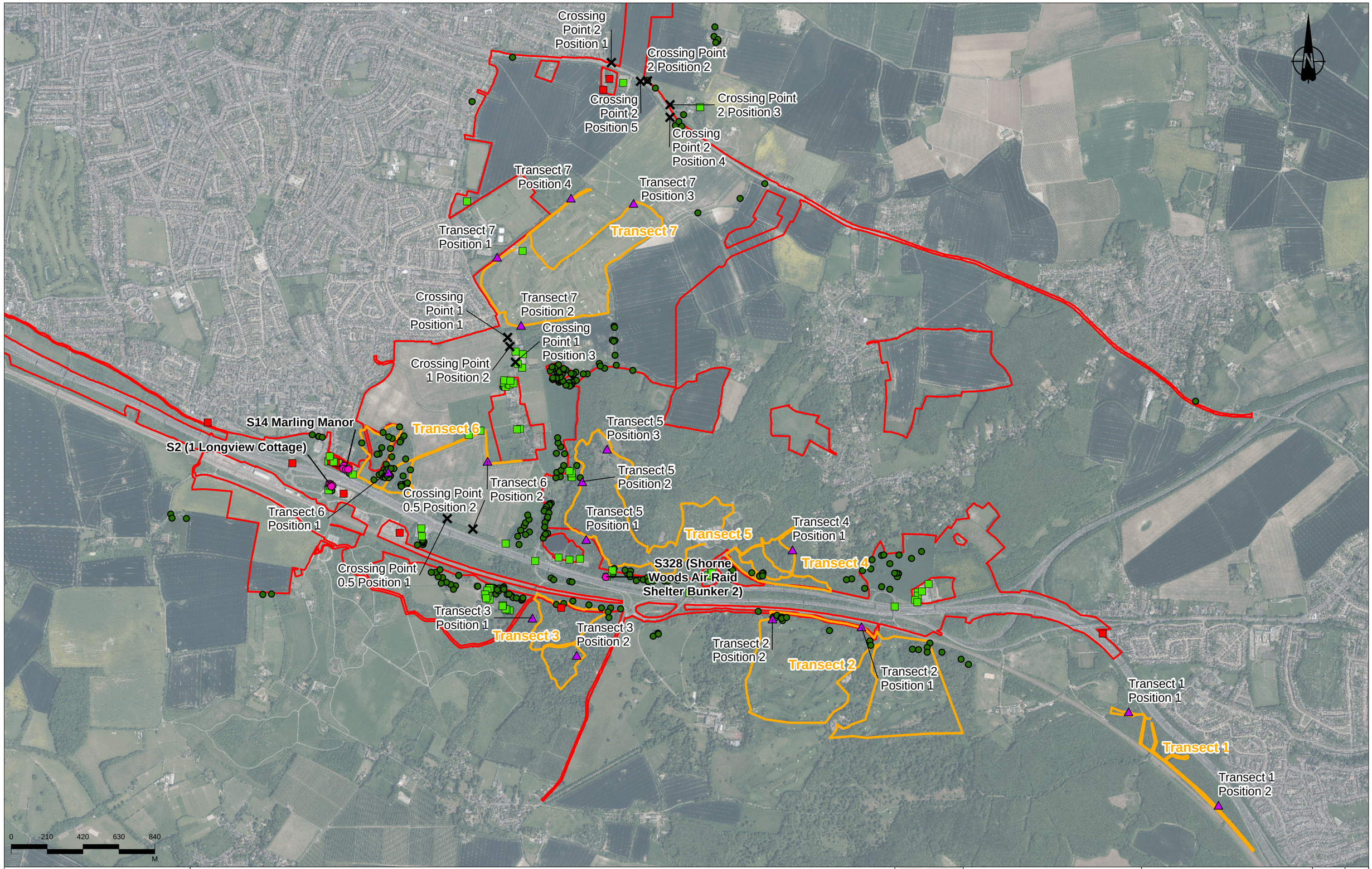


Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
P02	S8	19/10/2022	DCO Application	CD	SM	BF
P03	S9	29/06/2023	Natural England comments	CD	SM	BF

Legend

- Order Limits
- Bat tree ground assessed
- Structure surveyed
- Structure not surveyed
- Bat transect route
- Confirmed bat roost impacted building
- Surveyor location

