

Lower Thames Crossing

Code of Construction Practice

First Iteration of Environmental Management Plan

DATE: June 2021

VERSION: 0.2

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Code of Construction Practice

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Covering Note

This document is a draft of one of a series of Control Documents that will form part of our planned DCO application. Following this consultation we will carefully consider your feedback as we finalise the documents for our planned submission of the DCO application for the Lower Thames Crossing later this year.

The Code of Construction Practice (CoCP) provides a framework to manage construction and operational activities. Its objectives are to ensure that environmental mitigation commitments are met and necessary consents and licences are obtained.

The REAC identifies all good practice and essential mitigation from our ongoing environmental assessments to be carried out during the operation of the new road.

The following contains a draft copy of these documents to provide an example of how mitigation and commitments would be secured within the DCO application when it is submitted.

These documents reflect the changes to the design described in this consultation. Updates may be made to this document to reflect feedback received from stakeholders ahead of submitting the document as part of the DCO application.

We submitted a version of the Code of Construction Practice with our DCO application in October 2020. Many of the controls set out in this document were developed in response to the assessments we completed prior to that submission. These assessments are being updated for our resubmission, and our approach to environmental assessment, the identified environmental impacts and proposed mitigation are set out in this consultation within the Operations update, Construction update and the Ward impact summaries. In a number of places, this document refers to other documents within our proposed DCO application that set out assessments that led to the inclusion of controls.

As this is a draft of the application document, we have left these references in place with a (REF TBC) as a demonstration of how the finalised document will provide context of why a control is required. Our resubmitted DCO application will include all of the referenced documents to provide a clear link between the assessments and the controls. Following our withdrawal of our application we are continuing to develop our assessments, and we have included this document in the consultation to demonstrate how the controls will be secured in the DCO, and to seek feedback on our approach.

1 Introduction and background to the project

1.1 Background

- 1.1.1 The proposed A122 Lower Thames Crossing (the Project) is a new road that would 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.
- 1.1.2 The Project is a Nationally Significant Infrastructure Project (NSIP) under the Planning Act 2008. Therefore, an application for development consent has been submitted to the Planning Inspectorate. This Code of Construction Practice (CoCP) is part of a suite of documents which accompanies the application. A full description of the DCO Application Documents is provided within the 'Introduction to the Application' (REF TBC) which also accompanies the application.

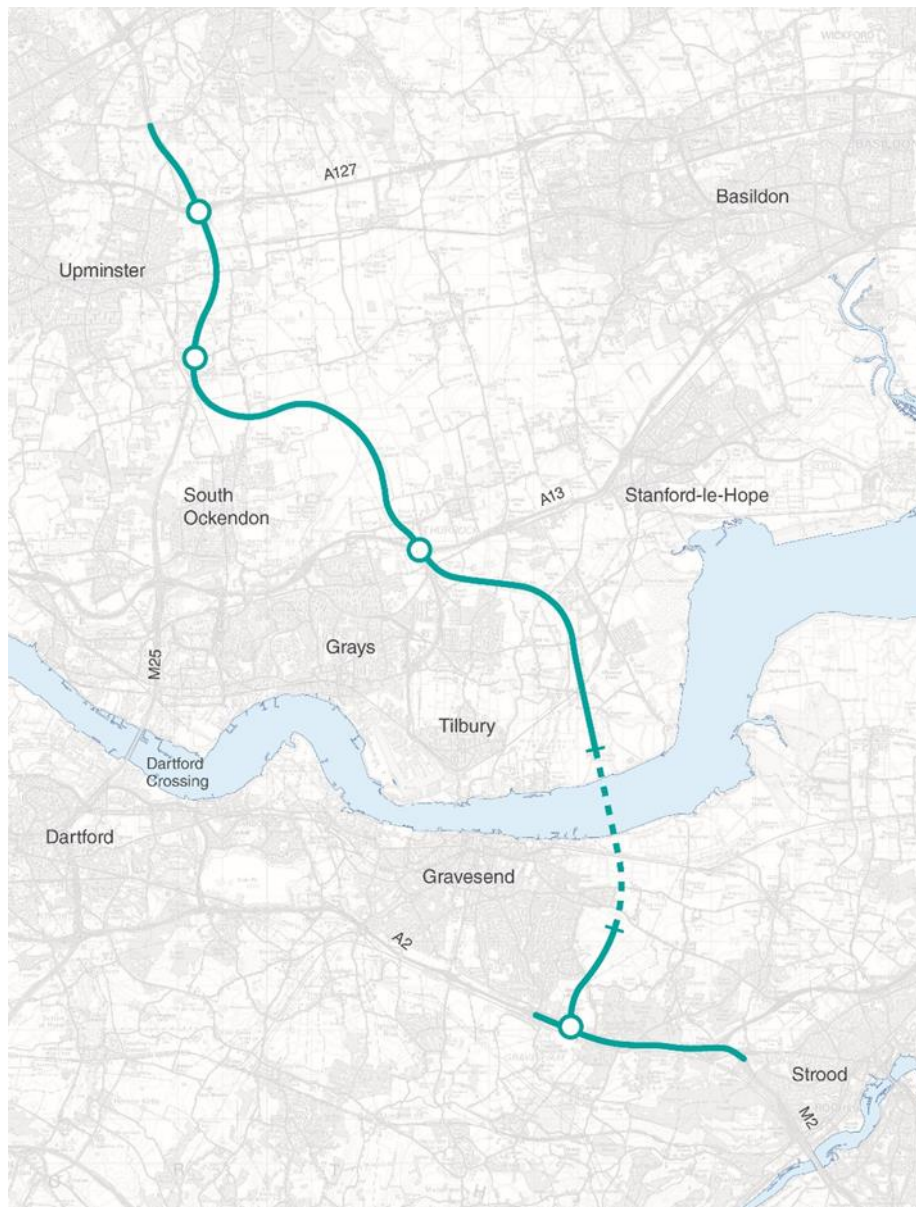
1.2 Description of the Project

- 1.2.1 The A122 Lower Thames Crossing (the Project) would provide a connection between the A2 and M2 in Kent, east of Gravesend, crossing under the River Thames through a tunnel, before joining the M25 south of junction 29. The Project route is presented in Plate 1.1.
- 1.2.2 The A122 road 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 and junction 29 of the M25. The tunnel entrances 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.
- 1.2.3 Junctions are proposed at the following locations:
- a. 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
- 1.2.4 To align with NPSNN policy and to help the Project meet the Scheme Objectives, it is proposed that road user charges would be levied. Vehicles would be charged for using the new tunnel.
- 1.2.5 The Project route would be three lanes in both directions, except for:
- a. link roads
- stretches of the carriageway through junctions
- the southbound carriageway from the M25 to the junction with the A13/A1089, which would be two lanes
- 1.2.6 In common with other A-roads, the A122 would operate with no hard shoulder but would feature a 1m hard strip on either side of the carriageway. It would also feature technology including stopped vehicle and incident detection, lane control, variable speed limits and electronic signage and signalling. Our A122

road design outside of the tunnel includes emergency areas spaced at intervals between 800 metres and 1.6km (less than one mile). The tunnel would include a range of enhanced systems and response measures instead of emergency areas.

- 1.2.7 The A122 would be classified as an 'all-purpose trunk road' with green signs. For the benefit of safety, walkers, cyclists, horse-riders and slow-moving vehicles would be prohibited from using it.
- 1.2.8 The Project would include adjustment to a number of side roads. There would also be changes to a number of public rights of way, used by walkers, cyclists and horse riders. Construction of the Project would also require the installation and diversion of a number of utilities, including gas pipelines, overhead power lines and underground electricity cables, as well as water supplies and telecommunications assets and associated infrastructure.
- 1.2.9 The Project has been developed to avoid or minimise significant effects on the environment. Some of the measures adopted include landscaping, noise mitigation, green bridges, floodplain compensation, new areas of ecological habitat and two new parks.

Plate 1.1 Project route



- 1.2.10 A more detailed project description is provided in Chapter 2: Project Description in the Environmental Statement (ES) (REF TBC).
- 1.2.11 It is anticipated that construction activity is likely to commence in 2023/24 after the DCO has been granted. Construction will take approximately six years, and the new road and tunnel are planned to open in 2029.

1.3 Scheme Objectives

- 1.3.1 Highways England's Sustainable Development Strategy sets out Highways England's approach and priorities to sustainable development. The strategy has particular regard for the following factors:
- a. **Financial** – supporting national and local economic growth and regeneration

- b. **Human** – protecting and improving the safety of road users and road workers
- c. **Natural** – protecting, managing and enhancing the environment
- d. **Social** – seeking to improve the well-being of road users and communities affected by the network
- e. **Manufactured** – ensuring efficiency and value for money

1.3.2 The Scheme Objectives developed specifically for the Project and agreed with the Department for Transport (DfT) are as follows:

- 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 resilience of the Thames crossings and the major road network
- g. to improve safety

1.4 Purpose and objectives of the document

1.4.1 This CoCP forms part of the DCO application. Together with the Register of Environmental Actions and Commitments (REAC) in Section 7, this document sets out a framework for how the mitigation and management of environmental effects will be delivered and maintained. As explained further below, the document has been produced in accordance with the Design Manual for Roads and Bridges (LA120). The CoCP is the “first iteration” of the Environmental Management Plan.

1.4.2 The s CoCP and REAC are proposed to be appendices to the ES. Following the grant of the DCO, the CoCP and REAC will provide control over site activities. As explained further in Section 2.56 of this document, the Environmental Management Plan (Second Iteration) (EMP2) must be substantially in accordance with this CoCP and must reflect the mitigation measures set out in the REAC. No part of the authorised development can commence until the EMP2 has been approved by the Secretary of State (SoS) for that part. There is an exception to this for certain specified pre-commencement activities, as set out in the DCO and the pre-commencement section of this document (Chapter 3).

1.4.3 Highways England, being the party in whom the powers of the DCO are vested, is responsible for the delivery of the Project. Highways England is responsible for all the works, which includes overseeing and assuring the Contractors.

- 1.4.4 The Contractors, including those carrying out the utilities works, will comply with applicable environmental legislation at the time of construction, together with any additional environmental controls required under the DCO, including those relevant commitments set out in this CoCP and REAC. The requirement for the Contractors to comply with these measures will be embedded within their contract for the Project.
- 1.4.5 The purpose and objectives of this CoCP are to provide clear and concise information which states how the mitigation and management of environmental effects will be delivered and maintained during the construction and operational phases of the Project.
- 1.4.6 An Environmental Impact Assessment (EIA) is being undertaken for the Project, and an Environmental Statement (REF TBC) is being prepared in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 ('the EIA Regulations'). The ES reports the findings of the EIA, which will determine the likely significant environmental effects of the construction and operation of the Project. The EIA process has iteratively informed the design development of the Project and the ES will set out the proposed mitigation measures that are needed to avoid, reduce or remediate potential impacts of the Project on the environment.
- 1.4.7 The CoCP and REAC will be provided to Contractors and will be binding upon them. The REAC brings together into one document the good practice and essential mitigation commitments relied on in the ES (REF TBC) and other DCO Application Documents.
- 1.4.8 In this context, good practice means standard and appropriate approaches and actions commonly used on infrastructure development projects to avoid or reduce environmental impacts, typically applicable across the whole Project. Essential mitigation means any additional Project-specific measures needed to avoid, reduce or offset potential impacts that could otherwise result in effects considered significant in the context of the EIA Regulations. These are in addition to the embedded mitigation measures and design controls that form part of the Project design, which are secured by the Design Principles, and the Environmental Masterplan (Figure 2.4, (REF TBC)).
- 1.4.9 Additionally, the CoCP and the REAC contains commitments developed in consultation with relevant stakeholders.
- 1.4.10 The Project is committed to avoiding, reducing or compensating for, as far as reasonably practicable, the adverse effects of the construction and operational activities of the Project upon people, businesses and the natural and historic environment.
- 1.4.11 The latest standard for Environmental Management Plans on Highways England projects, Design Manual for Roads and Bridges LA 120 (Highways England, 2020) applies to the first, second and third iterations of the EMP. Table 1.1 shows how these named environmental management plan documents relate to one another through the Project stages.

Table 1.1 Document relationships through the Project stages

Project stage	Common terminology for plans	Highways England, Design Manual for Roads and Bridges (DMRB) LA 120	Description	Terminology used in this document
Design	Code of Construction Practice (CoCP) or Outline Environmental Management Plan (OEMP)	First iteration of EMP	Produced during the design stage for the preferred route option.	CoCP
Construction	Construction Environmental Management Plan (CEMP)	Second iteration of EMP	Refined during the construction stage for the consented Project, in advance of construction.	EMP2
End of construction	Handover Environmental Management Plan (HEMP)	Third iteration of EMP	Building on the construction EMP refined at the end of the construction stage to support future management and operation.	EMP3

1.4.12 This document should be read in conjunction with DMRB LA 120 – Environmental Management Plans (Highways England, 2020), and the 'Highways England Strategic Road Network Concept of Operations' (Highways England, 2015) which covers Highways England's ten main operating principles of operation.

1.5 Structure of the CoCP

1.5.1 Chapters 1-6 provide a general overview and approach to the management of environmental impacts from the construction of the Project.

Chapter 1: Introduction

Chapter 2: General environmental management principles

Chapter 3: Pre-commencement

Chapter 4: Construction

Chapter 5: Communication and community liaison

Chapter 6: General construction and site management

- 1.5.2 These are followed by Chapter 7, the REAC. The REAC presents the good practice and essential mitigation commitments identified in the ES by environmental topic (or 'factor', as defined in DMRB LA 104 Environmental Assessment and Monitoring (Highways England, 2020)) as follows:
- a. Air quality
 - b. Cultural heritage
 - c. Landscape
 - d. Terrestrial biodiversity
 - e. Marine biodiversity
 - f. Geology and soils
 - g. Material assets and waste
 - h. Noise and vibration
 - i. Population and human health
 - j. Road drainage and the water environment
 - k. Climate
- 1.5.3 Additionally, the REAC contains mitigation measures identified in the Habitats Regulations Assessment Stage 1 & 2 (REF TBC) and Appendix 14.7: Water Framework Directive (REF TBC).

2 General environmental management principles

2.1 Procedures for the approval of EMP2

- 2.1.1 Requirement 4 in Schedule 2 (Part 1) of the DCO states that no part of the authorised development (the Project) is to commence until an EMP2 in accordance with this CoCP has been submitted to and approved in writing by the SoS following consultation with the relevant planning authority to the extent that it relates to the matters relevant to its function. There is an exception to this for certain specified pre-commencement activities, as set out in article 2 of the DCO.
- 2.1.2 Schedule 2 (Part 2) of the DCO identifies the formal procedure in relation to obtaining approvals from the SoS for those requirements in Schedule 2 (Part 1) of the DCO that require this approval. The requirements identify where consultation is required in advance of submission to the SoS, and also where consents, agreements and approvals are required from a body or individual other than the SoS, e.g. from the local planning authority.
- 2.1.3 Where the DCO Schedule 2 requirement identifies that consultation is required, the Contractor will provide a draft submission of the material to the identified consultee in advance of the submission. Consultees will be asked to provide comments in writing on the draft document unless otherwise agreed with the consultees. Any feedback received shall be considered in finalising documentation. Representations received from consultees will be provided to the SoS.

2.2 Environmental management systems

- 2.2.1 Highways England is developing and will operate an Environmental Management System (EMS) aligned to and capable of certification to ISO 14001:2015. The EMS will be part of the Integrated Management System (IMS). The Lower Thames Crossing EMS will describe the Project process to assure the delivery of the commitments in the REAC during the delivery of the programme. The Contractors will develop an EMS relevant to their scope of works on the Project.
- 2.2.2 The Contractors' EMSs will be approved by a UKAS accredited certification body to ISO14001:2015. It will establish procedures setting out, including:
- a. All relevant environmental aspects of the work and how they will be managed.
 - b. Staff competence and awareness requirements and how these are achieved and maintained.
 - c. The approach to be implemented in the EMP2 (as defined in paragraph 1.4 above) to plan and monitor compliance with environmental legislation and environmental controls imposed in the DCO including, for the avoidance of doubt, the measures set out in this document and the REAC.

- d. The measures to be taken to address change or non-compliance.
- e. Engagement and consultation with local authorities, other statutory bodies and the local communities.

- 2.2.3 The Contractors' EMSs shall cover the Project activities of all their Sub-Contractors and hauliers. The Contractors will also be required to coordinate with other Main Works Contractors and relevant parties that may affect their works. This will be documented in their EMSs, as appropriate.
- 2.2.4 The Contractors will hold certifications for safety (ISO 45001:2018), environment (ISO 14001:2015), quality (ISO 9001:2015) and these will include procedures for responding to emergency events. Contractors will be required to comply with the law applicable at the time, along with any additional environmental controls imposed in the DCO. For that reason, the statutory requirements are not separately listed within this CoCP.
- 2.2.5 CEEQUAL is an evidence-based sustainability assessment, rating and awards scheme for civil engineering, infrastructure, landscaping and public realm projects. The Contractor will achieve a CEEQUAL 'Very Good' standard by completion of their works and support Highways England in achieving a Project standard of 'Excellent'.

2.3 Environmental management plans

- 2.3.1 The Contractors responsible for the delivery of construction will each be required to develop an EMP2 (as defined in paragraph 1.4 above) specific to their work and in consultation with relevant stakeholders as listed in Table 2.1. The EMP2(s) will be prepared in accordance with this CoCP and will be specific to the location and scope of that part of the works to which the EMP2 relates. The EMP2 will include the implementation of appropriate industry-standard practice and control measures for environmental impacts during the relevant works. As a minimum, in accordance with Requirement 4 of Part 1 of Schedule 2 of the DCO, the EMP2 will be compliant with ISO 14001, be substantially in accordance with this CoCP and reflect the mitigation measures set out in the REAC. The EMP2 will be reviewed regularly and revised as necessary.

Table 2.1 Relevant stakeholders

	Local Planning Authority	Local Highway Authority	Other Body
Brentwood Borough Council	X		
Environment Agency			X
Essex County Council		X	
Gravesham Borough Council	X		
Historic England			X
Kent County Council		X	

	Local Planning Authority	Local Highway Authority	Other Body
London Borough of Havering	X	X	
Medway Council	X	X	
Natural England			X
Thurrock Council	X	X	
Transport for London		X	

- 2.3.2 The EMP2s, developed by the Contractors will set out their procedures for monitoring compliance with the mitigation measures set out in this document and the REAC. The EMP2s will include Contractor roles and responsibilities, together with appropriate control measures, training and briefing procedures, risk assessments, stakeholder engagement and monitoring systems to be employed.
- 2.3.3 The Contractors will produce Site Waste Management Plans, Materials Management Plans (which will be substantially in accordance with the outline Site Waste Management Plan and the Materials Handling Plan respectively) and Noise and Vibration Plans. These plans will form part of the EMP2. There will be additional topic management plans developed for environmental subjects that require further measures and controls to be implemented during the construction phase, and this will include air quality, ecology, soils, contaminated land, substances hazardous to health and pollution prevention controls. Traffic Management Plans will be developed to be substantially in accordance with the Outline Traffic Management Plan for Construction.
- 2.3.4 Once accepted by Highways England, the Contractors' EMP2s and topic management plans will (following the consultation mentioned in section 2.1 above) be submitted to the SoS for approval as per Schedule 2 Part 2 of the Order after consultation with the relevant local authorities and Natural England.
- 2.3.5 During the final stages of the construction phase, the Contractors will each prepare an EMP3 in consultation with relevant stakeholders (on matters relevant to their respective functions only) as listed in Table 2.1, and subject to agreement by Highways England. The information contained within the EMP3 serves to inform the approach to environmental management during the Project's operational phase to be implemented by Highways England. The EMP3 will build on the EMP2 and LEMP and will provide the relevant information on existing and future environmental commitments and objectives that will need to be honoured and ongoing actions and risks that will need to be managed. It will include as-built information and other details in a form that can be utilised by the organisation responsible for long-term operational management. The EMP3 must be developed and completed by the end of the construction, commissioning and handover stage of any part of the authorised development.
- 2.3.6 The, outline Landscape and Ecology Management Plan (oLEMP) outlines the proposed management of the landscape and ecological elements of the the Project. The Design Manual for Roads and Bridges (DMRB) standards GM701 series 3000 and GS 801 Series 3000 establish the general maintenance and

inspection requirements for motorways and all-purpose trunk roads. The oLEMP focuses on the management requirements for the land parcels that perform specific landscape and ecological mitigation functions for the Project. It details the management, regimes, maintenance expectation and monitoring requirements for each of those land parcel typologies. It should be read in conjunction with the Environmental Masterplan (Figure 2.4, (REF TBC)).

- 2.3.7 A final version of the LEMP for the relevant part of the Project will be created by the Contractors for implementation during the establishment period and after the establishment period. The LEMP will be substantially in accordance with this outline LEMP, including the habitat management requirements, targets and prescriptions set out in it. Once accepted by Highways England, the Contractors' LEMP will (following the consultation mentioned in section 2.1 above) be submitted to the SoS for approval as per Schedule 2 of the Order after consultation with the relevant local authorities and Natural England where relevant. As ecological and landscape matters are controlled (including in the operational phase) via the LEMP, they will not form part of the EMP3.

2.4 Considerate Constructors

- 2.4.1 In addition to a comprehensive EMS and EMP2 the Contractors shall sign up to and adhere to the Considerate Constructors Scheme (CCS).
- 2.4.2 The CCS is a national scheme that promotes good practice on construction sites through its codes of considerate practice; these commit registered sites to be considerate and good neighbours, as well as being respectful, environmentally conscious, responsible and accountable.

2.5 Employment and Skills

- 2.5.1 Targets will be set by Highways England in relation to numbers of apprentices, workless job starts (these are new job starts, sustained for at least 12 weeks, where the candidate was previously workless prior to being employed), graduates and traineeships, work placements and training for local residents (individuals supported to attain accredited or non-accredited training relevant to the delivery of the works at no cost to the individual). Employment and Skills Plans will be prepared by Contractors prior to the commencement of their works, setting out how they will contribute to meeting these targets. The Contractor will submit the Employment and Skills Plan will to the Project Skills and Employment Working Group and approved by Highways England.
- 2.5.2 The Project Skills and Employment Working Group will be responsible for ensuring that opportunities are maximised throughout the delivery phase in response to changing local needs and priorities. It will be a key consultee as the Project Employment and Skills Plans are updated on annual basis.
- 2.5.3 The Project Skills and Employment Working Group includes Project representatives and representatives from each local authority.