Static detector location

- Static detector location
- Crossing point

Client: national highways

Project: LOWER THAMES CROSSING

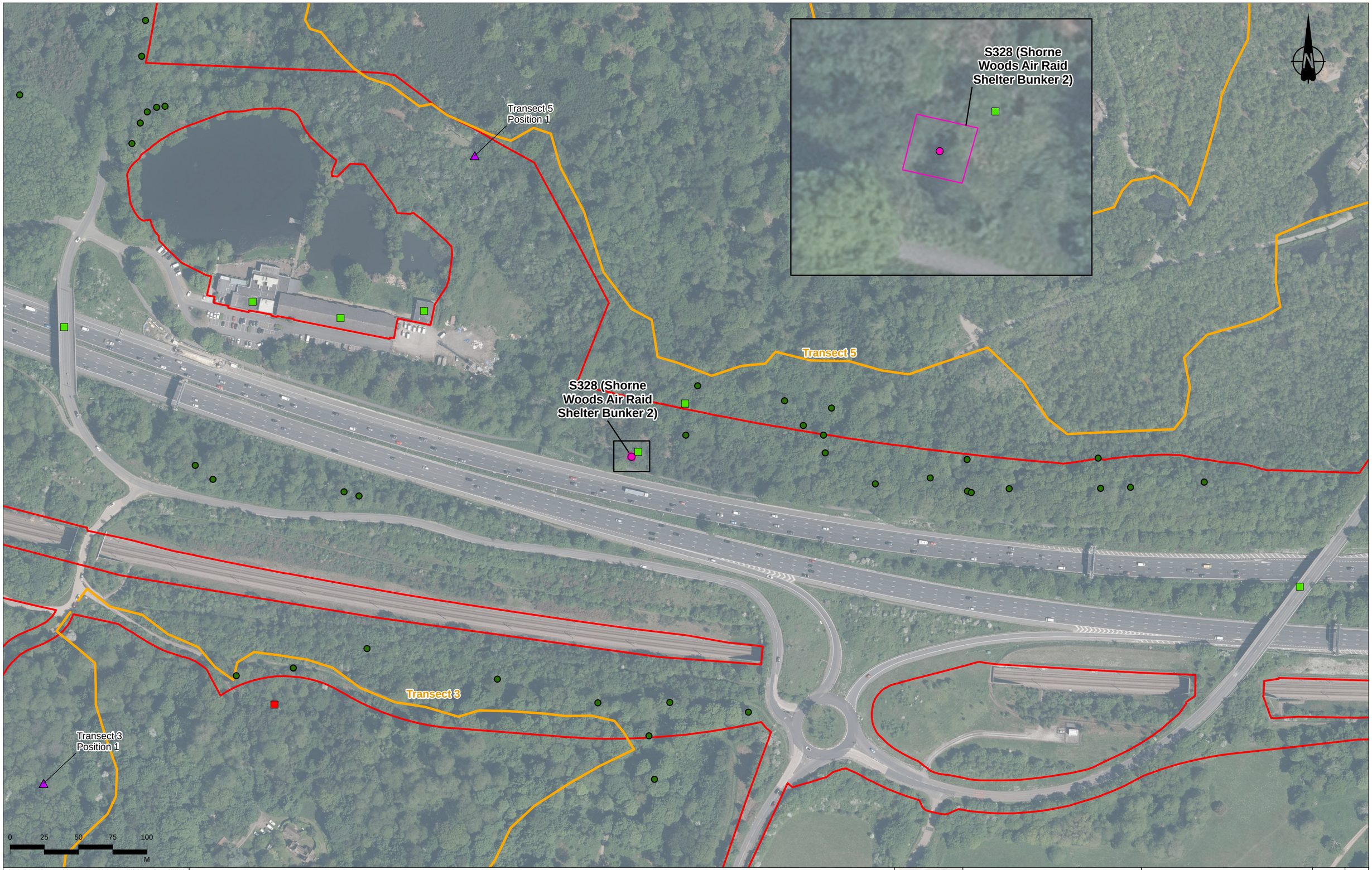
Status: DCO APPLICATION | Original Size: A3 | Revision: P03

Application Document Number: TR010032/APP/6.2 | Scale: 1:20,000

Drawing Title: Figure C5b - Survey Area

Page 1 of 9

Drawing Number: HE540039-CJV-EBD-SZP_EGNE00000000-DR-LE-60012



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Static detector location

- Static detector location

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P03	S9	29/06/2023	Natural England comments	CD	SM	BF

Client: national highways

Project: LOWER THAMES CROSSING

Status: DCO APPLICATION

Original Size: A3

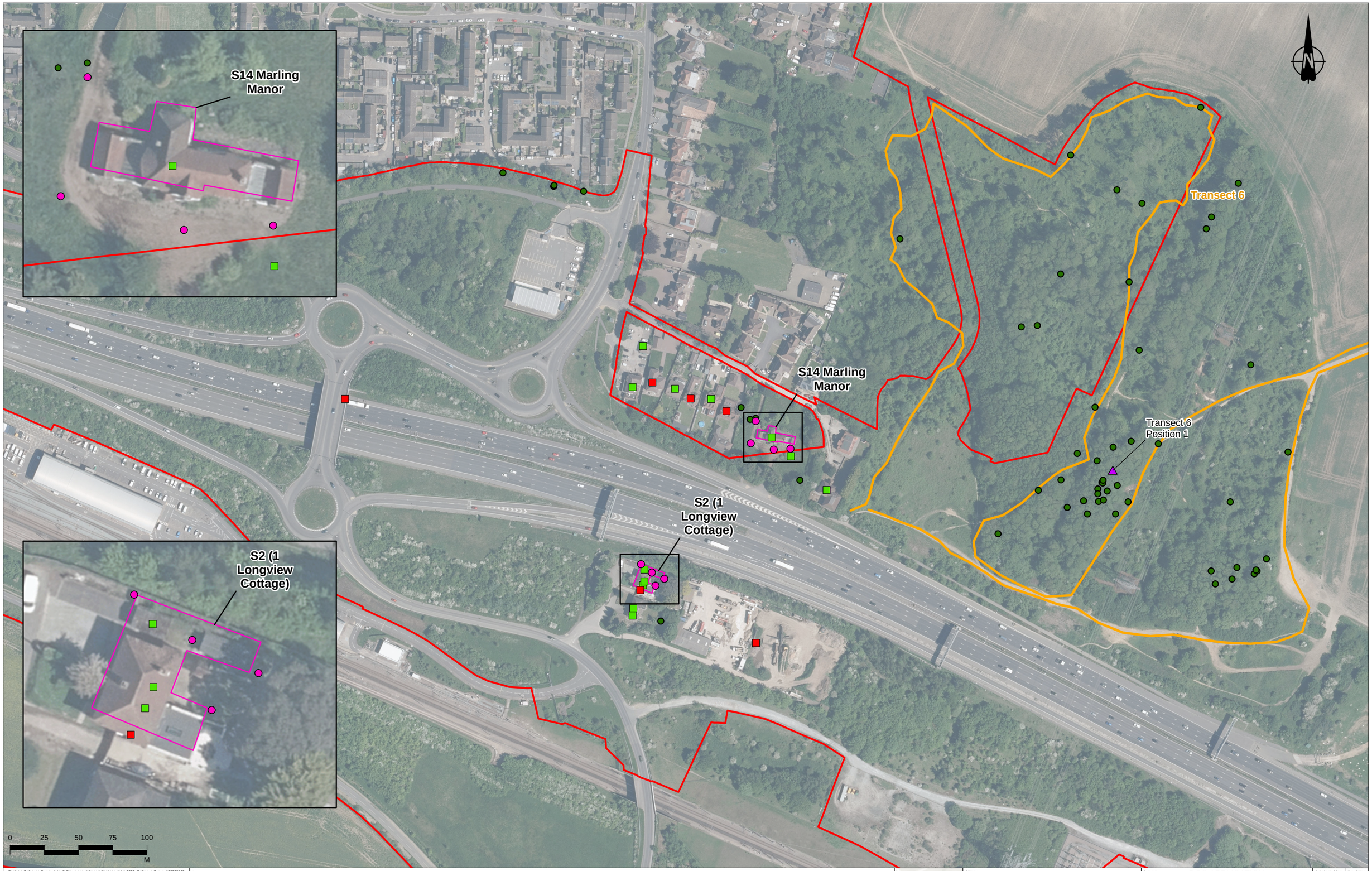
Revision: P03

Application Document Number: TR010032/APP/6.2

Scale: 1:2,500

Drawing Title: Figure C5b - Survey Area

Drawing Number: HE540039-CJV-EBD-SZP_EGNE00000000-DR-LE-60012



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Drawing Title: Figure C5b - Survey Area

Drawing Number: HE540039-CJV-EBD-SZP_EGNE00000000-DR-LE-60012

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P03	S9	29/06/2023	Natural England comments	CD	SM	BF