2.6 Enforcement and control procedures

- 2.6.1 This CoCP is proposed to be a certified document under Schedule 16 of the DCO. Requirement 4 of Schedule 2 (Part 1) of the DCO state that, '*No part of the authorised development is to commence until a EMP (Second Iteration), substantially in accordance with the Code of Construction Practice, for that part has been submitted to an approved in writing by the Secretary of State...*' and '*the EMP (Second Iteration) must ... reflect the mitigation measures set out in the REAC...*'. Requirement 4 further states that, '*The construction of the authorised development must be carried out in accordance with an approved EMP (Second Iteration)*'.
- 2.6.2 As such, Highways England, and Contractors involved with the construction of the Project will be required to comply with the provisions of this CoCP and EMP2. Highways England and Contractors involved with the operation of the Project will be required to comply with the provisions of the EMP3. To ensure that Contractors comply with this CoCP, EMP2 and EMP3, they will be incorporated into their contracts and Highways England will take appropriate action to ensure compliance with those contracts.
- 2.6.3 The Contractors and Highways England will clearly define the roles and responsibilities of key personnel. These will be defined within the EMP2s during the construction phase and the EMP3s during the operational phase. These definitions will need to be submitted for acceptance by Highways England.
- 2.6.4 The EMP2 will set out the arrangements and responsibilities for implementing, monitoring, auditing and enforcing the environmental mitigation set out in this CoCP and REAC.
- 2.6.5 The EMP2 will include details of a monitoring and audit programme to be delivered by the Contractors to confirm compliance with EMP2.
- 2.6.6 Highways England or their representatives will carry out site inspections and audits to verify the Contractors' compliance with EMP2. On request, relevant planning authorities, the Environment Agency and Natural England, will be given access to the results of the site inspections and audits, along with the opportunity to attend and observe Highways England site inspections and audits.
- 2.6.7 Plate 2.1 sets out where the various approvals required, sit within the DCO.

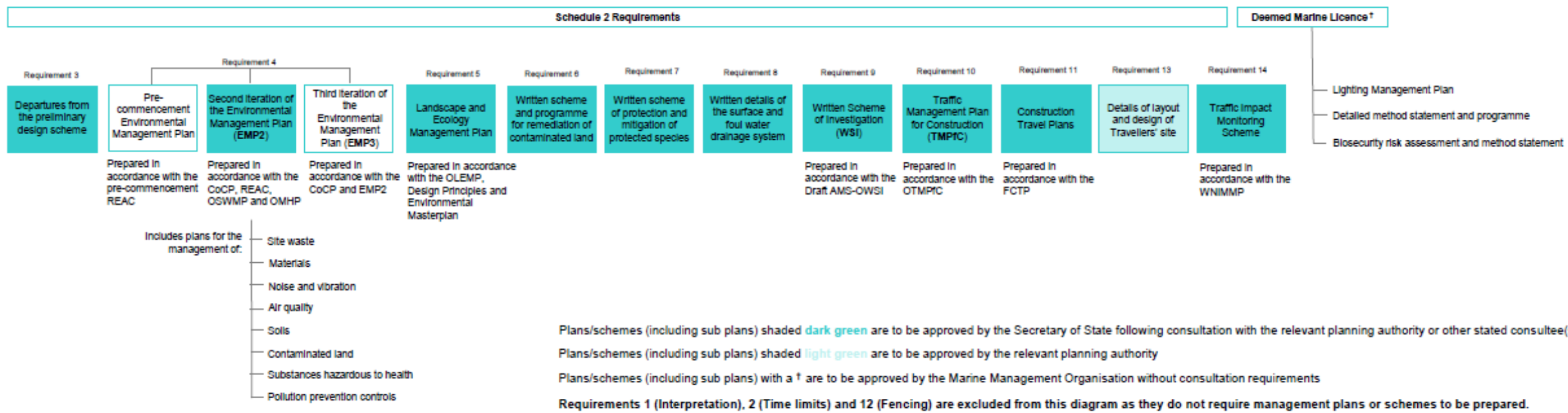
Plate 2.1 Management and Mitigation Plan

Contractors' Environmental Management System

Certified DCO application documents listed in Schedule 16 (e.g. Book of Plans, Environmental Statement, etc.)

- Control documents that provide commitments which are submitted as part of DCO application
- Register of Environmental Actions and Commitments (REAC)
 - Design Principles
 - Environmental Masterplan
 - Code of Construction Practice (CoCP)
 - Outline Site Waste Management Plan (OSWMP)
 - Outline Materials Handling Plan (OMHP)
 - Outline Traffic Management Plan for Construction (OTMPTC)
 - Framework Construction Travel Plan (FCTP)
 - Outline Landscape and Ecology Management Plan (OLEMP)
 - Draft Archaeological Mitigation Strategy – Outline Written Scheme of Investigation (Draft AMS–OWSI)
 - Wider Network Impacts Management and Monitoring Strategy (WNIMMP)

Relationship between management plans and detailed design frameworks and the Schedule 2 Requirements + Deemed Marine Licence (post DCO grant)



Other commitments made outside the Development Consent Order including through additional permits and consents, contractual arrangements and Highways England policies.

3 Pre-commencement

3.1 Pre-commencement activities

- 3.1.1 Pre-commencement is the phase between a DCO being granted and commencement of construction. Article 2 of the draft DCO (REF TBC) is proposed to provide a definition of commencement, but for ease of reference this has been included in Schedule 2 of the DCO. The effect of this definition is that the activities excluded are taken outside the scope of commencement meaning they can be carried out prior to the discharge of the requirements contained in Schedule 2 of the DCO and the approvals required therein.
- 3.1.2 The pre-commencement activities have been identified as activities which may be carried out early in the construction programme and which would have negligible or relatively minor environmental impacts. An analysis of the REAC was carried out, identifying mitigation measures which are relevant and are proposed to apply to these activities. These controls will be in place on the date the DCO comes into force in order to provide comfort that appropriate environmental controls apply to activities which can be carried out prior to the discharge of requirements under the DCO (as per Requirement 4(1) of Schedule 2 to the DCO).
- 3.1.3 The only activities that can take place during “pre-commencement” and their locations are listed in Table 3.1.
- 3.1.4 These activities shall be undertaken in accordance with industry good practice and relevant commitments in the REAC (see
- 3.1.5 Table 3.2 below). Ecology activities will also require protected species licences thereby adding an additional layer of control.

Table 3.1 Pre-commencement activities and locations

Activity	Location
Archaeological investigations as set out in the outline WSI.	Sitewide
Preparation of ecological receiving site for reptiles.	Sitewide
Preparation of ecological receiving site for Great Crested Newts.	Sitewide
Translocation of protected species	Sitewide
Installation of bat boxes and hibernaculum	Sitewide
Installation of dormouse boxes	Sitewide
Installation of artificial badger setts	Sitewide
Installation of bird boxes	Sitewide
Closure of badger setts	Sitewide
Installation of ecological exclusion fencing	Sitewide

Activity	Location
Environmental surveys and monitoring e.g. noise	Sitewide
Investigations for the purpose of assessing and monitoring ground conditions and levels	Sitewide
Erection of temporary means of enclosure	Sitewide
Receipt and erection of plant and equipment	Advance compound areas at CA02 (A2 compound), CA03 (Southern tunnel entrance compound), CA05 (Northern tunnel entrance compound), CA06 (Brentwood Road compound), CA10 (Stifford Clays Road compound East), CA14 (M25 compound) (Book of Plans, (REF TBC))
Diversion and laying of underground apparatus (except and excluded utilities work)	Services to compounds CA02 (A2 compound), CA03 (Southern tunnel entrance compound), CA05 (Northern tunnel entrance compound), CA06 (Brentwood Road compound), CA10 (Stifford Clays Road compound East), CA14 (M25 compound) (Book of Plans, (REF TBC))
Vegetation clearance for ecological mitigation	Sitewide
Temporary display of site notices or information	Sitewide

3.1.6 The REAC has been reviewed to identify environmental commitments relevant to the pre-commencement activities in Table 3.1. These primarily serve to provide for:

- a. Pre-condition surveys
- b. Measures for the protection of ecology, trees and agriculture
- c. Section 61 controls over noise
- d. A measure to protect ongoing site remediation work at a former petrol station near an access point to Compound CA02 (A2 compound)

3.1.7

3.1.8 Table 3.2 lists the commitments in the REAC identified to be relevant to pre-commencement activities.

3.1.9 The commitments in

- 3.1.10 Table 3.2 shall be implemented when carrying out the pre-commencement activities identified in Table 3.1.
- 3.1.11 REAC reference numbers in
- 3.1.12 Table 3.2 correspond to reference numbers and commitments in the REAC in Chapter 7 of this document. The detail of these commitments applicable to the pre-commencement activities is presented in Table 7.2

Table 3.2 REAC commitment references relevant to pre-commencement activities

Topic	REAC Ref No.
Geology and Soils	GS002, GS015, GS030
Landscape	LV028, LV030, LV031, LV033
Noise and vibration	NV002, NV004, NV005, NV007
Terrestrial Biodiversity	TB002, TB003, TB004, TB005, TB006, TB008, TB009, TB010, TB011, TB012, TB013, TB014, TB015, TB016, TB017, TB018, TB020

4 Construction

4.1 Construction of the Project

- 4.1.1 The delivery of the Project has been split into several tranches of contracts in order to best serve the Project's requirements and programme. Highways England's contracting approach is outlined below, along with a brief description of each contract's purpose:
- a. **Tunnels and Approaches Package:** This contract is a design and build contract that will deliver the crossing under the River Thames and the approach ramp on the North side and approach in cutting on the South side. This contract will include the diversion and protection of existing utilities.
 - b. **Roads North of the Thames Contract:** This contract is a design and build contract that will deliver the Project from the proposed Tilbury Viaduct (which commences just south of the Tilbury Loop line) up to the M25. This contract will include the diversion and protection of existing utilities.
 - c. **Kent Roads Contract:** This contract is a design and build contract that will deliver the Project from approximately 100m north of Thong Lane (over the Lower Thames Crossing) to the M2/A2/Lower Thames Crossing junction. This contract will include the diversion and protection of existing utilities.

4.2 Project team roles and responsibilities

- 4.2.1 Highways England is responsible for the delivery of the Project and its implementation (unless the benefit of the Order is transferred under the terms of the Development Consent Order (REF TBC)). However, Highways England will appoint contractors and agents to implement the Project, including a Project Manager/Director as well as additional specialist consultants to supervise, monitor or check the Contractors' environmental procedures. These bodies will take on day-to-day responsibility for managing the commitments in this document.
- 4.2.2 The responsibility of the contractors and agents will be clearly identified within relevant documents and site files, but will be in accordance with the table below. It is anticipated that prior to the commencement of each main phase of the construction programme, individuals will be identified to fulfil the relevant roles
- 4.2.3 Highways England will appoint a suitably qualified and experienced Environmental Manager who will be responsible for monitoring and assuring compliance of the Project's works with all environmental commitments set out in this CoCP, other Project documentation and relevant environmental legislation.
- 4.2.4 A management structure that includes an organisational chart encompassing all staff responsible for environmental work will be included within all EMP2s. This will set out the respective roles and responsibilities with regard to the environment and identify the nominated Contractor Construction Environmental Manager. The envisaged key roles and responsibilities are set out in Table 4.1.

- 4.2.5 The Contractor Construction Environmental Manager will be supported by other specialists as necessary (including noise and vibration, air quality, geo-environmental, landscape, ecological, arboricultural and archaeological specialists).

Table 4.1 Envisaged roles and responsibilities for the Project construction phase

Role	Main environmental responsibility
Highways England Project Director	To collate and provide Project information to prospective Contractors. Overseeing implementation of the whole Project and the individuals undertaking specific roles and duties. To be accountable for delivery of contract requirements and the Environmental Management System for the Project.
Highways England Environmental Manager	<p>General responsibilities for the Highways England Environmental Manager include:</p> <ul style="list-style-type: none"> • Monitoring and assuring compliance of the Project's works with all environmental commitments set out in this CoCP, other Project documentation and relevant environmental legislation. • Develop and maintain a Project Environmental Management System (EMS) compliant with ISO 14001:2015. • Integrate with the Quality and Health, Safety, Security and Welfare (HSSW) team for a joint assurance focus. • Support and incorporate the digital strategy. • Own environmental audit and inspection programme based on risk and opportunities including undertaking assurance activities. • Co-ordinate a joint up approach to environmental management and continual improvement across the Project, including Contractors. • Monitor environmental complaints and their investigation and resolution. • Report on Contractors' environmental performance. • Support development of scope of works to incorporate environmental management requirements suitable for delivery and integration of potential works interfaces. • Lead on developing appropriate and effective environmental processes to ensure compliance and stimulate high environmental performance. • To consider project legacy and in all decision making in the same way as cost, risk and time. • Encourage innovative thinking and Contractors' initiatives which deliver and improve the Projects legacy benefits. • To hold HSSW as a key project value and to participate in the creation, development and implementation of HSSW strategies by the project leadership team.
Highways England Traffic Manager	<p>General responsibilities for the Highways England Traffic Manager include:</p> <ul style="list-style-type: none"> • Ensure that any traffic management required by the project is planned, delivered, and managed collaboratively. Ensuring that the commitments of the TMP to are adhered to, with a specific focus on: • Planning & Delivery • Network Occupancy

Role	Main environmental responsibility
	<ul style="list-style-type: none"> • Delivering Safely • Operations • Ensure that standards and best practices are applied in the planning and delivery of Traffic Management • Establish and chair the Traffic Management Forums ensuring that all affected stakeholders are invited to attend • Attend Traffic Management Clinic's and other third party established traffic management meetings (i.e. Kent Corridor Coordination Group) • Review feedback from Local Highway Authorities in terms of planned traffic management as well as the performance of key traffic management phases • Receive data from the main works contractors as to the performance of traffic management in terms of the impact on the strategic road network and local authority roads • Represent the Traffic Management Forum at the Joint Operations Forum to report on traffic management performance and to escalate issues of concern raised by stakeholders • Review the performance of incident management that occurs within the designated "Works Zone" as set out in a TMP and any relevant DLOAs • Act as the interface between the Community Liaison Team and Travel Plan Liaison Group • Generally, oversee the performance of the wider LTC construction network in terms of the coordination, planning and delivery of traffic management on the SRN and Local Road Network
Contractor Project Director	Responsible for management of the delivery of the construction phase related to their works package/contract. Has overall responsibility for the environmental performance of the Construction phase related to their works package/contract. Regularly communicates with Highways England and the relevant statutory environmental bodies on all environmental matters as they arise. Implements the measures set out in the CoCP and REAC.
Contractor Construction Environmental Manager	<p>General responsibilities for the Construction Environmental Manager include:</p> <ul style="list-style-type: none"> • Ongoing liaison with the Contractor's site management team and general site workforce. • Ensuring compliance with environmental legislation, consents, objectives, targets and other environmental commitments, including those arising from the ES. • Maintenance of the environmental documentation and ensuring compliance with ISO 14001:2015 including updates. • Management and coordination of environmental specialists and monitoring compliance of construction activities in line with the Environmental Management Plans and the relevant environmental legislation/ licences. • Acting as the focal point for all environmental matters onsite. • Liaising with the local authority archaeology advisors as well as statutory bodies such as Historic England.

Role	Main environmental responsibility
	<ul style="list-style-type: none"> • Liaising with the local authorities and statutory bodies. • Liaising with Highways England Operations Division. • Reviewing and developing the Environmental Management Plans throughout the duration of the construction phase. • Liaising with the statutory environmental bodies/ consultees. • Accompanying statutory environmental bodies/consultees on site visits. • Compiling applications for unexpected authorisations where required. • Leading investigations into environmental incidents. • Identification of key environmental concerns onsite as the construction phase develops. • Assisting with the delivery of environmental training to the workforce. • Assisting in the review of method statements. • Assessing and checking ongoing monitoring and survey results and updating relevant databases or management plans with any new information. • Identifying cost savings and best practice activities.
Contractor Environmental Clerk of Works	<p>General responsibilities for the Contractor Environmental Clerk of Works include:</p> <ul style="list-style-type: none"> • Providing daily updates to the Environmental Manager on site progress, compliance, issues, problems, successes. • Ongoing liaison with the Contractor's site management team and general site workforce. • Supporting the Project team in delivering the environmental components of the works during the construction phase. • Delivering environmental training to the workforce. • Recording the progress of the environmental works. • Monitoring and supervising construction activities in relation to environmental aspects. • Walkover of activities on the site and ongoing monitoring of the works area to ensure compliance with key environmental legislation and Environmental Management Plans. • Assisting in the review of method statements. • Identification of key environmental concerns onsite as the construction phase develops. • Instruction and confirmation of key requirements of each section to site personnel as the job progresses. • Monitoring and updating Environmental Manager on the progress of pre-construction surveys. • Assisting in monthly formal audits with Environmental Manager. • Assessing and checking survey results and updating databases and Environmental Management Plans with new information. • Identification of cost savings and best practice activities. • Immediate reporting of incidents to the Safety, Health and Environment department.

Role	Main environmental responsibility
	<ul style="list-style-type: none"> • Supporting the Environmental Manager in liaison with the statutory environmental bodies/consultees. • Accompanying statutory environmental bodies/consultees on site visits.
Environmental Specialists	<p>The Environmental Manager and Clerk of Works will require ongoing support from several specialists including but not limited to archaeologists, landscape designers, ecologists, geotechnical engineers and hydrogeologists.</p> <p>Specialists would be responsible for undertaking activities such as pre-construction surveys, watching briefs and advising on specific issues as and when they arise throughout the construction phase e.g. choice of materials and methodology.</p>
Contractor Consents Manager	<p>General responsibilities for the Contractor Consents Manager include:</p> <ul style="list-style-type: none"> • Preparing, implementing, maintaining and updating the Consents Management Plan and Consents Register(s). • Providing the main point of contact for all consents matters and co-operates with Highways England in all matters relating to Consents Applications, notifications and compliance. • Facilitating the provision of drawings and other design or Project information required for the preparation and submission of Consent Application(s). • Managing and monitoring the status of all Consents requirements such that the works or any part of the works for which Consents are required are not commenced until Consent is granted, notification given, and relevant conditions are complied with. • Monitoring compliance with Consents throughout the works to ensure the Consents are complied with and discharged. • Liaising with third-parties, Stakeholders and Highways England including arranging and attending liaison meetings or telephone calls as necessary as well as attending regular or standing meetings (or in both cases arranging for a deputy to attend, as agreed with Highways England from time to time). • Maintaining, managing and updating the Consents Registering and minuting all meetings and calls. • Notifying Highways England as soon as reasonably practicable of a breach of Consent(s) or a potential breach or dispute with a third party, or any situation where the Contractors consider that the third party is not facilitating the smooth progress of Consents.

4.3 Interface management of construction works

4.3.1 It is anticipated that the construction works will be split into three packages across the Project (as described in 4.1.1) to enable appropriate management. Some of these packages will proceed concurrently with ongoing construction activities in either the same or different locations under the control of other Contractors.

4.3.2 Therefore, activities by other Contractors will require coordination to manage this interface efficiently and maximise opportunities for reducing the overall

impact on the surrounding communities and environment. Contractors will work with Highways England in managing these interfaces. The outline Traffic Management Plan for Construction (oTMPfC) includes the appointment of a Highways England Traffic Manager for the entire Project network, their role would include the oversight of the various programmes so as to minimise the impacts on stakeholders

- 4.3.3 To facilitate this interface, Highways England will establish and chair a Joint Operations Forum (JOF), attended by senior representatives from the Contractors. The forum will meet regularly to discuss the interface between the Contractors areas of influence. There will be two-way communication between the JOF the Project's community liaison team and Traffic Manager, to ensure relevant information is shared, and when required lead on matters requiring action Section 5 provides more information on the Project's community liaison arrangements.
- 4.3.4 The JOF will be required to coordinate several activities as well as the potential interaction with other schemes and external stakeholders. Some of the key coordination responsibilities will include the following as appropriate:
- a. Coordination of delivery to ensure mitigation and management of environmental effects will be delivered and maintained. This shall include the coordination and implementation of ecological mitigation.
 - b. Emergency response – maintaining communication and holding meetings with emergency services and other key stakeholders and ensuring that emergency response plans employed by the Contractors are coordinated (see also Section 6.9 and Section 6.10).
 - c. Coordination of construction phasing and logistics – working collaboratively to ensure that all Contractors' construction programmes are aligned.
 - d. Traffic management – in conjunction with the Traffic Management Forum as detailed in the oTMPfC, working collaboratively to ensure appropriate planning and coordination of traffic management measures required for the Project construction works packages, and other schemes, have taken place to avoid potential conflicts and minimise disruption to road users.
 - e. Access to the sites – communication and collaboration in respect of logistics planning including arrangements for site access and abnormal loads with highway authorities and emergency services.
 - f. Construction workforce – monitoring the impact of the workforce on the community in its travel to and from work and its use of temporary accommodation.
 - g. Interface with other schemes – maintaining communication between the works on the Project and those of other relevant schemes in the area to help minimise the disruption on local communities.

- h. Construction (Design & Management) Regulations 2015 (CDM) – Coordination and communication between Principal Designers and Principal Contractors to ensure discussion activities take place between the Contractors to deliver a consistent approach across the Project, reduce risk, share lessons learnt and agree commonality through design. Legal obligation to ensure there is cooperation and communication between Principal Contractors and Principal Designers.
- i. To ensure construction phasing plans have been made available to the relevant Local Authorities for information, prior to works commencing in that phase.

4.4 Consents and permissions

- 4.4.1 A number of consents will be sought within the DCO and in addition, there will be further permission and consenting requirements. The Project's approach to consents and permissions is detailed within the Consents and Agreements Position Statement (REF TBC).
- 4.4.2 The intent of the Planning Act 2008 and Government policy is to enable development and construction-related consents to be included within the DCO. Therefore, where possible and practicable, additional consents have been included within the DCO. This would minimise the need for any further approvals before the works covered by the DCO can commence, as most of the consents required for construction would be in place at the point at which the DCO is granted.
- 4.4.3 The Project has been, and will continue to be, developed based on strong collaboration between its stakeholders, and any additional consents and agreements will be secured at relevant stages of the Project's development as necessary.
- 4.4.4 A summary of those consents and permissions that may be required and are not provided for in the DCO is listed in Table 4.2. Further information can be found in the Consents and Agreements Position Statement (REF TBC).

Table 4.2 Consents and permits that may be required

Issue	Consent/licence/agreement and legislation	Consenting authority	Requirement
Installation operation/plant operation/solvent emissions activities	Regulation 12 of the Environmental Permit under the Environmental Permitting (England and Wales) Regulations 2016 (as amended)	Environment Agency	<p>Multiple permits are likely to be required for construction activities, e.g. storage and treatment activities such as materials crushing, concrete / bitumen plants, remediation plant, transfer stations, short-term (less than three years) material storage.</p> <p>Locations where such permits would be required are construction compounds. During construction, construction compounds would be located along the Project route. Larger compounds would be required at the North and South Portals to allow for tunnelling operations and materials management.</p>
Water abstraction and impoundment	Water Abstraction: Licence under sections 24 and 25 of the Water Resources Act 1991 (restrictions on abstraction and impounding; restrictions on impounding)	Environment Agency	<p>Permits are likely to be required for construction activities, e.g. water abstraction for concrete processing; impoundment requiring changes to existing assets.</p> <p>Locations where such permits would be required are construction compounds. During construction, construction compounds would be located along the Project route. Larger compounds would be required at the North and South Portals to allow for tunnelling operations and materials management.</p>
Environmental permit (water discharge and/or groundwater activity)	Regulation 12 of the Environmental Permitting (England and Wales) Regulations 2016 (as amended)	Environment Agency	Permits will be required for dewatering, discharges to surface or groundwater from construction and operational activities.

Issue	Consent/licence/agreement and legislation	Consenting authority	Requirement
			<p>At the Northern Portal construction compound, a permit will be required for dewatering and discharge of groundwater, as well as for discharging surface water runoff due to the large surface area of the compound. At the South Portal, a permit will be required for discharge of surface water runoff from the construction compound due to its large surface area.</p> <p>Additional permits may be required for discharge of foul water to the sewage network under consent of the relevant utilities company. '</p>
European Protected Species licensing	Conservation of Habitats and Species Regulations 2017	Natural England	Required for the translocation of species in the Order Limits prior to the commencement of construction.
Water Voles	Schedule 5 of the Wildlife and Countryside Act (as amended)	Natural England	Required for the translocation of species in the order limits prior to the commencement of construction.
Badger licence	Protection of Badgers Act 1992 (section 10(1)(d))	Natural England	Badger setts have been identified within the Order Limits and it may be necessary to undertake the closure and removal of confirmed badger setts during the scheme construction. This consent is therefore likely to be required prior to commencement of construction activities.
Noise, vibration and environmental impact of construction works	Section 61 consent under the Control of Pollution Act 1974	Local authority	For construction works and associated operations to approve mitigation approach for potential disruption and impacts
Self-Service Marine Licence	Marine and Coastal Access Act 2009	Marine Management Organisation	For works that may be undertaken in the River Thames, or on the foreshore, that are not addressed through provisions made in the Deemed Marine Licence,

Issue	Consent/licence/agreement and legislation	Consenting authority	Requirement
			a Self-Service Marine Licence would be required in addition to the Deemed Marine Licence. Such works would include: reprofiling, moving material, specific construction activities, maintenance, dredging, and the deposit or removal of any substance or object.
Crane Oversail Licence	Highway Act 1980 (section 177 and 178)	Local authority	For construction works such as structural elements of the road scheme (e.g. bridges)
Mobile phone masts	Town and Country Planning Act 1990	Local authority	To increase the capacity of mobile networks at work sites.
Temporary use of common land during the construction period	Section 38 Commons Act 2006	Local authority	Highways England is proceeding on the basis that a separate consent under section 38 of the commons Act 2006 will be required for the proposed temporary use of, and construction activities on, parts of Tilbury Green and Walton Common.
Temporary hoarding and scaffolding over existing roads	Highways Act 1980 Sections 169(1), 172(1), and 173	Local authority	Setting up compounds adjacent to roads. Demolition, repairs or protective works to buildings adjacent to roads.

4.5 Environmental asset data and as-built drawings

- 4.5.1 The environmental features of the Project are shown on the Environmental Constraints Plans (REF TBC).
- 4.5.2 Surveys for the following species have been undertaken to inform the ES and subsequent delivery and management of mitigation measures identified in the REAC to control environmental effects:
- a. Bats
 - b. Otters
 - c. Dormice
 - d. Great crested newts
 - e. Water voles

- f. Common reptiles (grass snake, adder, common lizard, slow worm)
- g. Breeding birds
- h. Wintering and 'on passage' wetland bird surveys
- i. Barn owls (targeted surveys)
- j. Invertebrates (terrestrial, aquatic and benthic – including tentacled lagoon worm)
- k. Badgers
- l. Species listed in accordance with the requirements of 6 (specifically harvest mice and brown hares)
- m. Marine mammals and eels (incidental observations only)

4.5.3 Species' surveys for the above have been carried out and will be presented as part of our DCO application.

4.5.4 Cultural heritage surveys were undertaken to inform the ES, including:

- a. Cultural heritage desk-based surveys
- b. Geophysical surveys
- c. Archaeological trial trenching
- d. Historic buildings assessment

4.5.5 Cultural heritage surveys have been carried out and will be presented in our DCO application. Environmental asset data and as-built drawings would be required for the operation of the Lower Thames Crossing.

4.5.6 The submission arrangements for providing as-built drawings and environmental asset data to Highways England are:

- a. The Contractor issues an electronic copy of all as-built drawings and environmental asset data to Highways England in a format agreed by Highways England and compiles and maintains a register of the date and contents of the drawings and data submitted.
- b. Arrangement for the provision of information to the subsequent asset owner stakeholders, including local authorities detailed in Highways England DMRB GG182 Major Schemes: Enabling handover into operation and maintenance (Highways England 2020).

4.6 Protection of existing infrastructure and buildings

4.6.1 Powers related to the protection of existing infrastructure and buildings are included in the DCO.

- 4.6.2 The Contractors will take measures, including the carrying out of surveys, investigations, obtaining consents and agreements, to protect existing buildings and infrastructure in consultation with the appropriate statutory undertakers and stakeholders. The Contractors will undertake the design and implementation of any repairs, strengthening, modifications (temporary or permanent) required.

5 Communication and community engagement

5.1 Communication and community engagement

5.1.1 Highways England will develop a Communications and Engagement Strategy (CES) that outlines the objectives and processes for engagement and communications with all stakeholders. The Contractors will each develop a Communications and Engagement Plan (CEP) in support of the CES that will ensure that stakeholders are informed of the works activities and to maintain good relationships with other parties.

5.2 Communications and Engagement Plan

5.2.1 The Contractors' CEP will be submitted to Highways England for review and will include:

- a. The Contractors' processes and procedures that demonstrate how they will meet the requirements of scope of works and Highways England's CES.
- b. How the Contractor will distribute communications to stakeholders, local authorities, local residents and communities.
- c. How any communication specific commitments within in the DCO will be discharged.
- d. The roles, responsibilities and contact information for the Contractor's staff involved in delivering the CEP.
- e. A programme of initial communication activities with stakeholders and communities.
- f. Key messages, communication channels and target audiences.
- g. Reporting metrics to be used to monitor and report on communications performance.

5.2.2 The CEP will be submitted for acceptance by Highways England, following consultation with the local planning authorities. The CEP will be provided to the relevant local authority before the authorised development is commenced. Experienced community relations personnel/community liaison officers will implement the plan, provide appropriate information and provide support to the Contractors to resolve community issues.

5.2.3 Communication with local authorities, including parish councillors and the Project's 'neighbours', will be undertaken throughout the construction phase, through Community Liaison Groups and Traffic Management Forum (as detailed in the oTMPfC). The Contractors will engage with the local community, particularly focusing on those who may be impacted by construction, including local residents, businesses, landowners and the specific needs of protected groups (as defined in the Equality Act 2010).

- 5.2.4 The Project will provide information and feedback and respond to stakeholders and affected communities regarding upcoming construction activities.
- 5.2.5 The CEP will provide a detailed programme of community engagement, setting out how relevant planning authorities, communities, stakeholders and affected parties will be engaged with throughout the construction period. It will specify stakeholders, communities and affected parties (such as schools, places of worship, businesses and environmental organisations) and for each group, identify the proposed methods and likely timing of consultation for each key stage of work. Such methods may cover, but are not limited to, community drop-in sessions, one-on-one meetings with key stakeholders as relevant, newsletters and leaflet drops (explaining forthcoming works).
- 5.2.6 Other information to be described within the CEP includes:
- a. Details of the enquiries and complaints procedure including information on the helpline and email addresses available for stakeholders to contact Highways England directly.
 - b. Details of how the needs of vulnerable groups will be met in terms of use of accessible media and appropriate formats for the visually impaired.
 - c. A detailed programme of community involvement through volunteering and educational activity (including Science Technology Engineering and Maths (STEM) programmes with local schools, colleges, and apprenticeship opportunities).
 - d. In consultation with the relevant local authorities the Project will establish and maintain Community Liaison Groups (CLGs) in those communities likely to be most impacted by construction activities. The CEP will identify in which communities it will be appropriate to establish a CLG, in advance of construction commencing. The CEP will set out the process by which CLGs will be established and administered together with an initial schedule of planned meetings according to key work stages. CLGs will meet regularly before and during the construction period.

Community helpline, enquiries and complaints procedure

- 5.2.7 The Highways England Customer Contact Centre will be used to deal with enquiries and complaints from the public. This consists of a phone line, email and website contact facility. The information line is staffed by Highways England 24 hours a day, seven days a week. The relevant contact number, email and website addresses for the Highways England Customer Contact Centre will be displayed on signs around the construction site in locations easily accessible to the public. The Highways England Customer Contact Centre will provide a response to enquiries and complaints within 10 working days.

- 5.2.8 The procedure, which is already in place as a standard Highways England process, will:
- a. Log enquiries and complaints in a register.
 - b. Deal with enquiries and complaints appropriately, recognising that they may be due to the effect of construction works on people, their properties and other interests.
 - c. Direct the enquiry or complaint to the correct person for review and appropriate action if the person recording it cannot do so.
 - d. Take appropriate action and respond to enquiries or complaints.
 - e. Outline the process for Highways England to review enquiries and complaints regularly to assess the adequacy, efficiency and effectiveness of the enquiries and complaints system and procedure, and the measures being taken to respond to any enquiries or complaints, and close out on resolution.
 - f. Identify clusters of enquiries and complaints by location and topic for further consideration by Highways England.
- 5.2.9 The extent of the action taken will depend on the nature of the enquiry or complaint. All complaints will be investigated to establish the cause of the complaint and whether the works or issue complained about comply with the Project's environmental requirements and other relevant requirements such as legislation, standards and codes of practice.

Community Liaison Groups

- 5.2.10 The proposed CLGs will be open to attendance from the local community. Attendance and membership will be publicised in the local areas using traditional and digital media. Where possible, local community leaders will be identified so that they are involved in the process of agreeing how community engagement will be undertaken in their area.
- 5.2.11 The scope of the CLGs will be to ensure that local residents are appropriately informed and therefore prepared for forthcoming changes and construction activities.
- 5.2.12 Terms of Reference, such as frequency of meetings, for the CLGs will be developed with the participants and agreed in advance of construction commencing. It is anticipated that the Terms of Reference will then evolve as the Project progresses.
- 5.2.13 The Local Community Leaders of the CLGs will be invited to the Traffic Management Forum.

5.3 Notice of work

- 5.3.1 Contractors will notify occupiers of nearby properties in advance of works taking place, if there is a possibility of them being impacted, taking account of the type and duration of the activity. This notification will be undertaken in accordance with the CEP (see 5.2). Such notices would be in addition to notices required under the temporary possession articles of the Development Consent Order.
- 5.3.2 At least two weeks before such works are carried out, the Contractors will distribute information sheets relating to the programmed activities. The information sheets will detail the expected disruptions and measures being taken to avoid, minimise or mitigate the adverse impacts of these works. There may be circumstances where for example, emergency works need to be carried out and notification may not meet the timeframe.

6 General construction site management

6.1 Construction logistics

- 6.1.1 The Contractors will produce Construction Logistics Plans and will be required to implement directly and through their Sub-Contractors and suppliers, the following standards:
- a. Construction Logistics Community Safety (CLOCS) – A national standard of planning the supply routing and management of sites to reduce risk to vulnerable road users.
 - b. Freight Operator Recognition Scheme (FORS) (Silver or above) – A national standard of managing vehicle fleets and driver training to reduce risk to vulnerable road users.
 - c. Driving for Better Business – A national standard of reducing risk to professional drivers.
- 6.1.2 The Contractors will inform Highways England what their strategy is for implementing FORS silver or above. Abnormal loads and transport movements from a European origin will be exempt.
- 6.1.3 All Contractors will have and maintain CLOCS champions throughout the programme.
- 6.1.4 The Contractors will investigate the use of multimodal transport including use of the river Thames via port facilities adjacent to the Project Order limits – this point is expanded upon in the outline Materials Handling Plan. Contractors will be required to consider the impact of any multimodal transport options on the wider road network and environment, and demonstrate the decision process used to select transport options.
- 6.1.5 Contractors will be encouraged to optimise the use of autonomous plant and equipment and a modernised fleet.

6.2 Traffic management

- 6.2.1 An outline Traffic Management Plan for Construction (oTMPfc) has been produced to provide outline concepts and principles that will be applied for the design and management of construction traffic management and transport logistics for the Project. This outline document provides a framework for discussion purposes with relevant authorities.
- 6.2.2 As required by Requirement 10 of Part 1 of Schedule 2 of the DCO, the Contractors will be required to produce Traffic Management Plans for construction before commencing works. The Traffic Management Plans must be substantially in accordance with the outline traffic management plan for construction. Traffic management for construction will be dealt with via that document. The Traffic Management Plans will focus on:
- a. Strategic road network traffic management including lane closures speed control and temporary road closures and diversions.

- b. Local road network, including temporary contraflows, road closures, diversions both on-line and off-line and weekend closures.
- c. Traffic management within the worksite, such as traffic routes and workforce pedestrian management, strategic and local road networks due to the different highway authorities.
- d. Management of construction traffic impacts on other road users, including both motorised and non-motorised road users.

6.3 Journey planning

- 6.3.1 A Framework Construction Travel Plan (FCTP) has been produced to provide a framework with regards to the implementation of travel planning for the movement of personnel to and from the construction areas and compounds during the construction phase of the Project. The key aim of the FCTP is to minimise adverse local disruption or traffic impacts on the highway network from worker and visitor travel to and from construction areas and compounds, by reducing the number of single-occupancy vehicle trips and encouraging the uptake of sustainable and active modes of travel.
- 6.3.2 The FCTP sets out guidance for developing Site-Specific Travel Plans (SSTPs) for each construction compound, or compounds where these are closely located with similar levels of accessibility. This includes the Utility Logistic Hubs (ULH) required for Statutory Undertakers to carry out the utility-specific works.
- 6.3.3 The SSTPs will be developed by the contractors as set out in the Requirements and produced following the latest guidance and best practice. The SSTPs will be subject to review (and approval) by the SoS, in consultation with relevant local planning authorities.
- 6.3.4 The FCTP and future SSTPs are designed to incorporate the flexibility needed to respond and adapt to changing conditions over the duration of the Project, and will require a continuous monitoring and review process. Regular employee travel surveys will be undertaken at each site, reviewing targets and indicators as necessary.
- 6.3.5 The SSTPs will adhere to the following principles which provide options to promote sustainable transport:
 - a. Walking and using sustainable forms of transport at sites shall be supported where travel can be completed in a lit highway environment, with footways for pedestrians.
 - b. Parking will be controlled at each compound to ensure demand does not exceed supply.
 - c. Shuttle buses will operate from existing transport hubs on both sides of the Thames. These hubs are currently envisaged as Gravesend (Bus, HS1, National Rail), Grays (Bus, National Rail) and Upminster (Bus, National Rail, London Underground, London Overground). Buses are likely to provide routes to each compound and inter-compound connectivity and will be for Project workforce only.

- 6.3.6 Each SSTP will contain the following:
- a. An assessment of the existing accessibility of the compound
 - b. The sustainable transport principles, as encapsulated above
 - c. Targets for the SSTP, which will be SMART (specific, measurable, attainable, realistic and time-bound)
 - d. Measures, which are targeted to the location to enable the targets to be achieved
 - e. Details of the management of the SSTP, including the appointment of a Travel Plan Coordinator
 - f. Details of a clear monitoring programme which will establish the effectiveness of the SSTP measures against the targets set
 - g. An action plan which provides a programme for the delivery of the measures, setting this out in a clear way

6.4 Working hours

- 6.4.1 The working hours at the worksites will depend on the construction activities. Table 6.1 classifies the normal working hours that will be applied.

Table 6.1 Normal working hours

Classification	Description
Standard working hours 07:00 to 19:00 weekdays 07:00 to 16:00 Saturday Plus, up to one hour before and after for mobilisation (start-up and close down) procedures. Additional repair and maintenance periods (if required): 08:00 to 17:00 Sundays	Mobilisation Period: Daily start-up and close down procedures will include but not be limited to: deliveries, workforce movement to place of work, unloading, site briefings, inspections, refuelling, maintenance and general preparation and housekeeping works. Activities will not include operation of plant or machinery and will be limited to activities that do not cause a significant noise and vibration impact, and disturbance to local residents, schools or businesses. Repair and maintenance activities will comprise general mechanical maintenance to construction machinery and plant such as cranes, excavators, compressors, grouting equipment and dewatering pumps, or as agreed under the Section 61 consent/notice (unless appealed to the Secretary of State).
Tunnelling, below ground shaft works and portals 00:00 to 24:00 Monday - Sunday	At the portals most surface activities will be completed within the standard working hours. However, certain activities will require extended working hours (see Earthworks (extended), below) including major concrete pours, piling/diaphragm wall works, and base slab grouting. For the tunnelling and associated construction activities, the underground work will be undertaken on a continuous 24-hours, seven days a week basis.

Classification	Description
	<p>Underground excavation of the portal structure and the required hoisting and support operations will be undertaken on a 24-hours, seven days a week basis.</p> <p>Additionally, the following will be in operation on a 24-hours, seven days a week basis:</p> <ul style="list-style-type: none"> • Key support activities, such as dewatering and surveying, excavated material handling, slurry treatment plant, pumps, maintenance workshops, general material (tunnel lining segments etc.) supply to tunnelling operations (including cross passages), ventilation fans, cranes, compressors and site security are required for safeguarding the works and will be in operation and maintained on a continuous 24-hours, seven days a week basis. • Onsite factory casting of the tunnel segments and other concrete elements. • Works to distribute tunnel-arising spoil within the confines of CA5 / Northern tunnel entrance, using a conveyor from the separation plant to the initial stockpile on Shed Marsh and from here it will be distributed and spread using standard earthmoving equipment. • Collection (via the Port's private road) of aggregates from the neighbouring Port of Tilbury.
Earthworks (extended) 07:00 to 22:00 Monday to Saturday	Covering, filling and cutting activities, placement of excavated material, including but not limited to onsite bulk movement of materials, excavations and compaction of fill.
Security 00:00 to 24:00 Monday - Sunday	Security personnel and monitoring will be operational on a continuous 24-hours, seven days a week basis.

Anticipated additional working hours

- 6.4.2 In some circumstances, the Contractors will need to undertake work under additional working hours as defined in Table 6.2 below.
- 6.4.3 These works may include those within the existing highway and railway boundaries during night-time, weekends and/or bank holidays. These works would be undertaken at these times for reasons of safety or operational necessity and may involve consecutive nights over weekends.
- 6.4.4 Examples of activities within the existing highway boundaries that may be required during additional working hours include surface tie-ins, installation of signage, technology, implementation of traffic management and road resurfacing.
- 6.4.5 Examples of activities within the existing railway boundaries that may be required during additional working hours include rail cant/roll survey, under-track crossing installation, surface monitoring equipment installation and track maintenance during tunnel boring machine (TBM) crossing.
- 6.4.6 Activities outside normal working hours that could give rise to disturbance will be kept to a reasonably practicable minimum.

Table 6.2 Additional working hours

Classification	Description
Extended working hours 19:00 to 22:00 weekdays	These are intermittent and are required to cover certain construction activities that require more than the standard working hours to be completed. These include, but are not limited to, major concrete pours, and piling/diaphragm wall works.
Overnight working hours 22:00-07:00	Include resurfacing works, tie-in works, bridge beam lifts etc.
Bank Holidays	Online works for highways. Utilities works when services are being cut off.
Specific worksites	<p>Construction works of the tunnel ramps may have to be extended between 19:00 and 22:00 Monday to Friday. Should Port of Tilbury be used to provide materials to the site, vehicles may be used on a 24-hours, seven days a week basis for collections and delivery along Substation Road.</p> <p>Table 6.3 identifies the utilities construction activities and locations which may be undertaken on a 24-hours, seven days a week basis.</p> <p>Table 6.4 identifies the Kent Roads highways construction activities and locations which may be undertaken on a 24-hours, seven days a week basis.</p> <p>Table 6.5 identifies the Roads North of the Thames highways construction activities and locations which may be undertaken on a 24-hours, seven days a week basis.</p>
Out of hours / Possession working	<p>It will be necessary to undertake a number of activities outside of normal working hours. These are required for:</p> <ul style="list-style-type: none"> • Utilisation of periods of low traffic flows for items such as abnormal loads/construction plant delivery, working within the existing highway or footpath boundary, works affecting operation of railways. • Utilisation of periods with low demand or flows for utility diversions. • Ensuring minimum disruption to third parties who may have ongoing operations during the day.
Short notice working	<p>On a major project such as this, there is a potential need for works to be completed or undertaken at short notice, to secure and make safe construction operations.</p> <p>Where a piece of work needs to be undertaken at short notice, the Section 61 dispensation or variation mechanism for these works will be used. Where possible, the dispensation or variation will be sought 48 hours in advance of the works.</p>

Classification	Description
Tidal river working	<p>Certain activities such as surveying, additional GI or supply, construction and removal of temporary works such as discharges must be undertaken according to tidal cycles and may therefore take place any time within a 24 hour period.</p> <p>Supply and construction of permanent works such as discharges must also be undertaken according to tidal cycles and may therefore take place any time within a 24 hour period.</p>

Table 6.3 24/7 construction working locations - Utilities

Proposed 24/7 construction working utilities locations	Feature Crossing
Trenchless installation of the A2 for 2No water pipelines	A2
Trenchless installation of Thong Lane for a gas pipeline	Thong Lane
Erection and removal of OHL equipment	Network Rail Asset
Erection and removal of OHL equipment	A2
Installation of a tunnel as a conduit for a gas pipeline	LTC
Installation of a tunnel as a conduit for a gas pipeline	LTC
Installation of a tunnel as a conduit for a gas pipeline	LTC
Trenchless installation of Thong Lane for a gas pipeline	Thong Lane
Trenchless installation of Thong Lane for a gas pipeline	Thong Lane
Trenchless installation of the London, Tilbury & Southend Line for 2No water pipelines	Network Rail Asset
Trenchless installation of the London, Tilbury & Southend Line for 4No water pipelines	Network Rail Asset
Erection and removal of OHL equipment	Network Rail Asset
Removal of OHL equipment and trenchless installation of the London, Tilbury & Southend Line for electricity networks	Network Rail Asset
Trenchless installation of the London, Tilbury & Southend Line for 2No water pipelines	Network Rail Asset
Estimated 5No. trenchless installations under the A1089 for provision of utilities	A1089
Erection and removal of OHL equipment	A1089
Installation of a tunnel as a conduit for a gas pipeline	A13
Estimated 3No. Trenchless installations under the A13 for provision of utilities	A13
Erection and removal of OHL equipment	A13

Proposed 24/7 construction working utilities locations	Feature Crossing
Estimated 4No. Trenchless installations under the A13 for provision of utilities	A13
Trenchless installation of the A13 for 2No water pipelines	A13
Trenchless installation of the London, Tilbury & Southend Line for installation of electricity networks	Network Rail Asset
Trenchless installation of the London, Tilbury & Southend Line for installation of electricity networks	Network Rail Asset
Trenchless installation of the London, Tilbury & Southend Line for 2No water pipelines	Network Rail Asset
Removal of OHL equipment	M25
Trenchless installation of the M25 for installation of electricity networks	M25
Trenchless installation of the M25 for 2No water pipelines	M25
Estimated 7No. trenchless installations under the M25 for provision of utilities	M25
Trenchless installation of the M25 for gas pipeline	M25
Trenchless installation of the M25 for installation of electricity networks	M25
Trenchless installation of the M25 for installation of electricity networks	M25
Estimated 5No. Trenchless installation of the A127 & M25 for gas pipeline	A127 & M25
Estimated 2No. Trenchless installation of the M25 J29 gyratory	M25 J29
Trenchless installation of the M25 for installation of electricity networks	M25
Trenchless installation of the M25 for gas pipeline	M25