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Revision: P03

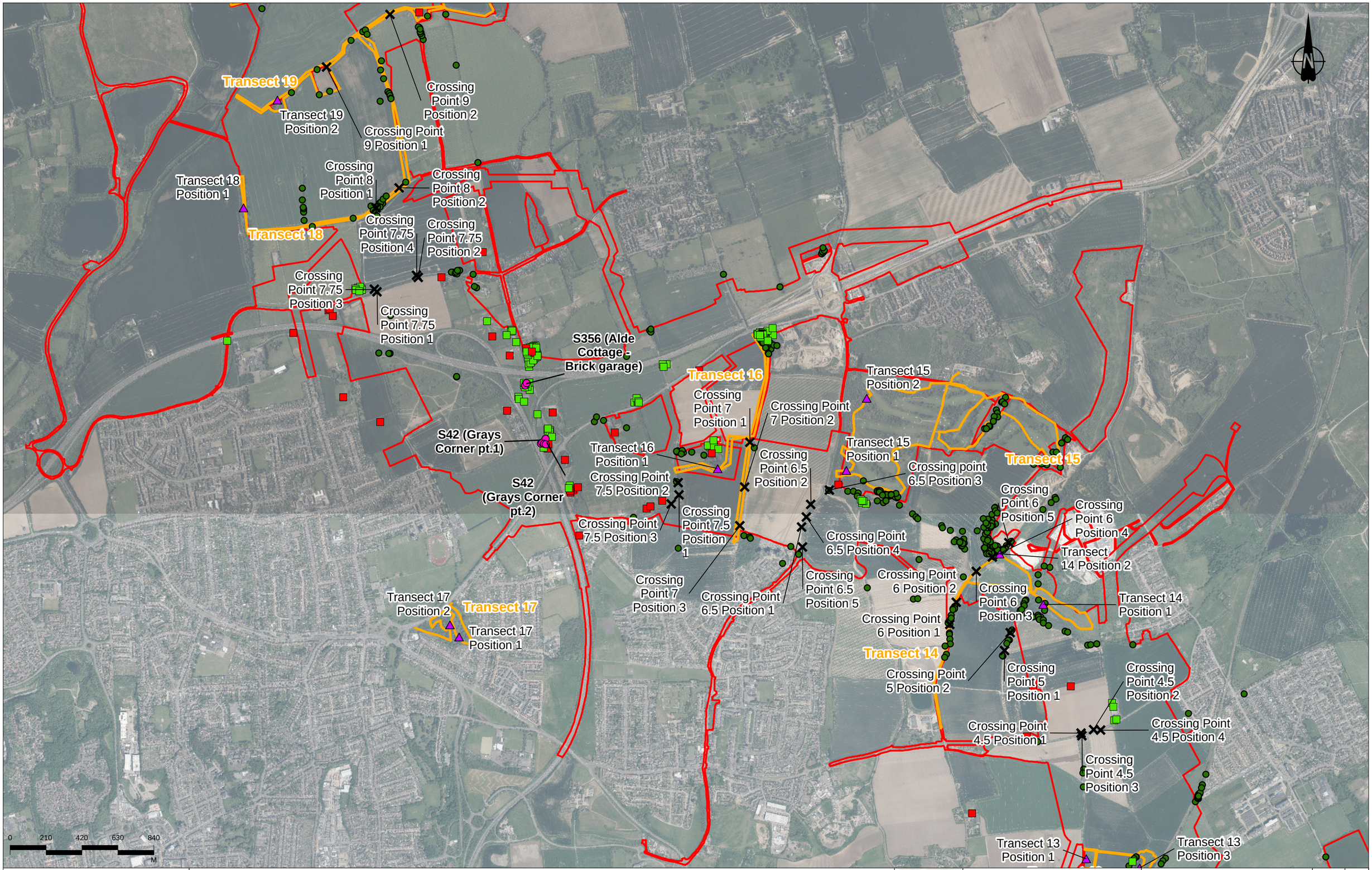
Application Document Number: TR010032/APP/6.2

Scale: 1:20,000

Drawing Title: Figure C5b - Survey Area

Page 4 of 9

Drawing Number: HE540039-CJV-EBD-SZP_EGNE00000000-DR-LE-60012



Legend

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Client: national highways

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Status	DCO APPLICATION
Original Size	A3
Revision	P03
Application Document Number	TR010032/APP/6.2
Scale	1:20,000

Drawing Title: Figure C5b - Survey Area

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Drawing Number: HE540039-CJV-EBD-SZP_EGNE00000000-DR-LE-60012