Table 6.4 24 Hour construction working locations - Kent Roads

Activity	Structure ID/Proposed 24/7 construction working highway locations	Location
Bridge Construction	BRN0000019 - LTC southbound to A2 westbound Viaduct	A2
Bridge Construction	BRN0000002 - Thong Lane Over M2 Overbridge - Lifting of bridge beams and tie in of bridge to existing thong lane (north of A2).	A2
Bridge Demolition	BRE0025747 - Existing Thong Lane Over M2 Overbridge	A2
Bridge Demolition	Brewers Rd Existing Bridge Demolition	A2
Bridge Construction	BRN0000001 - Brewers Road Bridge (Lifting of beams)	A2
Highway Tie in works	Thong Lane tie in works	Thong Lane over LTC

Activity	Structure ID/Proposed 24/7 construction working highway locations	Location
Highway Tie In Works	Gravesend East Junction Slips & Marling Cross Widening Works & Henhurst Road	Gravesend East Junction Slips
Highway Tie In Works	A2 tie in works - eastbound tie in	A2
Highway Tie In Works	A2 tie in works - westbound tie in	A2
Highway Tie In Works	A2 tie in works to Brewers Road	A2
Highway Tie In Works	A2 Surfacing works	A2

Table 6.5 24 Hour construction working locations - Roads North of the Thames

Activity	Structure ID/Proposed 24/7 construction working highway locations	Location
Bridge Construction	BRN0000025 - Tilbury Viaduct	Tilbury Loop Rail Line
Bridge Construction	BRN0000042 - A1013 Over the A1089	A1089
Bridge Demolition	BRE0012830 - Existing Bridge Demolition	A1089
Bridge Construction	BRN0000046 - A13WB to LTC northbound viaduct	A1089
Box Jack	BRN0000048 - A13 Over the LTC	LTC Underpasses A13
Box Jack	BRN0000049 - A13 over LTC northbound Slips	LTC Underpasses A13
Bridge Demolition	BRE0000N20 - Existing Rectory Road	Rectory Road over A13
Bridge Construction	BRN0000053 - Proposed Rectory Road Bridge	Rectory Road over A13
Highway Tie In Works	A13 westbound on slip tie in works	A13
Highway Tie In Works	A13 eastbound off slip tie in works	A13
Highway Surfacing	A13 Surfacing works	A13
Highway Technology Installations	A13 Gantry Installations	A13
Highway Tie In Works	A1013 tie in works & surfacing	A13
Highway Tie In Works	A1089 tie in works & surfacing	A1089
Highway Tie In Works	Local road tie in works Green Lane	Green Lane
Highway Tie In Works	Local road tie in works Stifford Clays Rd	Stifford Clays Rd
Highway Tie In Works	Local road tie in works Muckingford Rd	Muckingford Rd

Activity	Structure ID/Proposed 24/7 construction working highway locations	Location
Highway Tie In Works	Local road tie in works Brentwood Rd	Brentwood Rd
Box Jack	BRN0000081 - M25/LTC Junction	LTC Underpasses M25
Bridge Construction	BRN0000082 - Footpath over Upminster Railway	Upminster Railway, East of M25
Bridge Construction	BRN0000088 - Footbridge over the M25	M25
Bridge Construction	BRN0000087 - LTC northbound Collector over Shoeburyness Railway	Shoeburyness Railway/M25
Bridge Construction	BRE0013562 - Works related to BRN0000087	Shoeburyness Railway/M25
Bridge Construction	BRE0013567 -Cobham Hall Viaduct	M25 J29
Bridge Construction	BRN0000089 - Footbridge over A127	A127
Highway Tie In Works	B186 North Road Tie in works/BRN0000073	North Road - B186 Interface LTC
Highway Technology Installations	M25 Gantry Installations	M25
Highway Tie In Works	M25 Widening /Tie in works	M25 General tie-in works, BRN0000084, BRE0013562, BRE0013568, BRN0000086 BRE0013569, BRE0013570 & Various retaining walls

- 6.4.7 Some works, such as utility works, earthworks and ecological works are dependent on agreed outages, weather conditions and seasonal variation. In these circumstances, it may be necessary for the Contractor to seek an extension to the normal working hours. If this is required, consent will be sought from the local authority prior to commencement of the works
- 6.4.8 When working close to live railways, to ensure the safety of construction personnel and railway operations, some activities may be required to be undertaken during closures, known as possessions, of the railway lines.
- 6.4.9 For all works required to be undertaken by the Contractor, an application will be made by the Contractor to the relevant local authority prior to undertaking the works under Section 61 of the Control of Pollution Act 1974 unless appealed. Any variations to the normal working and additional working hours required will be agreed with the relevant local authority and Highways England.

- 6.4.10 In the case of work required in response to an emergency, or overrunning works that if not completed will be unsafe or harmful to the works, staff, public or local environment, the relevant local authority will be informed as soon as reasonably practicable of the reasons for and likely duration of the works.
- 6.4.11 Abnormal loads or those that require a police escort may be delivered outside standard working hours subject to the requirements and approval of the relevant authorities, e.g. delivery of tunnel boring machines, heavy lift crane/equipment, prefabricated bridge beams or heavy plant.

6.5 Construction site layout and good housekeeping

- 6.5.1 The Contractors will plan for construction sites to be organised, having due regard for nearby residential, commercial, environmental and other sensitive receptors, to reduce the likelihood of an environmental incident or nuisance occurring.
- 6.5.2 In addition to the measures in the REAC, the following principles will be implemented subject to local constraints:
- a. Electricity will be used to power up fixed plant and facilities (depending on feasibility and availability of adequate electrical supply).
 - b. Noise-generating activities will be sited away from noise-sensitive receptors where practicable and screened if necessary and practicable to reduce the noise impact.
 - c. Traditional warning alarms for plant will be avoided in favour of less obtrusive alternatives such as white noise alarms or absolute segregation/exclusion, subject to availability and meeting particular safety requirements.
 - d. Use of loudspeakers or loudhailer devices will be avoided except in emergencies.
 - e. Storage facilities, temporary offices, fixed plant, machinery and equipment will be positioned to reduce as far as practicable the environmental impacts, having due regard to the constraints of each site.
 - f. Site accommodation will be located to avoid overlooking residential properties, containing and limiting visual intrusion of construction sites, as far as reasonably practicable.
 - g. Depending on local restrictions, wheel washing facilities will be located at a suitable location within the site so as to prevent mud from being tracked onto nearby roads and, the provision s road sweeping.
 - h. There will be effective preventative pest and vermin control and prompt treatment of any pest and vermin infestation, including arrangements for disposing of food waste or other attractive material. If infestation occurs the Contractors will take immediate action to eliminate the infestation and prevent further occurrence.
 - i. Open fires will be prohibited as part of overall prevention of fire on sites.

- j. General 'good housekeeping' arrangements will ensure the sites are safe, clean and tidy.
- k. Adequate welfare facilities will be provided for all working personnel and visitors.
- l. Smoking areas will be provided at site offices and worksites, equipped with containers for smoking wastes, and located away from site entrances and residential areas.
- m. There will be management of staff congregating outside the sites prior to commencing or leaving work.
- n. Sustainable use of resources on sites, e.g. energy and water, will be encouraged.
- o. The use of sustainable materials will be encouraged and the use of plastics and harmful substances minimised.

6.6 Construction compound

6.6.1 The construction compounds will provide the following typical core facilities, as appropriate, with the type and number of facilities relevant to the number of personnel utilising the compound and associated nearby construction activities:

- a. Appropriate water management
- b. Materials and aggregates storage
- c. Loading and unloading area
- d. Parking for vehicles and bicycles
- e. Plant management
- f. Project offices
- g. Recycling facilities
- h. Refuelling
- i. Security control
- j. Vehicle/wheel wash
- k. Welfare facilities

6.6.2 Construction compounds including below ground construction, viaduct launch sites and tunnels will receive and support specialist plant and equipment, and this will be sited within the compound and specific worksite as required.

- 6.6.3 Project offices, welfare facilities, sleeping accommodation and workshops will be constructed from a mix of single and modular units. Styles and calculations for the number of potential units are to be based on 12m x 3m x 3m units, stacked to minimise surface area taken up at ground level. This includes sleeping accommodation.
- 6.6.4 The Project anticipates units being stacked up to an equivalent maximum height of five units (circa 15m), with potential for viewing areas at the top of some.
- 6.6.5 Site layouts for construction compounds will be made available to the relevant local authority for information, prior to works commencing in that phase.

Sleeping accommodation

- 6.6.6 The size of tunnel indicates that specialist resources will be supporting construction and therefore, temporary sleeping accommodation could be required. The Project currently assumes a provision of temporary sleeping accommodation for up to 480 personnel. All sleeping accommodation will be provided within the CA05 Northern tunnel entrance compound. The locations within CA05 Northern tunnel entrance compound of these accommodation units will be confirmed once the Contractors have been appointed.
- 6.6.7 Access to accommodation and welfare facilities within the compounds will be managed by 24/7 security allowing the movement of workers but ensuring construction vehicle movements are not occurring outside of working hours.
- 6.6.8 Highways England would employ measures to reduce the impact on the local accommodation market and associated social services. Highways England and its contractors would implement travel plans to encourage sustainable travel from home. Highways England would also help workers to find accommodation and is considering an accommodation helpdesk to align need with supply, therefore benefiting local accommodation providers and the local economy.

6.7 Worksite security

- 6.7.1 Construction worksites will be under the control of the Contractors, who have a statutory duty to prevent unauthorised access. The Contractors will carry out site-specific assessments of the security and trespass risk at each site and implement appropriate control measures.
- 6.7.2 The following measures will be used where appropriate by the Contractors to prevent unauthorised access to sites:
- a. Use of high perimeter fencing or hoarding for site security and public safety, as determined by site-specific security risk assessments.
 - b. Maintenance of PRowS assessed in the ES (REF TBC), where reasonably practicable, or provision of an appropriate alternative where feasible.
 - c. Installation of secure gates and security provision outside of working hours.
 - d. Security lighting around the site and site perimeters.
 - e. Adequate competent and accredited security guards and patrols.

- f. CCTV, infrared surveillance and alarm systems where required. The location and direction of view of security cameras or blocking software to prevent intrusion into residential properties will be considered.
- g. Securing of site equipment and materials, such as fuel storage containers, outside working hours.
- h. Immobilising of plant.
- i. Securing of ladders and scaffolding to prevent unauthorised access to restricted areas and neighbouring properties.

Site fencing and hoarding

- 6.7.3 Site-specific security risk assessments carried out by the Contractors will determine the type of perimeter fencing or hoarding to be installed. This will be compliant with DCO Schedule 2, Part 1, Requirement 12 which references the Manual of Contracts Documents for Highways Works (MCHW). The form of fencing and hoarding will be fit for purpose, taking into consideration the location, construction activities and surrounding landscape. The Contractors will be responsible for obtaining hoarding licences for hoarding or fencing on the highway.
- 6.7.4 Locations for ecological and acoustic fencing requirements are identified on the Environmental Masterplan (Figure 2.4, (REF TBC)).
- 6.7.5 The Contractors will be responsible for maintaining all their perimeter fencing and hoarding.
- 6.7.6 Highways England requires the Contractors to ensure that hoarding and other materials used are appropriate to the location and activities within the compound/worksites affecting noise level at the boundary.
- 6.7.7 Fencing may be used in areas of low security risk to reduce visual impact on the environment and aid security patrol management of the area. The Contractors may use Heras fencing as an interim measure to secure a site or adapted site boundary prior to installing permanent hoarding, or likewise when demobilising from an area.
- 6.7.8 Hoarding will be erected to the boundary of higher-risk activity sites or where visual screening is required. Hoarding will typically be 2.4m high but could be higher in the highest security risk areas.
- 6.7.9 The following measures will be applied when installing and maintaining the site perimeter fencing or hoarding, as appropriate:
 - a. Use of appropriate fencing or hoarding, which ensures the site is identifiable as a Highways England site, taking into consideration the outcomes of security risk assessment, construction activity and existing landscape.
 - b. Where possible sustainable materials may be used for such equipment and solid wooden hoardings are to be attached to all highway-facing boundaries, including footways, bridleways and byways.

- c. Hoardings may be topped with anti-climb measures based on the risk assessment.
- d. Hoardings to be of a type or design and managed so posterage and graffiti is minimised.
- e. Providing information boards with key contact details such as Highways England Customer Contact Centre number, enquiries and complaints procedure, out of hours contact details and information on the works.
- f. Displaying notices on site boundaries to warn of hazards onsite such as deep excavations, construction access and movements.
- g. Be sensitive to visual intrusion impacts.
- h. Will not create hazardous zones for vulnerable users.

6.8 Site lighting

- 6.8.1 Site lighting and signage will be provided by the Contractors to ensure the safety and security of the construction sites. It will be at the appropriate luminance required to provide safe working conditions. Where needed and appropriate, lighting to site boundaries will be provided, and illumination will be sufficient to provide a safe route for the passing public. Precautions will be taken to avoid shadows cast by the site hoarding on surrounding footpaths, roads and amenity areas. Where appropriate, lighting will be activated by motion sensors to prevent unnecessary usage.
- 6.8.2 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 5489-1, Code of Practice for the Design of Road Lighting (BSI, 2020), where applicable.
- 6.8.3 Lighting will also be designed, positioned and directed to prevent or minimise light disturbance to nearby residents, ecological receptors, as well as motorists and rail and marine operations. This provision will apply particularly to sites where night working or security lighting will be required.
- 6.8.4 Low energy fittings shall be used unless otherwise accepted by Highways England. Any site-specific lighting controls will be described in Contractors' EMP2s.

6.9 Emergency preparedness

- 6.9.1 The Contractors will hold certifications for safety (ISO 45001:2018), environment (ISO 14001:2015), quality (ISO 9001:2015) and these will include procedures for responding to emergency events. The Contractors will ensure that emergency preparedness procedures for each worksite are developed. The procedures will be standardised as far as practicable across the various worksites and will be appropriate to the anticipated hazards and specific layouts. The emergency procedures will be produced in consultation with the emergency services, Kent Resilience Forum and Essex Resilience Forum and other relevant stakeholders. For works on the existing railway and highway

networks, as well as the tunnelling works, they will be produced in accordance with established industry procedures. Further guidance is contained within Site Clearance Capability – A guide for effective local planning, response and recovery (Department for Communities and Local Government, 2016).

- 6.9.2 Emergency Preparedness Procedures will be reviewed quarterly or to reflect changes in procedure, whichever is sooner.
- 6.9.3 The Contractors will ensure that the requirements of the relevant fire authority will be followed for the provision of site access points. The accesses may vary over time and will be updated as required and should also be suitable for emergency services. This is particularly important in relation to the tunnel construction. Emergency radio channels are to be reserved and be compatible with those used by Fire and Rescue services.
- 6.9.4 Aspects that will be covered as part of the environmental incident and emergency preparedness procedures will include:
- a. Notification procedures for emergency services in the event of an incident.
 - b. Procedures in the event of the discovery of unexploded ordnance (UXO).
 - c. Flood emergency response procedures.
 - d. Requirement to run emergency rescue drill from an underground location(s) including collaborative planning and participation by relevant rescue authorities.
 - e. Emergency spill response procedures to be developed in consultation with the Environment Agency and to take into account any specific requirements on incident response planning related to the worksite.
 - f. The emergency phone number and method of notifying the relevant local authority, statutory bodies, contact numbers for Highways England and the Contractors' staff.
 - g. Management and communication of diversion/alternative routes during unplanned events/emergencies.

Emergency access

- 6.9.5 The Contractors will ensure that the requirements of the emergency services will be followed for the provision of site access points. The accesses may vary over time and will be updated as required and communicated to the services. Specific helicopter landing provision will be at the North Portal close to hyperbaric facilities.

Fire prevention and control

- 6.9.6 The Contractors will ensure that all construction sites and associated accommodation and welfare facilities will have in place appropriate plans and management controls with the aim of preventing fire.

- 6.9.7 Fire plans and controls will be developed in consultation with the local emergency services and local authority.

6.10 Environmental incident control

- 6.10.1 Contractors will develop and implement appropriate measures to control the risk of environmental incidents such as pollution events, and contravention of ecological and archaeological legislation due to construction activities, materials and extreme weather events. This will be included in Contractors' EMP2s or Environmental Incident Control Plans as most appropriate in line with the nature and scope of works.
- 6.10.2 It will recognise the risk of pollution from construction activities and present proactive management practices to ensure that any foreseeable pollution incidents, such as diesel spillage, are prevented if possible or minimised, controlled, reported to relevant parties and remediated.
- 6.10.3 Emergency procedures will be produced in consultation with the emergency services, the Environment Agency and Highway Authorities, and will be produced in accordance with established industry procedures and will include drills, exercises and scenarios.
- 6.10.4 In the event of an incident arising, Highways England will work with the Contractors, relevant statutory body and landowners to ensure that appropriate corrective and preventative action is taken.
- 6.10.5 If any emergency works are undertaken within, or with the potential to impact, a Site of Special Scientific Interest, the works will be undertaken in a way which minimises the amount of harm and Natural England will be notified as soon as practicable; further guidance is available at the Natural England, Site of Special Scientific Interest: public bodies responsibilities website.
- 6.10.6 The Contractors will put in place arrangements to investigate and provide reports on any potential or actual significant environmental incidents.
- 6.10.7 The following measures shall be adopted by Contractors to manage the risk of pollution incidents:
- a. Run emergency response drills to simulate major environmental incident.
 - b. Provide maps showing the locations, together with address and contact details, of local emergency services facilities such as police stations, fire authorities, medical facilities and other relevant authorities.
 - c. Ensure that site drainage plans and flood risk plans (as appropriate) are available onsite and kept up to date.
 - d. Statement of appropriate information will be held onsite and provided immediately in the event of any incident such as a spillage or release of potentially hazardous materials.
 - e. Ensure that pollution shut-off valves are used in compounds with positive drainage systems.

- f. Ensure the appropriate number, location and type of pollution response kits are defined for each worksite and located on worksite plans/maps.
- g. Ensure personnel are competent in the use of pollution response kit and emergency response techniques. Ensure the level and evidence of competency is documented.
- h. Include an environmental training section within EMP2s.
- i. Ensure personnel have an awareness and understanding of the relevant plans relating to pollution response and emergency response techniques.
- j. Ensure that clear protocols and communication channels are implemented so that any spillages are dealt with as soon as they are identified. Include an escalation process for escalating an incident to emergency services and from site staff response to an Incident Response Team (or equivalent).
- k. Provide contact details for the relevant authorities, such as the Environment Agency, and the persons responsible on the construction site and within the Contractors' organisation, for pollution incident response.
- l. Provide contacts for a competent spill-response company which can be contacted at short notice for an immediate response, 24 hours, seven days a week.
- m. Give notification of pollution incidents, to relevant statutory bodies, environmental regulatory bodies, local authorities and local water and sewerage providers, where required.
- n. Notification of appropriate emergency services, authorities and personnel on the construction site.

Extreme weather events

- 6.10.8 The Contractors will pay due consideration to the impacts of potential extreme weather events and related conditions during construction. The Contractors will use a short to medium-range weather forecasting service from an approved meteorological data and weather forecast provider as well as flooding information from the Environment Agency and tidal information from the Port of London Authority to inform short to medium-term programme management, environmental controls and impact mitigation measures.
- 6.10.9 The Contractors will ensure that the measures within this CoCP are implemented and will, as appropriate, consider additional measures to ensure the resilience of the proposed mitigation of impacts during extreme weather events is robust. As appropriate, method statements will also consider extreme weather events where risks have been identified.

Induction, training and briefing procedures for staff

- 6.10.10 The Contractors' EMP2s will cover competence of personnel in pollution prevention and awareness of emergency response techniques and procedures in accordance with ISO 14001:2015.
- 6.10.11 There will be a Project induction facility where everyone will receive a common induction which will include environmental risks and commitments from across the Project.
- 6.10.12 In addition, each Main Works Contractor will be responsible for delivering a site-specific induction which will include site-specific environmental risks.
- 6.10.13 Each member of staff undertaking a task in the programme will receive a specific task briefing before starting work on that task, which will include any relevant environmental risks and mitigation.
- 6.10.14 Competence of individuals for every task will be assessed by a member of the project team with relevant experience.
- 6.10.15 There will be a training facility focusing on key risk aspects of the Project, which will reinforce site-specific training.

6.11 Unexploded ordnance

- 6.11.1 The Contractors will carry out pre-construction risk assessments to determine the possibility of finding unexploded ordnance within the construction area. An emergency response procedure will be prepared and implemented by the Contractors to respond to the discovery of unexploded ordnance. This will include notifications to the relevant local authorities and emergency services.
- 6.11.2 The Contractors will comply with the recommendations of the Unexploded Ordnance (UXO) Report (REF TBC).

6.12 Clearance and reinstatement of sites on completion

- 6.12.1 Sites will be reinstated, in accordance with article 35 (temporary possession) of the DCO and in line with the Requirements in Schedule 2, Part 1 of the DCO.

6.13 Operation

- 6.13.1 By the end of the construction, commissioning and handover stage of any part of the Project, the Contractors will develop the third iteration of the EMP (EMP3). EMP3 will comply with the latest Highways England standard (currently DMRB LA 120 (Highways England, 2020)).
- 6.13.2 EMP3 will detail maintenance and monitoring activities throughout the operational phase having regard for the specific mitigation measures identified within the REAC as well as Highways England and Local Authority's and Local Highway Authority's operating procedures.
- 6.13.3 During the implementation of the EMP2 the ongoing management commitments will be developed.

7 Register of environmental actions and commitments

7.1 Introduction

- 7.1.1 The Register of Environmental Actions and Commitments (REAC) consolidates the mitigation commitments arising from the environmental impact assessment process for convenient reference. The REAC identifies the good practice and essential mitigation commitments that underpin our environmental assessments. These commitments would be legally secured through Requirement 4 of Schedule 2 to the Development Consent Order (DCO).
- 7.1.2 The REAC contains environmental commitments that would be implemented during the construction and operational phases of the A122 Lower Thames Crossing (the Project) if the DCO is granted. The commitments listed in the REAC would be incorporated in the environmental management plans produced for construction and handover stages of the Project in accordance with Requirement 4 of Schedule 2 to the DCO.
- 7.1.3 In this context, good practice means standard approaches and actions commonly used on infrastructure development projects to avoid or reduce environmental impacts, typically applicable across the whole Project. Essential mitigation means any additional Project-specific measures needed to avoid, reduce or offset potential impacts that could otherwise result in effects considered significant in the context of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations). These are in addition to the embedded mitigation measures that form part of the Project design, which are secured by the Design Principles and the Environmental Masterplan (REF TBC).

7.2 Guide to the REAC table

- 7.2.1 The REAC is presented in a table format with headings setting out:
- a unique identifier to facilitate cross-reference with the ES and other DCO documentation
 - a name for the commitment
 - details of the commitment including a clear and specific description of the action, the objective of any essential mitigation and any relevant commitments relating to monitoring
 - the achievement criteria which define successful implementation of the action
 - identification of the party responsible for the action
 - whether the commitment relates to the construction or operational stage of the Project
 - how the commitment is secured in the DCO, e.g. through a Requirement

- 7.2.2 Where the achievement criteria are self-explanatory, the phrase 'implementation of commitment actions' is used. As with all commitment items in the REAC, the procedures to implement these measures will be developed during detailed design or handover and documented in the environmental management plans produced in accordance with Requirement 4 of Schedule 2 to the DCO.
- 7.2.3 Table 7.1 is for the pre-commencement REAC table as described in Chapter 3.
- 7.2.4 Table 7.2 is the full REAC table.

7.3 REAC table

Table 7.1 Pre-Commencement REAC Table

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Geology and Soils	GS002	Pre-construction surveys	Prior to any construction compound area being prepared, a pre-condition survey would be undertaken to determine the current land quality across the compound area. A repeat survey would be done after the compounds have been removed to confirm that the area has been returned to its previous condition where reasonably practicable or in line with landowner agreements.	Completion of surveys	Contractor	Construction	EMP2 - Requirement 4
Geology and Soils	GS015	Soil management	The Contractor would have in place an agricultural liaison officer or named deputy who shall be contactable by telephone 24 hours a day, seven days a week during construction activities on agricultural land.	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4
Geology and Soils	GS030	Temporary road location	A temporary access road is proposed across the former Esso petrol station on the northside of the A2/M2 junction. This is to provide access to construction the A2 compound. The former petrol station is identified in ES as a high-risk site due to contamination. However, prior to construction of the access road, the Environment Agency would be consulted on the alignment of the road to ensure that potential disturbance of residual contamination present in this area is avoided so as not to disturb any ongoing remediation works in this area.	Highways England to agree temporary road alignment in consultation with the Environment Agency	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV028	Protection of retained vegetation	An Arboricultural Method Statement and Tree Protection Plan would be prepared in accordance with BS 5837:2012 identifying measures for the protection of retained vegetation prior to the commencement of site clearance works. These measures would be complied with during construction and all works to trees and vegetation removal would be implemented under the supervision of the Environmental Clerk of Works.	Implementation of measures for the protection of retained vegetation and avoidance of harm to retained vegetation.	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV030	Veteran and ancient tree fencing	In accordance with standing advice prepared by Natural England and the Forestry Commission (2018), the following measures would be developed to protect veteran trees, ancient trees and ancient woodland identified on the Environmental Masterplan: 1. Screening barriers would be provided to protect retained ancient trees, ancient woodland and veteran trees from dust and pollution from nearby works. Locations of barriers will be defined in accordance with the requirements set out in REAC item LV028. 2. A buffer zone would be defined to avoid impact on root zones. These would be as follows: - For veteran trees, the buffer would be a minimum of 15 times the diameter of the tree trunk or five metres beyond the canopy, whichever is the greater - For ancient trees and ancient woodland, a separation distance of 15m from the canopy of the ancient trees/woodland edge would be maintained between the proposed construction activity and the asset.	Clearly defined approach to deliver successful establishment of vegetation as set out in the Environmental Masterplan	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
			These measures would be followed by the Contractor unless specifically agreed by Highways England, following the advice of a qualified arboriculturist, and following non-invasive root investigations which have determined that a smaller buffer would be appropriate to the tree or woodland.				
Landscape	LV031	Relocating lost veteran trees	Where removal of dead wood or veteran trees is required, the intact hulks of felled veteran trees would be relocated in close proximity to a nearby veteran tree, woodland or parkland area in accordance with standing advice prepared by Natural England and the Forestry Commission (2018). Dead wood would be placed within the woodland within which is located, in log piles and left to decompose naturally. This would provide opportunity for invertebrates and fungi resident within the tree to relocate. The location for the placement of the hulk will be identified following liaison with the relevant local planning authorities and be supervised by a qualified arboriculturist.	Relocation of intact tree hulks in accordance with NE and FE guidance	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV033	Long Lane compound A. Bunds	Where reasonably practicable, stockpiles formed from material excavated on site would be sited along the eastern boundaries of Long Lane Compound A, as material becomes available. This is to reduce visual impacts for the caravan site off Gammon Fields, and its subsequent relocation site immediately to the west.	Highways England acceptance of the location of stockpiles within construction compounds.	Contractor	Construction	EMP2 - Requirement 4
Noise and vibration	NV002	Noise and Vibration Plan	A Noise and Vibration Management Plan (NVMP) or equivalent would be prepared for each part of the construction works subject to Section 61 control for consideration by the relevant planning authority.	Approval of NVMP or equivalent by the SoS in consultation with local planning authority	Contractor	Construction	EMP2 - Requirement 4
Noise and vibration	NV004	Section 61 Consents	Where appropriate, consents would be obtained from the relevant local authorities under Section 61 of the Control of Pollution Act 1974 (which may include noise and vibration limits where relevant) for the proposed construction works.	Compliance with the terms of Section 61 consents	Contractor	Construction	EMP2 - Requirement 4
Noise and vibration	NV005	Baseline noise levels	Pre-construction baseline noise levels would be submitted to the relevant planning authority to establish a pre-construction baseline for monitoring compliance with construction noise limits.	Acceptance by the EHO for relevant planning authorities on baseline levels to	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
				inform Section 61 consents			
Noise and vibration	NV007	Best Practicable Means	<p>Best Practicable Means as defined under Section 72 of the Control of Pollution Act 1974 would be employed during the construction phase to reduce noise nuisance. These would include measures such as:</p> <ul style="list-style-type: none"> - installing and maintaining hoarding around the construction areas likely to generate noise - keeping site access routes in good condition with condition assessments on site to inspect for defects such as potholes - turning off plant machinery when not in use - maintaining all vehicles and mobile plant such that loose body fittings or exhausts do not rattle or vibrate - using silenced equipment where available, in particular silenced power generators and pumps - no music or radios would be played for entertainment purposes outdoors on-site - plan site layout to ensure that reversing is kept to a reasonably practicable minimum. Reversing manoeuvres, that are required would be managed by a trained banksman/vehicle marshal to ensure they are conducted safely and concluded quickly - non-percussive demolition techniques would be adopted where reasonably practicable to reduce noise and vibration impact 	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB002	Maintaining integrity of important habitats adjacent to works	Temporary fencing would be used to demarcate important and protected habitats, preventing construction access to protect them from accidental damage. Important and protected habitats include ecological translocation sites, and retained woodland, trees and hedgerows shown on the Environmental Masterplan. Fencing would be installed under the supervision of the Environmental Clerk of Works and in accordance with good practice guidance such as BS 5837:2012 Trees in relation to design, demolition and construction.	Successful retention of important habitats.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB003	Maintaining integrity of important habitats adjacent to works	Work compounds, access tracks, haulage routes, material storage areas, generators and other construction activities would not be located within areas of retained vegetation shown on the Environmental Masterplan.	Implementation of commitment actions.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB004	Breeding birds	Disturbance, and incidental mortality, of breeding birds would be avoided by timing vegetation clearance and structure removal outside of the bird nesting season (March to August inclusive) wherever possible. Where this is not possible, appropriate measures would be taken to avoid harming birds or their nests (such as temporary fencing around nesting sites where they are immediately adjacent to construction works), under supervision by a suitably experienced Environmental Clerk of Works.	Compliance with the Wildlife and Countryside Act 1981 (as amended).	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Terrestrial Biodiversity	TB005	Invasive species	Invasive species would be identified prior to construction and would be removed or treated to prevent their spread, following the Construction Industry Research and Information Association's (CIRIA) guidance in Wade et al. (Invasive Species Management for Infrastructure Managers and the Construction Industry, 2008)	Implementation of commitment actions.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB006	Environmental Clerk of Works	Employment of suitably qualified and experienced Environmental Clerks of Works (ECoW) throughout the construction phase of the project to supervise implementation of environmental mitigation and protection commitments.	Acceptance by Highways England of the ECoW nominated by the Contractor.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB008	Badger setts	Badger setts identified within the Order Limits for closure would be closed by permanently excluding badgers and then removing the empty setts. The setts would be closed under licence from Natural England outside of the badger breeding season (breeding season takes place between 1 December and 30 June). For any main setts that will be closed with no suitable naturally occurring alternative sett, an artificial sett will be constructed in a suitable location.	Compliance with requirements of Natural England licences.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB009	Bat roosts	Bat roosts that would be lost or heavily disturbed due to construction or operational activities would be removed under licence and alternative roosting structures would be provided in areas indicated on the Environmental Masterplan.	Compliance with requirements of Natural England licences.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB010	Barn owl breeding sites (direct loss)	Barn owl breeding sites that would be lost due to construction would be removed while not in active use. Alternative breeding sites (nest boxes) would be provided >1.5km away from the Project boundary and other major roads, within an appropriate setting and in compliance with Barn Owl Trust advice (2015). As agreed with the Essex Wildlife Trust (EWT), a minimum of 12 artificial nest boxes would be installed in land managed by them. This would provide a replacement ratio two boxes for one lost site; the final number of boxes required would be informed by pre-construction surveys.	Provision of Barn owl breeding sites	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB011	Barn owl breeding sites (disturbance)	Barn owl breeding sites which would not require closure, but that may be subject to disturbance due to proximity to works would be screened by acoustic fencing to prevent disturbance during the breeding season under the supervision of the Environmental Clerk of Works.	Implementation of commitment actions in accordance with Natural England guidance.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB012	Breeding birds (temporary loss of nesting habitat)	Bird nest boxes would be provided within areas of retained woodland and trees shown on the Environmental Masterplan to supplement the habitat creation by offsetting the loss of nesting opportunities whilst newly created habitats establish. A ratio of 10 assorted small nest boxes and one medium open fronted nest box per hectare of lost woodland/scrub would be adopted in accordance with BTO Field Guide No. 23, where it is reasonably practicable to erect this number of nest boxes. For hedgerows, a ratio of 10	Implementation of commitment actions in accordance with BTO guidance.	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
			assorted small nest boxes per kilometre of hedgerow would be adopted, where it is reasonably practicable to erect these numbers within retained vegetation. The measures would be implemented under the supervision of the Environmental Clerk of Works.				
Terrestrial Biodiversity	TB013	Displacement of protected/not able species	Where habitats that are known or assumed to support protected or notable species, clearance would take place in a phased, directional manner towards areas of contiguous retained habitat. This would encourage mobile species to actively move from the construction site into the wider landscape. These measures would be implemented under the supervision of the Environmental Clerk of Works.	Compliance with requirements of Natural England licences.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB014	Natural England licences	All required Natural England licences and associated working practices and method statements would be in place prior to any related construction works starting in areas where licensable species occur.	Compliance with requirements of Natural England licences.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB015	Monitoring of pre-existing protected species and important habitats	Monitoring of protected species during and post-construction would be in line with the requirements of the protected species mitigation licence.	Compliance with requirements of Natural England licences.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB016	Translocation of protected species	Where the approach to habitat clearance referred to in REAC ref. TB013 is not considered appropriate to avoid potential mortality of protected species, a programme of trapping and translocation would occur to move animals away from the construction site and to established receptor sites with sufficient carrying capacity prior to habitat clearance occurring. Species or groups which may be subject to trapping and translocation are GCN (and all other native amphibian species found during this process), water voles and dormice.	Compliance with requirements of Natural England licences.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB017	Translocation of notable species	Where protected species licences are not required, the approach to habitat clearance and the potential need to trap and translocate non-licensable species (reptiles and/or native amphibians species excluding GCN) to established receptor sites with sufficient carrying capacity would be determined and undertaken by the Environmental Clerk of Works.	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Terrestrial Biodiversity	TB018	Translocation of habitat features of value to protected/not able species	Habitat features of value to protected species that can themselves be moved to mitigation areas/receptor sites (for example dead-wood features for terrestrial invertebrates, and refugia for amphibians and reptiles) would be translocated where appropriate, to be determined by the Environmental Clerk of Works.	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB020	Translocation of important lichens	Where important lichen species, <i>Usnea cf. esparantiana</i> , present within woodland south-west of the M25 junction 29, and <i>Physconia distorta</i> and <i>Fellhaneropsis vezdae</i> , present within The Wilderness woodland, are found on trees being felled or pruned to accommodate works, any timber hosting these species would be retained and moved immediately after felling into retained areas of the same woodland as shown in the Environmental Masterplan. Timber would be placed on the woodland floor immediately adjacent to a tree of the same host species. All works would be supervised by the Environmental Clerk of Works.	Presence of translocated lichen 24 months after translocation	Contractor	Construction	EMP2 - Requirement 4

Table 7.2 REAC table

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Air Quality	AQ001	Vehicle and plant emissions	<ol style="list-style-type: none"> 1. All on-road heavy vehicles would comply with the standards set within the London Low Emission Zone (LEZ) across all sites within Order Limits for the relevant class of vehicle. 2. All Non-Road Mobile Machinery (NRMM) net power 37kW to 560kW would comply with the engine emission standards set by London's Low Emission Zone for NRMM across all sites within Order Limits. From 1 September 2020, NRMM used on any site would therefore be required to meet emission standard Stage IIIB as a minimum. From 1 January 2025, NRMM used on any site would be required to meet emission standard Stage IV as a minimum. 3. Ensure all vehicle engines, mobile and fixed plant stationed on site are not left running or idling unnecessarily. 4. Use low emission vehicles and plant fitted with catalysts, diesel particulate filters or similar devices where reasonably practicable. 5. Use ultra-low sulphur fuels in plant and vehicles where reasonably practicable. 6. Keep vehicles and plant well maintained, with routine servicing to be completed in accordance with the manufacturer's recommendations and records maintained for the work undertaken. 	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Air Quality	AQ002	Demolition	<p>Implement good practice measures to reduce dust during demolitions works such as:</p> <ol style="list-style-type: none"> 1. Soft strip inside buildings before demolition (i.e. retain external walls and windows where safe to provide a screen against dust) 2. Use water suppression for dust control during demolition operations 3. Avoid explosive blasting, using appropriate manual or mechanical alternatives 4. Bag and remove any biological debris or damp down such material before demolition 	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Air Quality	AQ003	Earthworks and construction	<p>Implement good practice controls to reduce dust during works such as:</p> <ol style="list-style-type: none"> 1. Cover with topsoil and re-vegetate earthworks and exposed areas including soil stockpiles to stabilise surfaces 2. Use a cover such as hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil 3. Remove the cover systematically during work to reduce exposure of areas that are not being worked on 4. Avoid removing thin layer scabbling of concrete from structures by compressed air powered machines, where reasonably practicable 5. Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless required for a particular process, in which case ensure that appropriate additional control measures are in place to prevent escape 6. Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored with suitable emission control systems to prevent escape 7. For small supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust 	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Air Quality	AQ004	Dust from trackout	<ol style="list-style-type: none"> 1. Use of water-assisted dust sweepers on the access and local roads to remove any material tracked out of the site 2. Avoid dry sweeping of large areas 3. Ensure vehicles entering and leaving worksites are securely covered to prevent escape of materials during transport 4. Inspect haul routes for integrity, instigate necessary repairs and record in site log book 5. Access gates to be sited at least 10m from receptors, e.g. residential properties, where reasonably practicable 6. Apply dust suppressants to locations where large volume of vehicles enter and exit the construction site 	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Air Quality	AQ005	Dust management good practice	<ol style="list-style-type: none"> 1. Undertake on-site and off-site inspections to monitor dust 2. Plan site layout so that machinery, stockpiles, mounds and dust causing activities are located away from receptors, as far as this is reasonably practicable 3. Erect suitable solid screens or barriers around dusty activities or the site boundary 4. Avoid site runoff of water or mud 5. Remove waste materials that have a potential to produce dust from site as soon as reasonably practicable 6. Cover, seed or fence stockpiles to prevent wind whipping 7. Cutting/grinding/sawing equipment to use water as dust suppressant or suitable local extract ventilation 8. Ensure an adequate water supply on the site for effective dust/particulate matter suppression, using recycled water where reasonably practicable 9. Use enclosed chutes, conveyors and covered skips to reduce escape of dust 10. Reduce drop heights from conveyors, loading shoves, hoppers and other loading or handling equipment to a practical minimum and use fine water sprays on such equipment where appropriate 11. Ensure equipment is readily available on site to clean any spillages and clean up spillages as soon as reasonably practicable after the spill is identified 12. Reuse and recycle waste to reduce dust from waste materials 	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4
Air Quality	AQ006	Air Quality monitoring during construction	The Contractor shall determine the level of any dust and particulate monitoring carried out on project construction sites by means of a risk-based approach. This will identify the type of monitoring that is required on each worksite by looking at the details of the specific packages of work within the site boundaries and the location of receptors around the site. Should monitoring be required, the monitoring locations will be approved by the Secretary of State (SoS) in consultation with the relevant local authority.	Approval of air quality monitoring programme by the SoS in consultation with relevant local authorities	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Air Quality	AQ007	Baseline dust monitoring	Should dust monitoring be required in accordance with the requirements of AQ006, it would begin at least three months prior to the commencement of the construction works to allow a suitable pre-construction baseline to be established unless otherwise agreed by Highways England following consultation with the relevant local authorities.	Approval of baseline dust monitoring programme by the SoS in consultation with relevant local authorities	Contractor	Construction	EMP2 - Requirement 4
Air Quality	AQ008	Actions in case of air quality monitoring exceedance	<p>If required during construction, continuous particulate monitoring for PM₁₀, PM_{2.5} and TSP (total suspended particles) will be carried out using appropriate survey instruments at locations approved under REAC item AQ006, in consultation with the relevant local authority. Instruments will be set up at relevant sites to operate an alert system when a predetermined site action level approved by the Secretary of State in consultation with the relevant local authority, is reached. If the alarm is triggered, the following actions will be taken:</p> <p>a. The Contractor, or a delegated representative, shall at the earliest reasonable opportunity, investigate activities on the site to ascertain whether any visible dust is emanating from the site or activities are occurring that are not in line with dust control procedures.</p> <p>b. Any identified causes will be rectified, where reasonably practicable. Actions will be recorded in a site logbook and the relevant local authority notified of the event and actions by telephone or email, as soon as is reasonably practicable, after or during the dust event.</p> <p>c. If no source of the dust event is identified, other project sites and local authority or Automatic Urban and Rural Network monitoring sites will be contacted to establish whether there is an increase in particulate concentrations in the wider area.</p> <p>d. If the cause of the alert is not related to site operations, the outcome of any investigation will be recorded in a site logbook which would be made available to the relevant local authority on request.</p> <p>e. Dust monitoring will continue until that part of the construction works has been completed, or earlier, if the site is deemed to be low risk in</p>	Compliance with the approved air quality monitoring programme	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
			consultation with Highways England and the relevant local authority.				
Climate	CC001	PAS2080	The main works Contractors will adhere to PAS 2080 throughout the works and develop a compliant approach detailing how greenhouse gas (GHG) emissions reductions will be identified, prioritised, implemented and monitored during construction. The main works Contractors will be required to submit their PAS 2080 approach to Highways England for acceptance within three months of appointment. The main works Contractors will be required to obtain certification/verification by an accredited organisation that verifies PAS 2080 within 12 months of appointment.	Implementation of a PAS2080 compliant GHG emission monitoring and minimisation approach during construction.	Contractor	Construction	EMP2 - Requirement 4
Climate	CC002	Greenhouse gas emissions: reduction from the carbon model baseline	The Contractor would develop and achieve a carbon reduction target to be agreed by Highways England.	Achievement of target GHG emissions	Contractor	Construction	EMP2 - Requirement 4
Climate	CC003	Greenhouse gas emissions: quantification and reporting of GHG emissions	The main works Contractor(s) would quantify and report GHG emissions quarterly to Highways England in line with the requirements of DMRB LA 114 Climate. This information would be evaluated by Highways England and used to inform assessment of future projects.	Submission of quarterly reports on GHG emissions	Contractor	Construction	EMP2 - Requirement 4
Climate	CC004	Greenhouse gas emissions: compound electricity	The Contractor(s) would procure electricity from renewable electricity suppliers to cover the consumption from the Project's construction compounds (including the consumption of the tunnel boring machine and concrete batching plant).	Procurement of renewable electricity to cover consumption from construction compounds	Contractor	Construction	EMP2 - Requirement 4
Climate	CC005	Greenhouse gas emission: Operational phase emissions monitoring	The road operator would provide quarterly GHG emissions returns and analysis from the operation and maintenance of the Project to Highways England during the operational phase in accordance with the requirements of DMRB LA 114 Climate. This information would be evaluated by Highways England and used to inform assessment of future projects.	Reporting of quarterly greenhouse gas emissions returns and evaluate data	Highways England	Operation	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Climate	CC006	Resilience to climate change	The Contractor(s) would design the permanent works in accordance with, relevant design standards and use construction materials and products that would be resilient to the effects of projected future climate change in line with UKCP18.	Design and specification of materials resilient to the effects of future climate change	Contractor	Construction	EMP2 - Requirement 4
Climate	CC007	Greenhouse gas emissions - operational supply of electricity	Electricity used for operation of the Project would be procured from renewable electricity suppliers.	Procurement of renewable electricity for operation of the Project	Highways England	Operation	EMP3 - Requirement 4
Climate	CC008	Low energy lighting	Low energy light sources (for example light-emitting diode (LED) or equivalent technology) would be used within Project lighting systems (subject to emergency lighting requirements) to reduce energy consumption during the operation of the Project and offer a more readily recyclable product at the end of life, compared to traditional light source lamps and luminaires.	Use of LED or equivalent technology low energy lighting	Highways England	Operation	EMP3 - Requirement 4
Cultural Heritage	CH001	Physical damage to heritage assets	The draft Archaeological Mitigation Strategy and Outline Written Scheme of Investigation (AMS-OWSI) includes details of specifically identified measures to mitigate the impact to known heritage assets and a range of generic mitigation measures from which appropriate mitigation would be applied for currently unknown heritage assets that could be physically damaged by construction. The draft AMS-OWSI will be updated as further information from archaeological evaluation becomes available. The AMS-OWSI sets out the scope of Written Schemes of Investigation (WSIs) to be prepared. The WSIs would define the details of specific mitigation measures for protection or recording of heritage assets which would be implemented before or during construction at locations identified within the AMS-OWSI.	Implementation of mitigation measures set out in the AMS-OWSI approved by the Secretary of State including measures specified in the WSIs and in accordance with Requirement 9 of the DCO.	Contractor	Construction	Requirement 9
Cultural Heritage	CH002	Limiting land take for archaeological investigations	The spatial extent of intrusive archaeological investigations shall not extend beyond the limits of deviation for the works proposed in the DCO application.	Implementation of commitment actions.	Contractor	Construction	Requirement 9