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
P02	S8	19/10/2022	DCO Application	CD	SM	BF
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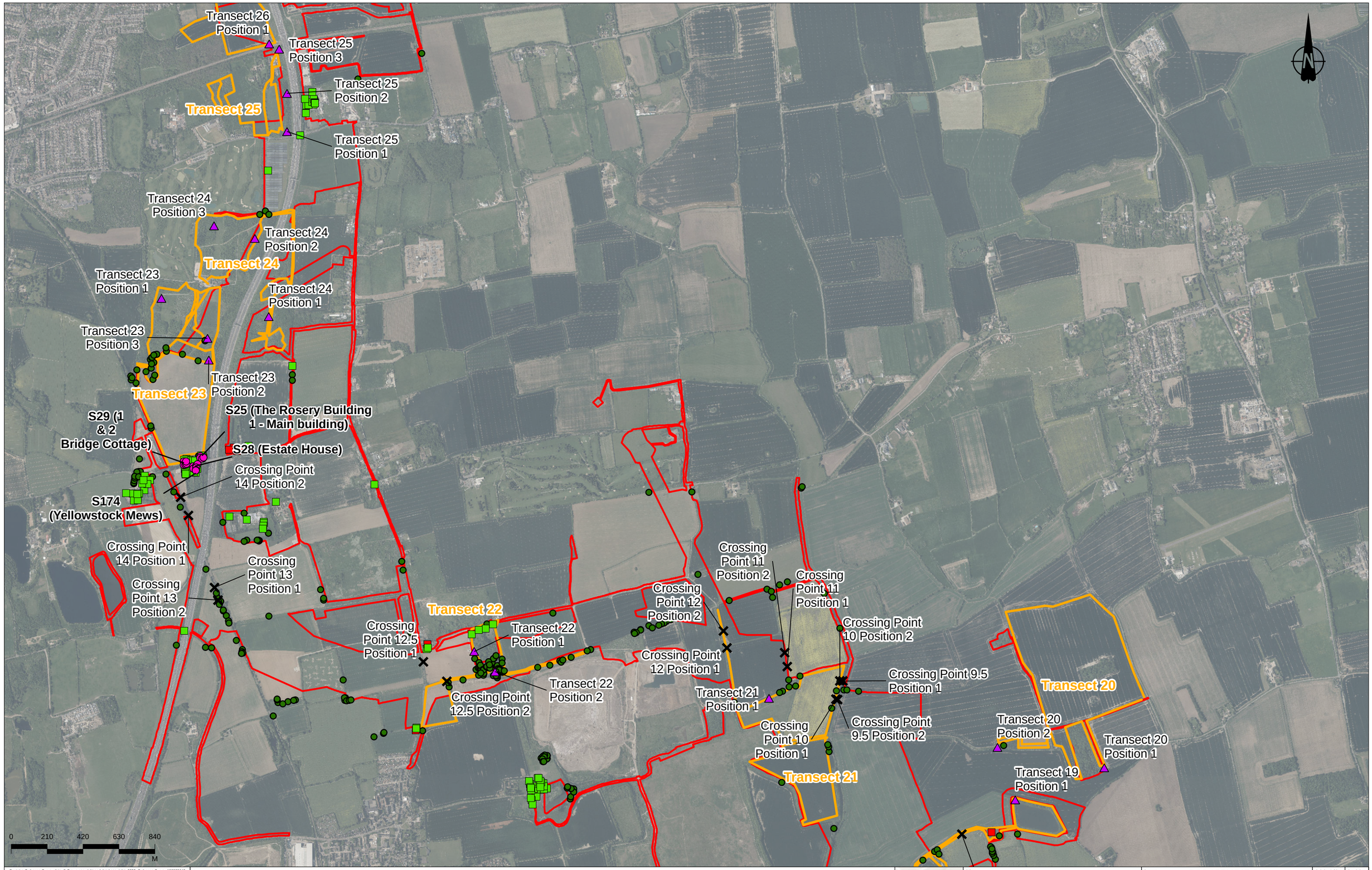
Status: DCO APPLICATION | Original Size: A3 | Revision: P03

Application Document Number: TR010032/APP/6.2 | Scale: 1:2,500

Drawing Title: Figure C5b - Survey Area

Page 6 of 9

Drawing Number: HE540039-CJV-EBD-SZP_EGNE00000000-DR-LE-60012



Legend

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Client: national highways

Project: LOWER THAMES CROSSING

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Original Size	A3
Revision	P03
Application Document Number	TR010032/APP/6.2
Scale	1:20,000
Drawing Title	Figure C5b - Survey Area Page 7 of 9
Drawing Number	HE540039-CJV-EBD-SZP_EGNE00000000-DR-LE-60012

Legend

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Static detector location

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P03	S9	29/06/2023	Natural England comments	CD	SM	BF

Client: national highways

Project: LOWER THAMES CROSSING

Status: DCO APPLICATION

Original Size: A3

Revision: P03

Application Document Number: TR010032/APP/6.2

Scale: 1:2,500

Drawing Title: Figure C5b - Survey Area

Page 8 of 9

Drawing Number: HE540039-CJV-EBD-SZP_EGNE00000000-DR-LE-60012

Legend

- Order Limits
- Bat tree ground assessed
- Bat transect route

Static detector location

- Static detector location

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
P02	S8	19/10/2022	DCO Application	CD	SM	BF
P03	S9	29/06/2023	Natural England comments	CD	SM	BF