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Cultural Heritage	CH003	Cropmark complex scheduled monument at Orsett	The Contractor shall follow the MoRPHE procedural model (Historic England, 2015) to prepare a detailed project design for the archaeological investigation of the cropmark complex at Orsett (SM1). This design will inform the WSI and the development of archaeological mitigation. After completion of the archaeological works, as specified in the WSI, the relevant archaeological contractor shall apply to Historic England for removal of the site from the official list of protected historic sites.	Implementation of mitigation measures set out in the AMS-OWSI approved by the Secretary of State including measures specified in the WSIs and in accordance with Requirement 9 of the DCO. Submission of application to Historic England for delisting of the scheduled monument.	Contractor	Construction	Requirement 9
Cultural Heritage	CH004	Grade II listed buildings	The WSIs will require Level 4 Historic Building Recording (Understanding Historic Buildings: A Guide to Good Recording Practice (Historic England, 2016)) of the three listed buildings at 1 and 2 Grays Corner (LB89), Thatched Cottage (LB58) and Murrells Cottage (LB96). This would include an intrusive watching brief prior to the demolition of the properties, focusing on areas of previously hidden structure. After completion of the historic buildings recording works the relevant archaeological contractor shall apply to Historic England for removal of the three buildings from the official list of protected historic sites.	Implementation of mitigation measures set out in the AMS-OWSI approved by the Secretary of State including measures specified in the WSIs and in accordance with Requirement 9 of the DCO. Submission of application to Historic England for delisting of the listed buildings.	Contractor	Construction	Requirement 9
Cultural Heritage	CH005	Fencing of heritage assets	Fencing for the protection of heritage assets required as mitigation in any WSI shall be securely installed prior to commencement of that part of the works. The Contractor shall prepare a method statement for all fencing works required for the protection of heritage assets, having regard for the mitigation measures set out in the WSIs for that part of the works, for consultation with the relevant local planning authority and, in the case of scheduled monuments and listed buildings, Historic England, prior to installation.	Implementation of mitigation measures set out in the AMS-OWSI approved by the Secretary of State including measures specified in the WSIs and in accordance with Requirement 9 of the DCO.	Contractor	Construction	Requirement 9

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Cultural Heritage	CH006	Covering of heritage assets	Where potentially sensitive archaeological remains would be buried or sealed beneath fill material to ensure they are not disturbed during construction, in accordance with mitigation to be identified in the site specific WSIs, the Contractor shall prepare a method statement for consultation with the relevant local planning authority and, in the case of designated sites, Historic England, prior to construction of that part of the works. The method statement will describe: <ul style="list-style-type: none"> - measures to preserve in situ sensitive archaeological remains and prevent deformation of topsoil or subsoil horizons - measures for monitoring the continued protection of in situ archaeological remains - how the measures would be reversed at the end of construction at locations where the ground surface is to be restored to its original shape and condition in accordance with mitigation to be identified in the site-specific WSIs 	Implementation of mitigation measures set out in the AMS-OWSI approved by the Secretary of State including measures specified in the WSIs and in accordance with Requirement 9 of the DCO.	Contractor	Construction	Requirement 9
Cultural Heritage	CH007	Surveillance of heritage mitigation	The WSIs shall set out the arrangements and responsibilities for implementing, monitoring and auditing the mitigation measures identified in the WSIs for the protection of heritage assets during the construction. The findings shall be reported to Highways England and made available to the relevant local planning authorities or Historic England on request.	Demonstration of implementation of mitigation measures set out in the AMS-OWSI approved by the Secretary of State including measures specified in the WSIs and in accordance with Requirement 9 of the DCO.	Contractor	Construction	Requirement 9
Cultural Heritage	CH008	Management of heritage assets	Cultural Heritage Asset Management Plans (CHAMPs) would be implemented by Highways England in accordance with DMRB LA 116, for any heritage assets that remain within their ownership following construction of the Project.	Ongoing preservation of relevant heritage assets.	Highways England	Operation	EMP3 - Requirement 4
Geology and Soils	GS001	Ground investigation	The Contractor would complete further ground investigations prior to construction to inform detailed design of the Project. If, during further intrusive ground investigations, drilling is required in areas underlain with contaminated soils, drilling and excavation techniques in line with BS 5930 (British Standards Institution, 2020) and BS 10175 (British Standards Institution, 2017) would be adopted (e.g. environmental seals) to reduce the risk of	Acceptance of method statement by Highways England in consultation with the Environment Agency	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
			creating pollutant pathways. The Contractor would provide ground investigation method statements for acceptance of Highways England in consultation with the Environment Agency prior to commencement of the works.				
Geology and Soils	GS002	Pre-construction surveys	Prior to any construction compound area being prepared, a pre-condition survey would be undertaken to determine the current land quality across the compound area. A repeat survey would be done after the compounds have been removed to confirm that the area has been returned to its previous condition where reasonably practicable or in line with landowner agreements.	Completion of surveys	Contractor	Construction	EMP2 - Requirement 4
	GS003		NOT USED				
Geology and Soils	GS004	Chemical and fuel storage	Construction site compounds where chemical, waste oils or fuel storage and refuelling activities take place would be managed in line with the following measures: i. Within the construction site compounds, specific areas would be designated for the storage of chemicals, waste oils and fuel and refuelling activities. ii. These designated areas would be bunded to provide capacity for at least 110% of the largest container and placed on hardstanding to prevent downward migration of contaminants. iii. These designated areas would be designed with drainage to include measures for isolating spillages. iv. Any transfer of fuel or other potentially contaminated liquids would only take place within a designated transfer area. v. Drip trays would be provided to reduce the risk of spillages.	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4
Geology and Soils	GS006	Materials management	All excavated materials and soils proposed for reuse under a Materials Management Plan would be required to meet risk-based acceptability criteria applicable to its intended use. The procedures and criteria to be used would be set out in the Materials Management Plan (REAC ref. MW007) prior to commencement of that part of the works.	Compliance with the Materials Management Plan	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
	GS007		NOT USED				
	GS008		NOT USED				
	GS008		NOT USED				
Geology and Soils	GS009	Soil management	Soils would be handled and stored to allow their sustainable reuse in line with the Defra Construction Code of Practice for the Sustainable Use of Soil on Construction Sites (2009) and the MAFF Good Practice Guide for Soil Handling (2000). Full details of the soil resources present and the procedures for soils management (covering vegetation clearance, setting out haul routes, soil stripping, stockpile creation and management, soil reconditioning (where required) and soil reuse) would be set out prior to any soil stripping works commencing, covering all proposed end uses (e.g. agricultural land, woodland or other habitat types).	Approval of the procedures for soils management by Highways England	Contractor	Construction	EMP2 - Requirement 4
Geology and Soils	GS010	Soil management	Characterisation of the existing soil to determine its resilience to handling and stripping depths would be based on detailed soil surveys. Where information is not available (i.e. from the detailed ALC surveys), pre-construction soil surveys would be carried out by the Contractor to inform the development of appropriate soils management procedures.	Implementation of the procedures for soils management approved by Highways England	Contractor	Construction	EMP2 - Requirement 4
Geology and Soils	GS011	Soil management	Soil on land identified on the Environmental Masterplan (REF TBC), which is used during construction, will be profiled to support the land use identified on the Environmental Masterplan. The soil will be fully restored, in accordance with the soil reuse requirements in the soils management procedures (REAC ref. GS009), and will be recreated in the correct sequence of horizons, in such a manner that there are good fissures to facilitate soil profile drainage and plant root development.	Implementation of the procedures for soils management approved by Highways England	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Geology and Soils	GS012	Soil management	Reinstatement of soils affected by temporary works would aim to avoid any reduction in soil function. For agricultural land this will be measured by the quality of the land as defined by the ALC system (with a soil profile recreated to 1.2m below ground level where this was the pre-construction soil depth). For areas of landscape planting or habitat creation this will be measured by the successful restoration of the soil profile (both physical and chemical characteristics) defined for that particular habitat in the soils management procedures suitable to allow the establishment and long-term health of the habitat.	Implementation of the procedures for soils management approved by Highways England	Contractor	Construction	EMP2 - Requirement 4
Geology and Soils	GS013	Soil management	Procedures for the management of soil resources would include provisions for: i. Ensuring soils are stripped and handled in the driest condition reasonably practicable. ii. Ensuring topsoil and subsoil resources are stripped and stockpiled separately. iii. Keeping records of excavated and stored soils. iv. Confining vehicle movements to defined haul routes until all the soil resource has been stripped. v. Protection of stockpiles from erosion through establishment of a grass cover unless the soil materials are to be reused in a short timeframe (<60 days) in which case alternative erosion control measures may be required, such as silt fencing or the use of geotextile blankets. vi. Protection from tracking over using signage or fencing. vii. Ensuring the physical condition of the replaced soil profile to at least 1.2m below ground level and that is sufficient for the post-construction use. viii. The use of toolbox talks to inform all those working on the site of the requirements for soil handling, storage and reuse.	Implementation of the procedures for soils management approved by Highways England	Contractor	Construction	EMP2 - Requirement 4
Geology and Soils	GS014	Soil management	Following soil reinstatement there would be a five-year aftercare period during which defects would be corrected. The Contractor would prepare and present to Highways England for acceptance, a schedule of aftercare monitoring, maintenance and defect correction, to include soil testing, appropriate to the target specification (e.g. land grade where restoration is to agricultural use or specific characteristics where restoration is to support habitat creation or re-	Implementation of commitment actions	Highways England	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
			provision). Implementation of the aftercare monitoring, maintenance and defect correction will be overseen by an Environmental Clerk of Works.				
Geology and Soils	GS015	Soil management	The Contractor would have in place an agricultural liaison officer or named deputy who shall be contactable by telephone 24 hours a day, seven days a week during construction activities on agricultural land.	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4
Geology and Soils	GS016	Contamination verification	A verification report would be prepared by the Contractor after completion of work to remediate contamination at each site where this is undertaken. This would identify the locations of the remediation works undertaken and the final tested ground quality. These reports would be provided to the relevant local authority and Environment Agency as a record.	Submission of verification reports to the relevant local authority and Environment Agency	Contractor	Construction	EMP2 - Requirement 4
Geology and Soils	GS017	Contamination verification	The findings of the verification report (REAC ref. GS016) would be available for inclusion within the operations Health and Safety file or equivalent.	Implementation of commitment actions	Highways England	Operation	EMP3 - Requirement 4
Geology and Soils	GS018	Gas management	The ground gas regime across the Project and especially in close proximity to landfill sites would be investigated to inform design of enclosed and confined spaces (e.g. service ducts/boxes) to reduce the risk to human health (asphyxiation) and buildings or structures (explosion). No confined spaces associated with the Project would be accessible to the public.	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4
Geology and Soils	GS019	Contamination	If any incident were to occur which resulted in localised contamination, soils which had become significantly affected would be assessed and if necessary removed to reduce the risk of contamination migrating across a wider area or entering controlled waters.	Implementation of commitment actions in accordance with standard Highways England operating procedures	Highways England	Operation	EMP3 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Geology and Soils	GS020	East Tilbury haul road	A temporary access route would be created across East Tilbury landfill site for the ecology translocation to land to the east of the Project. The temporary access route would be designed to safeguard the capping layer on the landfill and minimise the risk of liquid waste being brought to the surface by the consolidation of the ground along the temporary access route. The design would be agreed with the Environment Agency in consultation with Thurrock Council unless otherwise agreed with Secretary of State prior to installation. Vehicle movements and the type of vehicles (tonnage) would be restricted to further reduce the risk of damaging the integrity of the cap and the wider environment. The temporary access route will be removed as soon as it is no longer required for ecological management purposes.	Design of the temporary access route would be agreed with the Environment Agency unless otherwise agreed with Secretary of State.	Contractor	Construction	EMP2 - Requirement 4
Geology and Soils	GS021	North Portal	Leachate from the East Tilbury landfill could be drawn towards the construction area of the North Portal and ramps due to the level of groundwater control required during excavation works. This would be mitigated through the construction of a deep barrier around the excavations to reduce groundwater ingress. The depth of the barrier walls would be informed by the results of modelling and consultation with the Environment Agency and Thurrock Council unless otherwise agreed with Secretary of State prior to the commencement of excavation works to construct the North Portal box structure and ramps. The need for any supplementary mitigation measures and any necessary monitoring would be informed by the results of modelling and consultation with the Environment Agency prior to the commencement of excavation works. Technical solutions would be developed by the Contractor following further investigation and assessment. Potential solutions could include: i. Ground treatment such as grouting to form a low permeability plug below the depth of excavation to reduce the risk of water inflow. ii. Construction of a slurry cut-off wall immediately west of the East Tilbury Landfill to decrease the permeability of the ground to lessen the risk of contaminant mobilisation and saline intrusion. iii. Potential to reduce the footprint of the structure by optimising the tunnel bore spacing and layout of the TBM launch structure.	Implementation of measures agreed with the Environment Agency unless otherwise agreed with Secretary of State to prevent mobilisation of leachate and saline intrusion	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
			iv. Creating a hydraulic barrier in the chalk between the East Tilbury Landfill and the excavated area, by recharging the chalk aquifer with some of the abstracted groundwater (subject to its quality).				
Geology and Soils	GS022	North Portal	Dewatering may be required during excavation works which could potentially cause waterborne contaminants to mobilise and flow in the groundwater towards the excavation. If dewatering is required, then the Contractor would treat groundwater from dewatering works to standards agreed with the Environment Agency before discharge under licence.	Compliance with terms of Environment Agency discharge licence	Contractor	Construction	EMP2 - Requirement 4
Geology and Soils	GS023	North Portal	The North Portal is located within an area historically used for landfill. Groundwater control during the excavation and construction activities for the tunnel boring machine (TBM) launch may cause an increased volume of gases to escape as soils, made ground and underlying alluvium become unsaturated. In addition, drilling through the area of historic landfill could lead to a build-up of gases behind the TBM. These factors would be considered during the detailed design to establish appropriate and safe procedures and working methods to construct the tunnel and North Portal. Gas monitoring will be undertaken during the construction for the launch and use of the TBM to detect changes in the gas regime as a safeguard to protect construction workers.	Compliance with relevant Health and Safety legislation and the CDM Regulations	Contractor	Construction	EMP2 - Requirement 4
Geology and Soils	GS024	Ground improvement tunnel	The design of the main crossing TBMs may require the construction of a ground improvement tunnel beneath the Thames Estuary and Marshes Ramsar site. The Environment Agency would be consulted on measures to reduce the risk of blow out and spreading of grout during tunnelling if a ground improvement tunnel is required.	Agreement of risk control procedures with Highways England in consultation with the Environment Agency	Contractor	Construction	EMP2 - Requirement 4
Geology and Soils	GS025	Northern tunnel entrance compound. Ground gas	Accommodation and welfare facilities are proposed within the Northern tunnel entrance compound which would service the North Portal construction activities. Ground gas associated with the historic landfill sites which may be present in the area could pose a risk to health. Prior to the accommodation being constructed, a gas assessment (investigation and monitoring) would be undertaken in the area to determine	Acceptance by Highways England of the gas assessment report	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
			the need for appropriate gas protection measures.				
Geology and Soils	GS026	Foundation works risk assessment	Construction of foundations has the potential to create pollution pathways and mobilise contaminants. The Contractors would prepare a foundation risk assessment report during detailed design specific to structures and ground conditions. This would be submitted to the Environment Agency for review prior to commencement of that part of the works to which the report relates.	Acceptance of foundation risk assessment report by Highways England in consultation with Environment Agency	Contractor	Construction	EMP2 - Requirement 4
Geology and Soils	GS027	Remediation strategy	The Contractor would develop proposals for site-specific remediation in consultation with the relevant local authority prior to implementation.	Acceptance of site remediation proposals by Highways England in consultation with the relevant local authority	Contractor	Construction	EMP2 - Requirement 4
Geology and Soils	GS028	Remediation of contamination	The construction works would include the removal of vegetation, stripping of topsoil, excavation and earth movements. These activities could cause the spreading and mobilisation of contaminants. i. During earth movement works, a watching brief protocol would be implemented under the supervision of an Environmental Clerk of Works. ii. Site workers would be vigilant to ensure visual or olfactory signs of contamination are noted and that contaminated soil is kept separate from other materials.	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4
Geology and Soils	GS029	Long term temporary stockpiles	Surplus clean chalk soils generated from construction works south of the River Thames are proposed to be stockpiled to facilitate control of offsite HGV traffic. The stockpiles of surplus clean chalk would be designed to safeguard the underlying soils and groundwater and the design would be agreed with the Environment Agency prior to stockpiling commencing.	Implementation of environmental management measures agreed with the Environment Agency	Contractor	Construction	Protective Provisions – Schedule 14
Geology and Soils	GS030	Temporary road location	A temporary access road is proposed across the former Esso petrol station on the northside of the A2/M2 junction. This is to provide access to construction the A2 compound. The former petrol station is identified in ES as a high-risk site due to contamination. However, prior to construction of the access road, the Environment Agency would be consulted on the alignment of the road to ensure that potential disturbance of residual contamination present in this area is avoided so	Highways England to agree temporary road alignment in consultation with the Environment Agency	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
			as not to disturb any ongoing remediation works in this area.				
Geology and Soils	GS031	Low Street Pit potential local geological site.	Low Street Pit has been identified as a potential local geological site due to the presence of Mucking Gravels. The Project has the potential to impact the Mucking Gravels during the construction of the Tilbury viaduct and the associated embankment earthworks and drainage, as well as due to the required diversion of statutory undertakers' impacted apparatus, which are located within the Low Street Pit. Construction activities on the eastern side of Low Street Pit, where an area of Mucking Gravels is present, would be restricted to prevent any excavations of the Mucking Gravels in this area and retain the existing eastern quarry slope.	No excavation of Mucking Gravel in the identified area unless otherwise approved by the Secretary of State.	Contractor	Construction	EMP2 - Requirement 4
HRA	HR001	Seasonal constraints to construction of discharge from construction of South Portal	Works to construct the infrastructure for the new South Portal construction drainage discharge would not take place within the Thames Estuary and Marshes Ramsar and any work within functionally linked land, would only be undertaken during April, May, June and July to avoid disturbance to passage and overwintering birds associated with European designated sites unless otherwise agreed with SoS in consultation with Natural England.	Implementation of commitment action	Contractor	Construction	EMP2 - Requirement 4
HRA	HR002	Seasonal constraints to works at the northern outfall	Works within the intertidal area to construct or decommission the northern outfall would be undertaken during April, May, June, July and August only to avoid disturbance to passage and overwintering birds associated with European designated sites unless otherwise agreed with SoS in consultation with Natural England.	Implementation of commitment action	Contractor	Construction	EMP2 - Requirement 4
HRA	HR003	Response to extreme weather	To avoid impacts to wintering birds during prolonged periods of sub-zero temperatures, activities potentially causing disturbance to wintering bird qualifying interests of the Thames Estuary and Marshes SPA/Ramsar will be undertaken in accordance with the general principles of the JNCC's 'Scheme to reduce disturbance to waterfowl during severe winter weather' (https://jncc.gov.uk/our-work/severe-weather-scheme/).	Implementation of commitment action	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
HRA	HR004	Noise barriers for compounds in or adjacent to Ramsar functionally linked land	Noise attenuation measures shall be incorporated within the Northern tunnel entrance, A226 Gravesend Road and Milton compounds and having regard for HR005 & HR006 to ensure that the construction activities do not result in noise levels within the Thames Estuary and Marshes SPA/Ramsar or any land functionally linked to it) that would cause disturbance to the wintering bird qualifying interests. The measures shall be in place prior to the operation of those compounds (or areas of compounds) and shall remain until the end of the compound operation.	Implementation of commitment action	Contractor	Construction	EMP2 - Requirement 4
HRA	HR005	Protection of birds from activities at the Northern tunnel entrance compound	The Northern tunnel entrance compound earthworks area immediately north of the River Thames shall be no closer than 75m to the existing field boundary and all soil reprofiling shall occur behind a 3m high bund that will delimit the extent of the works from functionally linked land associated with the Thames Estuary and Marshes SPA/Ramsar. Construction of the 3m high bund will be substantially started during April, May, June and July only, to avoid disturbance of birds in the passage and winter period from completion of construction of the bund and subsequent works behind it.	Implementation of commitment action	Contractor	Construction	EMP2 - Requirement 4
HRA	HR006	Seasonal constraints to works to form noise barriers at compounds	Erection of noise attenuation measures at the boundaries of compounds identified in HR004 will be carried out in April, May, June and July only to avoid disturbance of birds in the passage and winter period.	Implementation of commitment action	Contractor	Construction	EMP2 - Requirement 4
HRA	HR007	Habitat enhancement in functionally linked land	To provide enhanced functionality of functionally linked land associated with the Thames Estuary and Marshes SPA/Ramsar during the construction period, the management of the three fields in the plot south of the Metropolitan Police firing range and adjacent to the SPA/Ramsar (Land Registry ref. K794941) will consist of either a standing ripe crop ready to be harvested, winter stubbles or grass ley from 1 October to 1 March each year throughout the construction and operation of the A226 Gravesend Road and Milton compounds.	Implementation of commitment action	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
HRA	HR008	Groundwater surveillance	<p>Surveillance of groundwater levels will be carried out within the Thames Estuary and Marshes Ramsar in the vicinity of the tunnelling works for the duration of the construction period at borehole locations to be agreed with SoS in consultation with Natural England and Environment Agency.</p> <p>The Contractor would complete an annual review, for the period of construction and first five years of operation, of the groundwater levels and consult on any implications for qualifying features of the Ramsar site, and any necessary remedial measures with Natural England and the Environment Agency.</p>	Results of groundwater surveillance of agreed boreholes reported to Natural England and Environment Agency	Contractor	Construction	EMP2 - Requirement 4
HRA	HR009	Bird behaviour surveillance	<p>Between 1 September and 31 March inclusive during each year of construction, undertake monthly bird survey surveillance visits from fixed vantage points to observe functionally linked land associated with the Thames Estuary and Marshes SPA/Ramsar that lies within 300m of Order limits of the Project. The surveys will record numbers of waterfowl present and any behaviours in response to disturbance stimuli (including no response) to a specification developed in consultation with Natural England. If the bird surveillance visits show a change in bird behaviour the Contractor will investigate if this is attributable to construction activities, and if this is agreed with SoS, after consultation with Natural England, the Contractor will review mitigation measures in consultation with Natural England.</p>	Bird survey results reported to Natural England	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV001	Trees and vegetation, utilities	Detailed design for the alignment of the Project, including diverted utilities, to reduce the removal of trees and vegetation as far as reasonably practicable, and in accordance with the LEMP as approved by the SoS.	Acceptance by Highways England of tree removal drawings prior to commencement of utility diversion works within order limits and approval of SoS of landscaping scheme	Contractor	Construction	LEMP - Requirement 5
Landscape	LV002	Land reinstatement	Land temporarily impacted by works to divert utilities would be reinstated to its former condition and composition upon completion, as far as reasonably practicable, unless otherwise specified in the Environmental Masterplan or under the terms of article 35 of the dDCO which sets out the temporary possession powers.	Successful reinstatement of vegetation at these locations within 12 months for grassland, 24 months for hedgerows and five years for trees and woodland.	Contractor	Construction	LEMP - Requirement 5