Client: national highways

Project: LOWER THAMES CROSSING

Status: DCO APPLICATION

Original Size: A3

Revision: P03

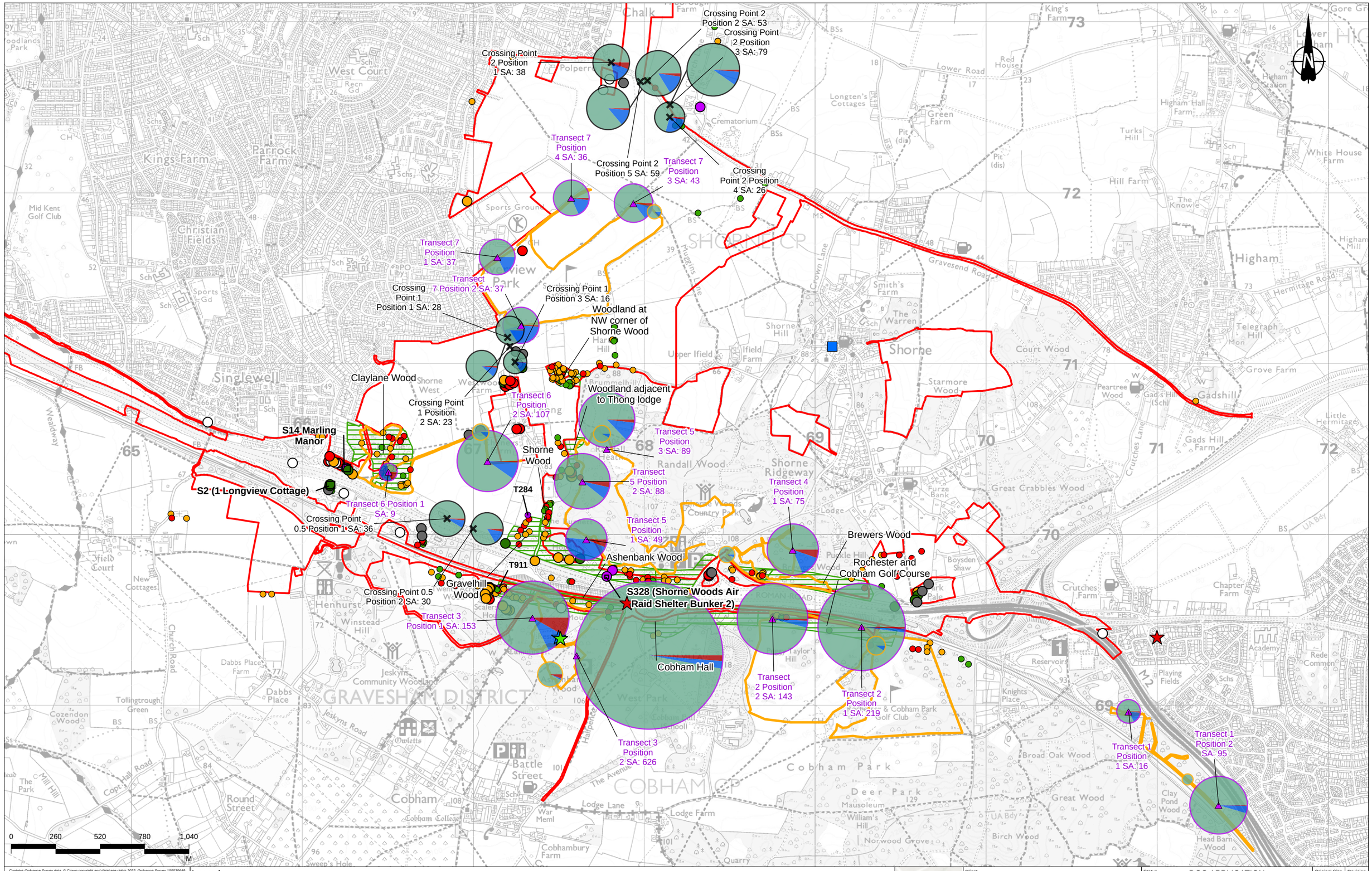
Application Document Number: TR010032/APP/6.2

Scale: 1:20,000

Drawing Title: Figure C5b - Survey Area

Page 9 of 9

Drawing Number: HE540039-CJV-EBD-SZP_EGNE00000000-DR-LE-60012



Legend

- Order Limits
- Sites of Special Scientific Interest
- Woodland assessment area
- Confirmed bat roost impacted building
- Roost building access point
- Static detector location
- Crossing point
- Bat transect route

Tree suitability

- Confirmed roost

- High
- Moderate
- Low

Building suitability

- Confirmed roost
- High

- Low
- Moderate
- Negligible
- No access

Desk study - hibernating bat

- Noctule

Desk study - maternity roost

- Leisler
- Noctule
- Soprano pipistrelle

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
P02	S8	19/10/2022	DCO Application	CD	SM	BF
P03	S9	12/07/2023	Natural England comments	CD	SM	BF
P04	S9	07/11/2023	Natural England comments	CD	SM	BF

Client: national highways

Project: LOWER THAMES CROSSING

Status: DCO APPLICATION

Original Size: A3

Revision: P04

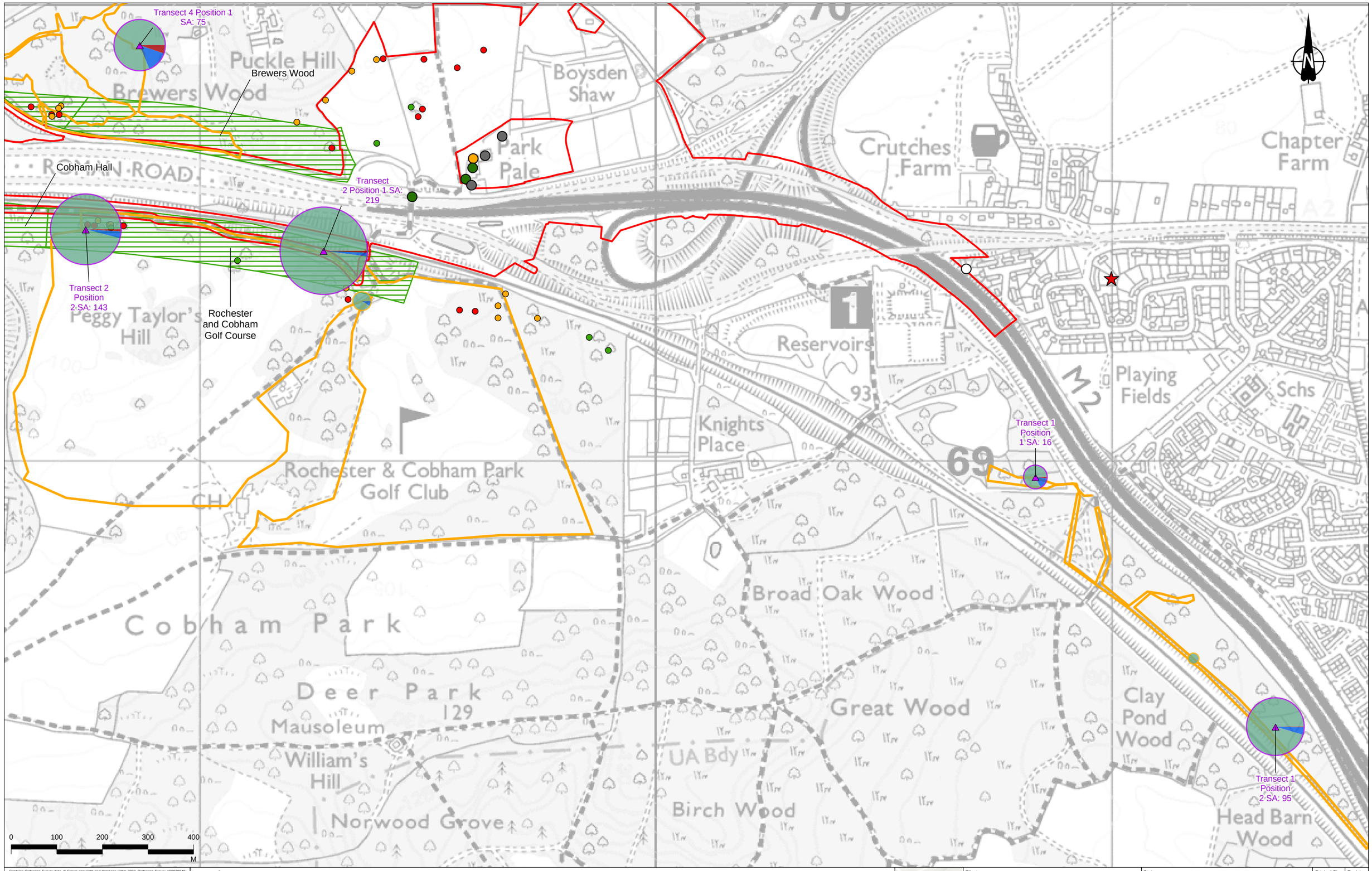
Application Document Number: TR010032/APP/6.2

Scale: 1:20,000

Drawing Title: Figure C6 - Survey Results

Page 1 of 19

Drawing Number: HE540039-CJV-EBD-SZP_EGNE00000000-DR-LE-60013



Legend

- Order Limits
- Sites of Special Scientific Interest
- Woodland assessment area
- Confirmed bat roost impacted building
- Roost building access point
- Static detector location
- Crossing point
- Bat transect route

Tree suitability
- High
- Moderate
- Low

Building suitability
- Low
- Moderate
- Negligible
- No access

Desk study - hibernating bat
- Noctule

Desk study - maternity roost
- Leisler
- Noctule
- Soprano pipistrelle

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
P02	S8	19/10/2022	DCO Application	CD	SM	BF
P03	S9	12/07/2023	Natural England comments	CD	SM	BF
P04	S9	07/11/2023	Natural England comments	CD	SM	BF