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Landscape	LV003	Landscape maintenance	The first five years of vegetation establishment would be overseen by an Environmental Clerk of Works. Vegetation that has failed to establish would be replaced as soon as identified within the next available planting season. At the end of the establishment period, subsequent landscape management would be undertaken in accordance with the Landscape and Ecology Management Plan (LEMP) [Successful establishment of planting within five years to serve its mitigation purpose as identified on the Environmental Masterplan.	Contractor	Construction	LEMP - Requirement 5
33Landscape	LV004	Planting	Where guards are used to protect seedlings and whips, the use of plastic tree guards would be avoided in favour of biodegradable options where available. In the event that plastic guards are used, these will be removed within five years of installation.	Avoidance of litter from broken or abandoned tree guards	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV005	Siting of construction compounds	No main compounds would be located within the Kent Downs AONB.	Highways England acceptance of construction compounds locations	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV006	Marling Cross compound, Views, Valley Drive, Mackenzie Way	Construction compound facilities greater than 6m in height would be located as southerly as is reasonably practicable to maximise the distance from residential properties on Valley Drive and Mackenzie Way and minimise visual prominence.	Highways England acceptance of the layout of buildings within construction compounds	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV007	A2 compound. Construction compounds facilities	Construction compound facilities greater than 6m in height would be located as south-westerly as is reasonably practicable to maximise distance from nearby residential properties on Thong Lane and from the adjacent boundary of the Kent Downs AONB.	Highways England acceptance of the layout of buildings within construction compounds	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV008	Southern tunnel entrance compound, Bund	Earth bunds of approximately 2-3m in height formed from material excavated on site would be sited along the boundary of the compound, as material becomes available to facilitate visual screening for residential properties on Thong Lane and Rochester Road (A226) during construction.	Highways England acceptance of the location of stockpiles within construction compounds	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV009	Southern tunnel entrance compound, Stockpile slopes	Softening the appearance of temporary earthwork stockpiles adjacent to the Kent Downs AONB by phasing the works to be such that south-east facing slopes are retained as grass seeded slopes for visual screening purposes for as long as reasonably practicable.	Implementation of commitment actions.	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV010	Southern tunnel entrance compound, Construction compound facilities	Construction compound facilities greater than 6m in height would be located to maximise distance from residential areas of Chalk and adjoining	Highways England acceptance of the layout of buildings within construction compounds	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
			Thong Lane, together with Thamesview School, as far as reasonably practicable.				
Landscape	LV011	A226 Gravesend Road compound, Bunds	Earth bunds of 3m in height would be formed from material excavated and retained on site, as material becomes available to facilitate visual screening for residential properties on Castle Lane, Chalk.	Highways England acceptance of the location of stockpiles within construction compounds	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV012	A226 Gravesend Road compound, Construction compound facilities	Construction compound facilities greater than 6m in height would be located as south-easterly as reasonably practicable to maximise distance from residential properties on Castle Lane, Chalk.	Highways England acceptance of the layout of buildings within construction compounds	Contractor	Construction	EMP2 - Requirement 4
	LV013		NOT USED				
Landscape	LV014	Northern tunnel entrance compound, Construction compound facilities, Readmans	Concrete batching plant and segment factory would be located adjacent to Readmans Industrial Estate.	Highways England acceptance of the layout of buildings and concrete batching plant within construction compounds	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV015	Station Road compound, Bunds	Where soil is excavated and retained on site temporarily, it would be stockpiled in the form of earth bunds to facilitate visual screening for residential properties along Church Road and Station Road.	Highways England acceptance of the location of stockpiles within construction compounds	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV016	Station Road compound, Construction compound facilities	Construction compound facilities greater than 6m in height would be located at the south of the compound, adjacent to the Northern tunnel entrance compound, where reasonably practicable, to maximise distance and visual screening from residential properties on Church Road and Station Road	Highways England acceptance of the layout of buildings within construction compounds	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV017	Brentwood Road compound, Bunds	Where soil is excavated and retained on site temporarily, it would be stockpiled in the form of an earth bund on the southern boundary of the compound to facilitate visual screening for residential properties within Chadwell St Mary where reasonably practicable.	Highways England acceptance of the location of stockpiles within construction compounds.	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Landscape	LV018	Brentwood Road compound, Compound construction facilities	Construction compound facilities greater than 6m in height would be located at the north of the compound, as far as reasonably practicable, to reduce visibility from residential properties at Chadwell St Mary.	Highways England acceptance of the layout of buildings and concrete batching plant within construction compounds.	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV019	Stifford Clays Road compound East, Construction compound facilities	Construction compound facilities greater than 6m in height would be located as westerly as reasonably practicable, to maximise distance from residential properties on Stifford Clays Road and Fen Lane.	Highways England acceptance of the layout of buildings within construction compounds.	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV020	Mardyke compound, Construction compound facilities	Construction compound facilities of greater than 6m in height would be located as westerly as reasonably practicable to minimise visibility from residential property (Hobletts).	Highways England acceptance of the layout of buildings within construction compounds.	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV021	Mardyke compound, Bund	Where soil is excavated and retained on site temporarily, it would be stockpiled in the form of earth bunds to facilitate screening for Hobletts to the north-east.	Highways England acceptance of the location of stockpiles within construction compounds	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV022	M25 compound, Construction compound facilities	Construction compound facilities of greater than 6m in height would be located as westerly as reasonably practicable to maximise the distance from the North Ockendon Conservation Area.	Highways England acceptance of the layout of buildings within construction compounds	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV023	M25 compound, Construction compound facilities,	It is anticipated that a concrete batching plant would be located within this compound. This facility would be located as south-westerly as reasonably practicable, to maximise distance from the North Ockendon Conservation Area.	Highways England acceptance of the layout of buildings and concrete batching plant within construction compounds	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV024	M25 compound, Bunds	Where soil is excavated and retained on site temporarily, it would be stockpiled as earth bunds on the eastern boundary of the compound to facilitate visual screening for the North Ockendon Conservation Area.	Highways England acceptance of the location of stockpiles within construction compounds.	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV025	Ockendon Road compound, Construction compound facilities	Construction of compound facilities of greater than 6m in height would be located as north-westerly as is reasonably practicable to minimise visibility from residential properties within the static caravan park located off Ockendon Road.	Highways England acceptance of the layout of buildings within construction compounds.	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV026	Ockendon Road compound, Bunds	Where soil is excavated and retained on site temporarily, it would be stockpiled in the form of earth bunds on the south and west boundaries of the compound, where required to facilitate screening for Ockendon Road and the nearest residential properties at the static caravan park.	Highways England acceptance of the location of stockpiles within construction compounds.	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Landscape	LV027	Warley Street, Construction compound facilities	Construction compound facilities of greater than 6m in height would be located adjacent to the M25, as far as is reasonably practicable.	Highways England acceptance of the layout of buildings within construction compounds.	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV028	Protection of retained vegetation	An Arboricultural Method Statement and Tree Protection Plan would be prepared in accordance with BS 5837:2012 identifying measures for the protection of retained vegetation prior to the commencement of site clearance works. These measures would be complied with during construction and all works to trees and vegetation removal would be implemented under the supervision of the Environmental Clerk of Works.	Implementation of measures for the protection of retained vegetation and avoidance of harm to retained vegetation.	Contractor	Construction	EMP2 - Requirement 4
	LV029		NOT USED				
Landscape	LV030	Veteran and ancient tree fencing	In accordance with standing advice prepared by Natural England and the Forestry Commission (2018), the following measures would be developed to protect veteran trees, ancient trees and ancient woodland identified on the Environmental Masterplan: 1. Screening barriers would be provided to protect retained ancient trees, ancient woodland and veteran trees from dust and pollution from nearby works. Locations of barriers will be defined in accordance with the requirements set out in REAC item LV028. 2. A buffer zone would be defined to avoid impact on root zones. These would be as follows: - For veteran trees, the buffer would be a minimum of 15 times the diameter of the tree trunk or five metres beyond the canopy, whichever is the greater - For ancient trees and ancient woodland, a separation distance of 15m from the canopy of the ancient trees/woodland edge would be maintained between the proposed construction activity and the asset. These measures would be followed by the Contractor unless specifically agreed by Highways England, following the advice of a qualified arboriculturist, and following non-invasive root investigations which have	Clearly defined approach to deliver successful establishment of vegetation as set out in the Environmental Masterplan	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
			determined that a smaller buffer would be appropriate to the tree or woodland.				
Landscape	LV031	Relocating lost veteran trees	Where removal of dead wood or veteran trees is required, the intact hulks of felled veteran trees would be relocated in close proximity to a nearby veteran tree, woodland or parkland area in accordance with standing advice prepared by Natural England and the Forestry Commission (2018). Dead wood would be placed within the woodland within which is located, in log piles and left to decompose naturally. This would provide opportunity for invertebrates and fungi resident within the tree to relocate. The location for the placement of the hulk will be identified following liaison with the relevant local planning authorities and be supervised by a qualified arboriculturist.	Relocation of intact tree hulks in accordance with NE and FE guidance	Contractor	Construction	EMP2 - Requirement 4
Landscape	LV032	Veteran tree replacement	A minimum of 30 individual specimen trees would be planted as replacement for 10 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, to reflect the equal split of lost trees on either side of the River. The location, stock size and species selection would be agreed with the Secretary of State following consultation with the relevant local planning authorities. Suitable species could include a combination of Oak (<i>Quercus robur</i>) and Sweet Chestnut (<i>Castanea sativa</i>). This would be undertaken during the construction phase within locations selected to allow sufficient open space for establishment of an open crown, whilst being as close as reasonably practicable to the location of the lost existing veteran trees to provide some ecological connection with other veterans nearby.	Implementation of the landscaping scheme approved by the SoS	Contractor	Construction	LEMP - Requirement 5

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Landscape	LV033	Long Lane compound A. Bunds	Where reasonably practicable, stockpiles formed from material excavated on site would be sited along the eastern boundaries of Long Lane Compound A, as material becomes available. This is to reduce visual impacts for the caravan site off Gammon Fields, and its subsequent relocation site immediately to the west.	Highways England acceptance of the location of stockpiles within construction compounds.	Contractor	Construction	EMP2 - Requirement 4
Marine Biodiversity	MB001	Construction of water management pipeline and outfall	Works to construct the water management pipeline and outfall, including any piling, must not be undertaken when the work area is either fully submerged, or partially covered by water where this would result in the transmission through the water column of noise and vibration or the generation of suspended sediments in accordance with the conditions set out by the Marine Management Organisation (MMO) in the Deemed Marine Licence.	Compliance with conditions of the Deemed Marine Licence	Contractor	Construction	Deemed Marine Licence - Schedule 15
Marine Biodiversity	MB002	Piling below mean high water spring	Techniques such as soft start/ramp-up would be utilised for the first 20 minutes of piling operations and should piling activities cease for more than 10 minutes, the soft start/ramp-up technique be repeated. Vibro-piling will be used until first refusal; thereafter impact piling being used to toe in the piles. Hammer energy would be reduced once an acceptable drive rate is observed.	Compliance with conditions of the Deemed Marine Licence	Contractor	Construction	Deemed Marine Licence - Schedule 15
Marine Biodiversity	MB003	Lighting during construction below mean high water spring	Prior to the commencement of works below mean high water springs, proposals for lighting of marine construction works subject to the Deemed Marine Licence that require 24-hour working will be developed and submitted to the MMO. This would include an assessment of the effects of measures such as directional lighting and controls on lux levels to mitigate effects on waterfowl during 24-hour operations.	Compliance with Deemed Marine Licence	Contractor	Construction	Deemed Marine Licence - Schedule 15
	MB004		NOT USED.				
	MB005		NOT USED.				