Client: national highways

Project: LOWER THAMES CROSSING

Status: DCO APPLICATION

Original Size: A3

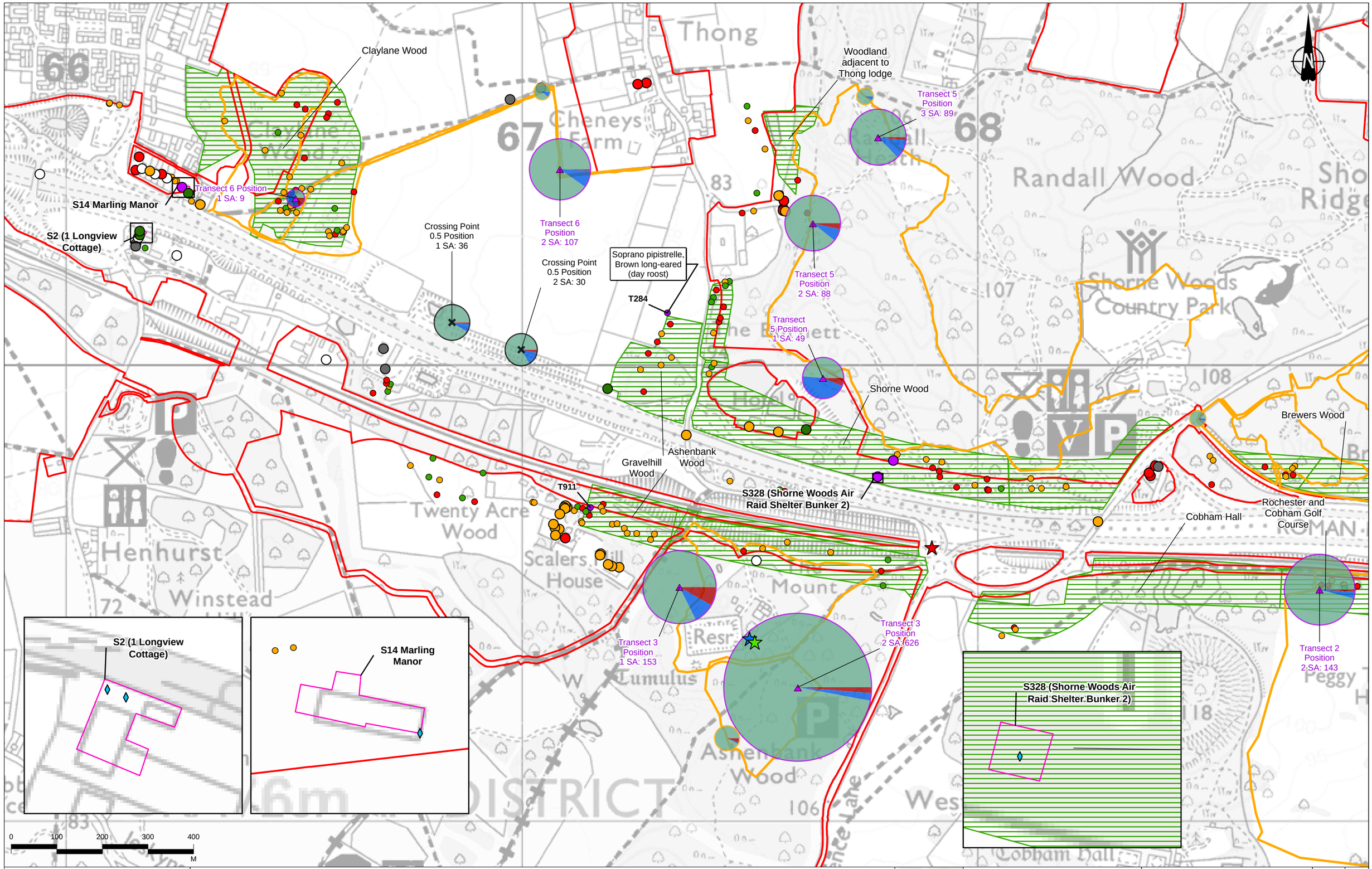
Revision: P04

Application Document Number: TR010032/APP/6.2

Scale: 1:7,500

Drawing Title: Figure C6 - Survey Results

Drawing Number: HE540039-CJV-EBD-SZP_EGNE00000000-DR-LE-60013



Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
P02	S8	19/10/2022	DCO Application	CD	SM	BF
P03	S9	12/07/2023	Natural England comments	CD	SM	BF
P04	S9	07/11/2023	Natural England comments	CD	SM	BF

Legend

- Order Limits
- Sites of Special Scientific Interest
- Woodland assessment area
- Confirmed bat roost impacted building
- Roost building access point
- Static detector location
- Crossing point
- Bat transect route

Tree suitability

- Confirmed roost

- High
- Moderate
- Low

Building suitability

- Confirmed roost
- High

- Low
- Moderate
- Negligible
- No access

Desk study - hibernating bat

- Noctule

Desk study - maternity roost

- Leisler
- Noctule
- Soprano pipistrelle

Client: national highways

Project: LOWER THAMES CROSSING

Status: DCO APPLICATION | Original Size: A3 | Revision: P04

Application Document Number: TR010032/APP/6.2 | Scale: 1:7,500

Drawing Title: Figure C6 - Survey Results

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Drawing Number: HE540039-CJV-EBD-SZP_EGNE00000000-DR-LE-60013

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