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Marine Biodiversity	MB006	Implementation invasive species introduction controls	A biosecurity risk assessment and method statement will be developed and implemented in line with the International Convention for the Control and Management of Ships' Ballast Water and Sediments (adopted in 2004; entry into force in 2017). This will outline the risks and control measures for managing the introduction of invasive non-native species.	Compliance with Deemed Marine Licence	Contractor	Construction	Deemed Marine Licence - Schedule 15
Material assets and waste	MW001	Preferentially avoiding use of primary materials	<p>1. Where design specification permits, key construction materials used would include a measurable recycled or secondary content.</p> <p>2. In line with the target set out in DMRB LA 110, 31% of aggregates used in construction would be recycled or secondary, for those applications where it is technically and economically feasible to substitute these alternative materials for primary aggregates. To facilitate compliance with this target, the Contractor would calculate the total aggregate required to achieve the detailed design, and the total where design specification dictates only primary aggregate is used. During construction, the Contractor would record the amount of primary and secondary/recycled aggregate by weight and calculate compliance with the target (offsetting the amount excluded by design specification).</p> <p>3. In line with the target set out in DMRB LA 110, 70% recycling and reuse on site of suitable, uncontaminated concrete from demolition activities to substitute use of primary material.</p> <p>4. Suitable uncontaminated concrete from demolition and construction activities would be processed to achieve non waste status in accordance with the Aggregates from Inert Waste Quality Protocol (WRAP, 2013).</p>	Implementation of commitment actions.	Contractor	Construction	EMP2 - Requirement 4
Material assets and waste	MW002	Responsible sourcing	<p>1. Priority would be given to sourcing primary, secondary and recycled aggregates from Kent, Essex and Greater London whenever the design specification permits and supply is available to embody the proximity principle.</p> <p>2. The Contractor would use the BRE Framework Standard for Responsible Sourcing (BES 6001) (BRE, 2008), to verify imported materials are sustainably sourced and managed, to reduce the impacts throughout the supply chain.</p>	Implementation of commitment actions.	Contractor	Construction	EMP2 - Requirement 4
Material assets and waste	MW003	Components standardisation	The Contractors would be required to review the design and investigate opportunities to standardise (where reasonably practicable)	Acceptance by Highways England of the material efficiency design report for works under the control of	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
			construction components such as beam depths, abutment sizes and piers to increase efficiency of materials use in production and reduce waste production. This initiative would be progressed through detail design and documented in a material efficiency design report submitted to Highways England prior to construction.	Highways England and its Contractors			
Material assets and waste	MW004	Design for off-site construction	The Contractors would be required to review the design to investigate the use of pre-fabricated structures and components and encourage a process of assembly rather than construction on site where economically and technically feasible.	Contractors to submit reports for Highways England review and acceptance prior to construction for works under the control of Highways England and its Contractors	Contractor	Construction	EMP2 - Requirement 4
Material assets and waste	MW005	Pre-demolition surveys	During construction it will be necessary to demolish various buildings, concrete structures and steel gantries. Pre-demolition surveys of these structures and buildings would be undertaken. Demolition materials would be identified and quantified including potential sources of recycled aggregate to be reused on site, as well as hazardous materials such as asbestos.	Completion of pre-demolition surveys	Contractor	Construction	EMP2 - Requirement 4
Material assets and waste	MW006	Site waste manager	During both detailed design and construction, Contractors would appoint a materials and waste manager to ensure that the waste hierarchy is implemented and opportunities are identified and implemented to reduce waste generation or improve recovery/recycling rates are identified. The materials and waste manager would be responsible for ensuring compliance with waste mitigation requirements set out in the REAC and ensuring the Site Waste Management Plan or equivalent procedures (REAC ref. MW009) are written and updated.	Acceptance by Highways England of the manager for materials and waste nominated by the Contractor for works under the control of Highways England and its Contractors.	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Material assets and waste	MW007	Reuse of excavated materials and soils	<p>1. Excavated material would be managed in line with the waste hierarchy with preference given to reuse where feasible and the design allows.</p> <p>2. Clean, naturally occurring soils would be reused on-site in line with Directive 2008/98/EC on Waste (Waste Framework Directive), Article 2.</p> <p>3. Contractors would implement all required environmental permits, exemptions and a Materials Management Plan (in accordance with the Definition of Waste: Development Industry Code of Practice (CL:AIRE, 2011) for the reuse of made ground and contaminated soils.</p> <p>4. Material that are not suitable for reuse or in excess to requirements would likely be managed as waste.</p>	Compliance with Material Management Plan and Duty of Care Requirements	Contractor	Construction	EMP2 - Requirement 4
Material assets and waste	MW008	Characterisation of excavated fill	A ground investigation would be used to identify material that would be excavated on site that could be used as Class I-IV fill materials or construction aggregate to reduce the need to import equivalent materials in more detail.	Completion of ground investigation for works under the control of Highways England and its Contractors	Contractor	Construction	EMP2 - Requirement 4
Material assets and waste	MW009	Site waste management procedures	The Contractors would produce Construction Site Waste Management Plans (CSWMP), substantially in accordance with the requirements of the Outline Site Waste Management Plan (oSWMP).	Approval of Construction Site Waste Management Plans as part of EMP 2 by the Secretary of State	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Material assets and waste	MW010	Site waste management	<p>Contractors would implement the following measures during construction in order to enhance recovery and recycling rates and minimise the quantities of waste:</p> <ol style="list-style-type: none"> 1. All waste arisings would be characterised and recorded. 2. All wastes would be classified, with mirror entry code wastes sampled to determine classification, in line with the prevailing technical guidance. 3. Waste management off-site would be completed under Duty of Care (Section 34 Environmental Protection Act). All waste would be transported using licensed carriers and taken only to appropriately permitted facilities. All waste movements would be accompanied by waste documentation such as Waste Transfer or Consignment Notes (dependent of waste class) which would be retained for the appropriate legal period. 4. Satisfy the legal need under the Waste (England and Wales) Regulations 2011 (as amended) for pre-treatment of waste and confirm this in a written declaration on the associated waste documentation. 5. Demonstrate and document that sufficient space has been allowed within the construction working areas for stockpiles for topsoil, contaminated material (for later off-site management), materials to be reused, excess clean material and imported materials for construction. This would enable the segregation of waste types, prevent the mixing of hazardous and non-hazardous wastes and enhance recovery rates by minimising degradation, damage and loss. 6. Segregate hazardous and non-hazardous waste, separating waste at source by type, where reasonably practicable, providing separate skips for general waste, metal, dry recycling and timber as a minimum at each compound. Suitable provision would also be made for common hazardous wastes, e.g. used absorbents, aerosol cans, oily rags and waste electronics. 	Implementation of site waste management procedures and Duty of Care obligations	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Material assets and waste	MW010 (continued)		<p>7. Provide impermeable surfaces with sealed drainage for remediation, quarantine and hazardous waste storage areas to minimise cross contamination of other waste streams and surrounding ground.</p> <p>8. Label stockpiles and skips with contents, to prevent the mixing of hazardous and non-hazardous wastes.</p> <p>9. Comply with any specific waste storage and handling requirements required by legislation, e.g. for asbestos or waste electronics.</p> <p>10. Vegetation waste should be reused on site wherever possible, e.g. for ecological mitigation (unless contaminated by invasive species).</p> <p>11. Where possible agree with material suppliers to reduce the amount of packaging on materials or to participate in a packaging take-back scheme.</p> <p>12. Implement a material delivery system to avoid materials being stockpiled, which increases the risk of their damage and disposal as waste.</p> <p>13. Monitor material quantity requirements to avoid over-ordering to reduce opportunity for oversupply and damage on site which would generate waste materials.</p> <p>14. Prioritise off-ground storage, e.g. on pallets, retention of materials in original packaging, protection from rain and collision by plant or vehicles.</p> <p>15. Ensure that the storage of lightweight or liquid/sludge waste materials will prevent dispersion by wind and precipitation.</p> <p>16. Seal stockpiles in place for over 30 days to maintain integrity of material.</p> <p>17. Seed topsoil stockpiles to reduce soil loss and maintain soil quality.</p> <p>18. Prohibit the burning of waste and unwanted materials on-site.</p> <p>19. In line with the requirements of DMRB LA 110, enhancement opportunities would be identified, reported and implemented during detailed design and construction to minimise the demand for material and the amount of waste sent for final disposal in landfill.</p>	Implementation of site waste management procedures	Contractor	Construction	EMP2 - Requirement 4
Material assets and waste	MW011	Reuse of materials	The Contractor would seek to achieve a target that 95% (by weight) of inert excavated materials destined for off-site waste management outside the Order Limits would be diverted from final disposal in landfill.	No more than 5% (by weight) of waste inert excavated materials would be placed in landfill.	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Material assets and waste	MW012	Reuse sites	The Contractor would identify reuse sites that score positively against a sustainability scoring system agreed with Highways England.	Implementation of commitment actions for works under the control of Highways England and its Contractors	Contractor	Construction	EMP2 - Requirement 4
Material assets and waste	MW013	Recycling and recovery of materials	The Contractor would use the methodology in the Waste Framework Directive (2008/98/EC) to demonstrate the recovery of non-hazardous construction waste, with a target of 90%. The Contractor would achieve a minimum recovery of 70% (by weight).	Achievement of specified target for works under the control of Highways England and its Contractors	Contractor	Construction	EMP2 - Requirement 4
Material assets and waste	MW014	Monitoring operational phase	The road operator would provide a summary of materials used and waste generated during the first year of operation in line with requirements of DMRB LA 110 Material Assets and Waste and used to update the Environmental Management Plan for future operational years.	Reporting of first year operational demand for materials and waste generation	Highways England	Operation	EMP2 - Requirement 4
Material assets and waste	MW015	Hazardous construction waste disposal	The Contractor would seek to achieve a target of 70% (by weight) of hazardous construction waste to be diverted from landfill. It is anticipated that this would be achieved by undertaking remediation or treatment within the Order Limits or off site at third party facilities. It is acknowledged that the nature of some hazardous construction waste may preclude this. Where a hazardous construction waste cannot be diverted from landfill, the justification and evidence will be provided by the Contractor and logged by the Contractor in the SWMP.	Achievement of specified target for works under the control of Highways England and its Contractors	Contractor	Construction	EMP2 - Requirement 4
Noise and vibration	NV001	Noise and Vibration level controls	Noise and vibration levels would be controlled in accordance with BS 5228: Code of practice for noise and vibration control on construction and open sites, to reduce disturbance to the environment and communities in the vicinity of the construction works, including Thames Estuary and Marshes SPA/Ramsar and associated functionally linked land.	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4
Noise and vibration	NV002	Noise and Vibration Plan	A Noise and Vibration Management Plan (NVMP) or equivalent would be prepared for each part of the construction works subject to Section 61 control for consideration by the relevant planning authority.	Approval of NVMP or equivalent by the SoS in consultation with local planning authority	Contractor	Construction	EMP2 - Requirement 4
Noise and vibration	NV003	Conveyor systems	A maintenance programme which includes inspection of the conveyor equipment would be implemented to reduce noise and vibration.	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Noise and vibration	NV004	Section 61 Consents	Where appropriate, consents would be obtained from the relevant local authorities under Section 61 of the Control of Pollution Act 1974 (which may include noise and vibration limits where relevant) for the proposed construction works.	Compliance with the terms of Section 61 consents	Contractor	Construction	EMP2 - Requirement 4
Noise and vibration	NV005	Baseline noise levels	Pre-construction baseline noise levels would be submitted to the relevant planning authority to establish a pre-construction baseline for monitoring compliance with construction noise limits.	Acceptance by the EHO for relevant planning authorities on baseline levels to inform Section 61 consents	Contractor	Construction	EMP2 - Requirement 4
Noise and vibration	NV006	noise assessment	Construction works would be assessed in accordance with BS 5228 using specific manufacturer's data and proposed position of equipment. Results of the assessment would be presented to the Environmental Health Officers of the relevant planning authorities prior to commencement of that part of the construction works, as appropriate, to inform consideration of Section 61 agreements.	Agreement with the EHO for relevant planning authorities on the terms of Section 61 consents	Contractor	Construction	EMP2 - Requirement 4
Noise and vibration	NV007	Best Practicable Means	<p>Best Practicable Means as defined under Section 72 of the Control of Pollution Act 1974 would be employed during the construction phase to reduce noise nuisance. These would include measures such as:</p> <ul style="list-style-type: none"> - installing and maintaining hoarding around the construction areas likely to generate noise - keeping site access routes in good condition with condition assessments on site to inspect for defects such as potholes - turning off plant machinery when not in use - maintaining all vehicles and mobile plant such that loose body fittings or exhausts do not rattle or vibrate - using silenced equipment where available, in particular silenced power generators and pumps - no music or radios would be played for entertainment purposes outdoors on-site - plan site layout to ensure that reversing is kept to a reasonably practicable minimum. Reversing manoeuvres, that are required would be managed by a trained banksman/vehicle marshal to ensure they are conducted safely and concluded quickly - non-percussive demolition techniques would be adopted where reasonably practicable to reduce noise and vibration impact 	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Noise and vibration	NV008	Community Engagement	Residents would be notified of particularly noisy work such as percussive piling and concrete breaking prior to their commencement. The mechanisms for notification will be detailed in the Community Engagement Plan. Effective communication would be established, keeping local residents informed of the type and timing of works involved, paying particular attention to potential evening and night-time works and activities which may occur in close proximity to receptors.	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4
Noise and vibration	NV009	Noise Monitoring	During the construction phase, day- and night-time noise and vibration monitoring would be undertaken at locations identified in consultation with the relevant local planning authorities to ensure that the mitigation measures suggested are working effectively.	Compliance with the terms of Section 61 consents	Contractor	Construction	EMP2 - Requirement 4
	NV010	Haulage routes	A maintenance programme which includes inspection of all haul routes and infill of potholes and other surface irregularities would be implemented to reduce noise and vibration.	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4
Noise and vibration	NV011	Acoustic barriers	The performance of acoustic barriers would be compliant with the specifications and requirements of DMRB LD 119 'Roadside environmental mitigation and enhancement – Appendix A'.	Installation of acoustic barriers	Contractor	Operation	EMP2 - Requirement 4
Noise and vibration	NV012	Conveyor systems	An acoustic insulation cover would be installed to reduce noise from conveyor systems that are operating within 300m of noise sensitive receptors including the Thames Estuary and Marshes SPA/Ramsar and associated functionally linked land.	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4
Noise and vibration	NV013	Road surfacing	A 'Level 3', very quiet road surfacing system, as defined by Highways England Specification for Highways Work Volume 1, Series 900, Table 9-17, shall be provided on all new and altered trunk roads and associated slip roads forming part of the Project.	Implementation of commitment actions	Contractor	Operation	EMP2 - Requirement 4
Noise and vibration	NV014	Operational fixed plant at tunnel service buildings	The noise emitted from operational fixed plant located at the tunnel service buildings shall not result in exceedance of the existing background level by more than 0dB(A) at the nearest residential receptors when assessed in accordance with BS 4142: 2014+A1:2019.	Implementation of commitment actions	Contractor	Operation	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Noise and vibration	NV015	Actions in case of noise monitoring exceedance	In the event that noise and vibration monitoring (as provided for in NV009) identifies that noise and vibration limits (as provided for in NV004) have been exceeded, the Contractor shall, at the earliest reasonably practicable opportunity, investigate to confirm that works being undertaken as part of the Project are the source of the noise. If this is confirmed, then the Contractor shall immediately undertake a further review of the best practicable means (as defined under the Control of Pollution Act, 1974) employed for the activity to minimise noise and agree additional or modified mitigation with the relevant local authority unless otherwise agreed with the Secretary of State .	Agreement with the EHO for relevant planning authorities on revisions to the terms of Section 61 consents unless otherwise agreed with the Secretary of State.	Contractor	Construction	EMP 2-Requirement 4
Population and Human Health	PH001	Public Rights of Way	Construction works would be planned in order to reduce the durations of time which footpaths, cycleways and bridleways would need to be closed. For such Public Rights of Way the following mitigation measures would be adopted: a) Early engagement with members of the public and relevant stakeholders (for example, local walking groups), in order to ensure they are fully appraised of any closures and diversions as far in advance as reasonably practicable. b) Clear and concise signposting would be used in order to clearly outline any temporary diversions as and when they are necessary. This would be carried out in consultation with the local highways authority, Public Right of Way officers and other relevant stakeholders. c) Social media would be used in order to update members of the public of any closures and diversions which are in place.	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4 and the Traffic Management Plan under Requirement 10
Road Drainage and Water Environment	RDWE001	Temporary drainage design	Work site drainage systems would incorporate pollution control systems designed in line with Control of Water Pollution from Construction Sites C532 (CIRIA, 2001) or as agreed with the Secretary of State. Watercourses near work sites would be regularly inspected for signs of siltation or other forms of pollution in line with CIRIA C741 guidance (CIRIA, 2015) and pumped groundwater, process effluents and construction site runoff would be tested to ensure compliance with discharge consent requirements.	Approval by SoS of construction site drainage systems following consultation with the relevant planning authority	Contractor	Construction	Requirement 8
Road Drainage and Water Environment	RDWE002	Temporary drainage design	Work site drainage systems would be inspected and maintained to ensure they continue to	No pollution of surface or groundwater from site drainage	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
			operate to their design standard, safeguarding surface and groundwater quality.				
Road Drainage and Water Environment	RDWE003	TBM water supply	The water to supply to the TBM may be supplied by groundwater abstracted from a Northumbrian Water borehole at Linford. If this is the case, then extraction rates would be agreed Northumbrian Water prior to commencement of main tunnelling works and would not be exceeded.	Compliance with agreed extraction rates	Contractor	Construction	EMP2 - Requirement 4
Road Drainage and Water Environment	RDWE004	Construction water management	Water use efficiency and leakage reduction measures would be adopted during the construction phase, such as use of water efficient fittings (taps, toilets) in site offices and welfare facilities, use of misting/atomising systems for dust suppression, drive on recirculating systems for wheel washing, and sub metering to help in detecting leaks where reasonably practicable.	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4
Road Drainage and Water Environment	RDWE005	Construction water management	Wastewater generated from the compound welfare facilities would be discharged to sewer, subject to the agreements with the utility providers, or in locations where a sewer connection is not reasonably practicable, collected and tankered off site for disposal at a licensed treatment facility.	Compliance with sewer discharge consents	Contractor	Construction	EMP2 - Requirement 4
Road Drainage and Water Environment	RDWE006	Construction water management	Surface water drainage would be provided for all surfaced roads and yards, buildings and any other hard or impermeable surfaces within construction compounds or worksites. Berms and bunds would be constructed to manage surface water runoff where necessary to protect watercourses, prevent ponding and to keep general runoff separate from contaminated runoff. Rainfall runoff from areas where there is a risk of contamination would be managed using temporary drainage systems and would be subject to treatment prior to discharge to any surface watercourse or drain. Rainfall runoff from areas of low contamination risk would be captured and reused where reasonably practicable e.g. to supply wheel wash facilities or for dust suppression, to reduce consumptive water use.	SoS approval of drainage system details following consultation with the relevant planning authority	Contractor	Construction	Requirement 8
Road Drainage and Water Environment	RDWE007	Protection of flood defences from ground movement	The potential for an impact on the integrity of the River Thames flood defences due to ground movement during tunnelling would be reduced by adopting good tunnelling practice, such as;	Avoidance of settlement that may affect the integrity of flood defences	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
			continuous working, erecting linings immediately after excavation, grouting, management of tunnel face pressures and the measurement of excavated material quantities. In line with the requirements of the Environment Agency, flood defences would be monitored to establish a pre-construction baseline and for a period of at least two years after completion of works to construct the tunnel to enable detection of any effects on the structural integrity/condition of the assets during construction of the Project. The monitoring methodology would be agreed with the Environment Agency and would continue until the annual rate of settlement is less than a rate identified agreed with the Environment Agency.				
Road Drainage and Water Environment	RDWE008	Protection of watercourses during utility works	Where below ground utilities diversions are required, watercourses would be crossed using trenchless techniques in order to avoid disturbance to channel form, flow regimes and riparian habitats and species, unless other techniques are agreed with the Environment Agency or LLFA, where relevant.	Implementation of commitment actions	Contractor	Construction	Protective Provisions – Schedule 14
Road Drainage and Water Environment	RDWE009	Reinstatement of bankside vegetation	Bankside vegetation would be reinstated at culvert entries and exits following the completion of construction works as soon as conditions are suitable for planting.	Successful reinstatement of vegetation at these locations within 12 months.	Contractor	Construction	LEMP - Requirement 5
Road Drainage and Water Environment	RDWE010	Bank protection	Where bank protection is required during construction work, this would take the form of soft or natural river bank protection, such as coir or other biodegradable geotextiles.	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4
Road Drainage and Water Environment	RDWE011	Operational drainage design	To reduce the potential for scour and associated hydromorphological change, highway drainage outfall headwall arrangements would be set back from the banks of the receiving watercourses and outfall designs would accord with DMRB CD 529.	SoS approval for details of drainage system following consultation with the relevant planning authority	Contractor	Construction	Requirement 8
Road Drainage and Water Environment	RDWE012	Operational drainage maintenance	Drainage infrastructure and treatment systems would be maintained in accordance with the Highways England GS 801: Asset Delivery asset inspection requirements and GM 701: Asset delivery asset maintenance requirements (ADAMr) as applicable, to ensure they continue to operate to their design standard to safeguard surface and groundwater quality.	No pollution of surface or groundwater from site drainage	Highways England	Operation	EMP3 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Road Drainage and Water Environment	RDWE013	Culvert design	Where culverting cannot be avoided, new culverts would be sized to maintain the current land drainage regime and to convey flood flows, inclusive of an allowance for climate change, without causing any detriment to baseline flood risk. Culvert inverts would be buried below existing bed levels to allow baseline bed levels, slopes and bed materials to be maintained.	SoS approval for details of drainage system following consultation with the relevant planning authority	Highways England	Operation	Requirement 8
Road Drainage and Water Environment	RDWE014	Culvert maintenance	Culverts would be inspected and maintained, in accordance with Highways England GS 801: Asset Delivery asset inspection requirements and GM701: Asset delivery asset maintenance requirements (ADAMr) as applicable. Where there are any additional specific inspection or maintenance requirements these would be documented in the Maintenance and Repair Statement.	Unobstructed free flow of culverted waters	Highways England	Operation	EMP3 - Requirement 4
Road Drainage and Water Environment	RDWE015	Replacement of existing reservoir at Low Street	An existing well and reservoir at Low Street used by a landowner to pump and store groundwater to feed irrigations systems would be crossed by the Project. Prior to works for the construction of the viaduct crossing that may impact this well and reservoir, this water supply system would be reconfigured, as agreed with the landowner, to maintain continuity of supply during construction and operation of the Project.	Continued provision of irrigation water at this location.	Contractor	Operation	EMP2 - Requirement 4
Road Drainage and Water Environment	RDWE016	Replacement of landowner water supply at North Ockendon	An existing surface water abstraction which is fed by groundwater flows emerging as a spring near North Ockendon may be compromised by the construction of the cutting beneath the M25. Prior to construction of the cutting an alternative water supply would be provided. The new supply would be tested for continuity of supply and water quality for a minimum period of six months from installation or as agreed with the landowner. A supply route from the new source to the existing landowner irrigation system would also be provided.	Continued provision of irrigation water at this location.	Contractor	Operation	EMP2 - Requirement 4
Road Drainage and Water Environment	RDWE017	Ground improvement tunnel	The Contractor would stabilise the ground to reduce ground movement (e.g. to protect Network Rail assets), facilitate operation of the TBM and maintenance of the cutterhead using a ground improvement tunnel or other suitable methods accepted by Highways England that would avoid the need for surface excavations/penetrations within areas designated for protection of wildlife.	Avoidance of surface excavation associated with TBM operation in areas on the southern shores of the River Thames designated for wildlife protection.	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Road Drainage and Water Environment	RDWE018a	Ground improvement tunnel	<p>The ground improvement tunnel and shafts, if used under REAC ref. RDWE017, would be constructed using methods to control groundwater pumping and ingress such as:</p> <ul style="list-style-type: none"> • Wet excavation and grout plug placement to form the shafts • Use of an earth pressure balancing TBM to form a lined tunnel with a specified maximum leakage rate compliant with the Lower Thames Crossing tunnelling specification. <p>Water and flow monitoring would be undertaken for the periods that the ground improvement tunnel is being used for construction purpose, in consultation with Environment Agency, to verify compliance with the tunnels design specification regarding maximum permissible rates of water ingress.</p>	Prior acceptance of methods by Highways England and implementation of monitoring in consultation with the Environment Agency	Contractor	Construction	EMP2 - Requirement 4
Road Drainage and Water Environment	RDWE018b	Ground improvement tunnel	<p>The ground improvement tunnel and shafts, if used under REAC ref. RDWE017, would be decommissioned by backfilling with suitable materials to ensure the ground improvement tunnel and shafts are completely filled. No temporary works would be left in the upper 2m of ground. Shaft sites would be returned to their current land use.</p>	Prior acceptance of methods by Highways England and implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4
Road Drainage and Water Environment	RDWE019	Ground treatment	<p>Chemicals and materials, such as cement, grout and lubricants used during construction activities in proximity to any groundwater Source Protection Zone would be stored, transported and used in a suitable manner to safeguard potable water supply.</p>	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4
Road Drainage and Water Environment	RDWE020	Ground treatment	<p>Construction of cross passages between the main tunnels would use groundwater control techniques, such as grouting or ground freezing, to reduce the requirement for dewatering and therefore local groundwater drawdown.</p>	Working methods to be approved by Highways England prior to construction	Contractor	Construction	EMP2 - Requirement 4
Road Drainage and Water Environment	RDWE021	Bankside reinstatement	<p>Bankside vegetation reinstatement and planting at the entrances to West Tilbury Main culvert would be designed to ensure no sharp light/dark interface to encourage continued fish passage. This would be achieved by planting with a scrub mix that will include Alder. Root barriers would be installed to protect structural integrity of the bank as appropriate.</p>	Successful establishment of suitable scrub mix within 24 months to provide diffuse shading	Contractor	Construction	LEMP - Requirement 5

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Road Drainage and Water Environment	RDWE022	A226 Gravesend Road, Milton, Northern tunnel entrance, Station Road and Mardyke compounds. Construction flood risk	In accordance with the requirements of the National Planning Policy Framework regarding development and flood risk, the Northern tunnel entrance, Station Road and Mardyke compounds to the north of the River Thames and the Southern tunnel entrance and Milton compounds to the south of the River Thames which are partially sited within Flood Zones 2 and 3, would be laid out in accordance with a site-specific flood risk assessment following the Sequential Test, where facilities at highest vulnerability to flooding, e.g. sleeping accommodation, medical and welfare and principal office facilities, are located in the lowest flood risk zone (Zone 1). Only low vulnerability and water compatible uses would be situated in the high-risk Flood Zone 3.	Acceptance by Highways England of the layout of buildings and facilities within construction compounds.	Contractor	Construction	EMP2 - Requirement 4
Road Drainage and Water Environment	RDWE023	River Thames discharge	To mitigate potential effects on water quality and hydrodynamics within the River Thames, the discharge arrangement described in REAC ref. RDWE028 would be constructed and operational in advance of the excavation of the North Portal and tunnelling works and would be used as the temporary discharge for treated construction phase effluents. All effluents would receive treatment prior to discharge into the Thames to ensure compliance with any limits detailed in the conditions of discharge as agreed with the Environment Agency.	Compliance with the Deemed Marine Licence and EA Discharge Consent	Contractor	Construction	Deemed Marine Licence - Schedule 15
Road Drainage and Water Environment	RDWE024	Maintenance and decommissioning of marine structures	Potential effects arising from the maintenance, use and decommissioning of marine structures would be controlled by the measures agreed with the MMO as detailed in the Deemed Marine Licence.	Compliance with the Deemed Marine Licence	Contractor	Construction	Deemed Marine Licence - Schedule 15
Road Drainage and Water Environment	RDWE025	Operational drainage design	Drainage design would include a treatment train for highway runoff designed in accordance with DMRB CG 501 and CD 532 to meet the requirements specified for each outfall to surface watercourses. Further survey and sampling to define the flow regime and water quality of receiving watercourses would be carried out at proposed points of discharge to inform the detailed design of treatment measures.	SoS approval for details of drainage system following consultation with the relevant planning authority	Contractor	Operation	Requirement 8
Road Drainage and Water Environment	RDWE026	Tunnel operational drainage design	The drainage system would include provision for the capture and isolation of contaminated waters to prevent pollution of the receiving watercourse. Discharges would be restricted to high tide conditions in order to maximise available dilution and mixing and to prevent scour/erosion of the intertidal zone.	SoS approval for details of drainage system following consultation with the relevant planning authority	Contractor	Operation	Requirement 8

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Road Drainage and Water Environment	RDWE027	Tunnel lining specification	Water infiltration into the tunnel bores and cross passages during operation would be reduced by measures including gaskets (for segmentally lined tunnels) and membranes (for sprayed concrete lined tunnels), compliant with the Lower Thames Crossing tunnelling specification.	Acceptance of detail design by Highways England	Highways England	Construction	EMP2 - Requirement 4
Road Drainage and Water Environment	RDWE028	North Portal construction compound drainage discharge	Drainage from the North Portal construction compound is proposed to outfall from the north side of the River Thames. The design of the discharge pipeline and outfall to the River Thames would provide for a subtidal mid-water discharge for effective dilution and dispersal, and to reduce disturbance to the intertidal zone. The discharge infrastructure would be designed in accordance with measures agreed with the Marine Management Organisation (MMO) as detailed in the Deemed Marine Licence (DCO Schedule 15).	Compliance with Deemed Marine Licence	Contractor	Construction	Deemed Marine Licence - Schedule 15
Road Drainage and Water Environment	RDWE029	Flood alleviation	Incorporation of a suite of flood alleviation measures such as altering road geometry to set the vertical alignment of carriageways above the design flood level, inclusive of freeboard and allowance for climate change resilience, including provision for flood bunds or walls to protect areas where the vertical alignment of the road is lower than the design flood level, to make the development safe from flooding over its design lifetime in line with the requirements of DMRB LA 113.	Approval of the flood risk design measures by the Secretary of State in consultation by the Environment Agency	Contractor	Operation	EMP2 - Requirement 4
Road Drainage and Water Environment	RDWE030	Culverting of Tilbury Main and maintaining fish passage	The West Tilbury Main culvert would integrate a fish pass aid designed for eels and elvers, incorporating some form of matrix, such as bristles, to assist their migration by crawling/climbing instead of swimming.	Highways England acceptance of the detailed design after consultation with the Environment Agency	Contractor	Operation	EMP2 - Requirement 4
Road Drainage and Water Environment	RDWE031	Culverting of Tilbury Main and maintaining fish passage	The West Tilbury Main culvert would be partially submerged at its downstream end to prevent perching and a resting pool for coarse fish would be provided immediately downstream of the culvert, with a minimum depth of 30cm.	Highways England acceptance of the detailed design after consultation with the Environment Agency	Contractor	Operation	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Road Drainage and Water Environment	RDWE032	Potable groundwater protection	The proposed road drainage attenuation and treatment pond located at Chadwell St Mary, as indicated on the Environmental Masterplan, is situated within a groundwater Source Protection Zone 1. The pond would include an impermeable lining in order to prevent seepage of drainage discharges into the ground to safeguard potable groundwater quality.	SoS approval for details of drainage system following consultation with the relevant planning authority	Contractor	Operation	Requirement 8
Road Drainage and Water Environment	RDWE033	Discharge from construction of South Portal	Water discharged into the western ditch from the South Portal construction compound would be treated to the standard specified within the discharge licence consent granted by the Environment Agency and released at greenfield runoff rates. The runoff collection and management system would be operated until full reinstatement of the compound area is complete. The water quality standards for the discharge into the western ditch will include (but not be limited to) the following parameters and would not exceed these values unless otherwise agreed by the Environment Agency as part of its discharge licence consents (such agreement not to be unreasonably withheld or delayed) which would be set following consultation with Natural England: Discharge rate of no more than 2ls ⁻¹ ; chemical composition of suspended solids less than or equal to 25mg/l; and pH between 6.56 and 9.86.	Compliance with EA discharge licence	Contractor	Construction	EMP2 - Requirement 4
Road Drainage and Water Environment	RDWE034	Operational drainage	To safeguard groundwater Water Framework Directive chemical status, infiltration basins fitted with treatment systems would be provided at the locations identified on the Environmental Masterplan. Proposed new infiltration basins serving smaller road drainage catchments at the A13 junction and south of the River Thames would have vortex grit separators. Those serving larger drainage catchments south of the River Thames would include lined sedimentation basins, vortex grit separators and penstock chambers. The two cascading infiltration basin systems, both located to the south of the River Thames as illustrated on the Environmental Masterplan, would incorporate sedimentation basins, areas of vegetated wetlands and penstock chambers. Where existing infiltration basins along the A2/M2 and at the M25 are to be retained and used by the Project, existing oil interceptors would be replaced with vortex grit separators	SoS approval for details of drainage system following consultation with the relevant planning authority	Contractor	Operation	Requirement 8

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
			and a penstock chamber to allow isolation and clean-up of accidental spillages.				
Road Drainage and Water Environment	RDWE035	Operational drainage	Where the Project ties in with the existing A2/M2 and M25 highways, the existing drainage infrastructure would be enlarged to accommodate the discharge from catchments affected by the Project in accordance with current design guidance, with appropriate allowances for climate change as detailed in DMRB CG 501: Design of Highway Drainage Systems and in line with Lead Local Flood Authority requirements. Specifically, the enlargement of existing M25 drainage infrastructure affected by the Project, as illustrated on the Environmental Masterplan, would achieve a minimum reduction in existing runoff rates of 50% by providing additional storage capacity. New drainage infrastructure, illustrated on the Environmental Masterplan, would serve the remainder of the Project and would provide storage to achieve discharges to surface watercourses at greenfield rates.	SoS approval for details of drainage system following consultation with the relevant planning authority	Contractor	Operation	Requirement 8
	RDWE036		NOT USED				

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Road Drainage and Water Environment	RDWE037	Mitigating effects of construction in the floodplain	Compensatory flood storage would be provided to offset the volume of floodplain storage lost to the Project, and to retain water in upland catchments. The compensatory storage would be formed and expanded in stages during construction of the Project. The compensatory storage may be used to offset any temporary loss of floodplain storage provided that the compensatory flood storage provisions always offset the total volume of lost floodplain storage.	Compliance with EA Flood Risk Activity Permit	Contractor	Construction	EMP2 - Requirement 4
Road Drainage and Water Environment	RDWE038	Avoiding impacts on Cranham Marsh Local Nature Reserve	Habitat survey data have identified discrete pockets of vegetation which is typically groundwater dependent at Cranham Marsh Local Nature Reserve (LNR). During detailed design, having regard for ground investigation (GI) data, measures to reduce groundwater drawdown beyond the M25 cutting, comprising either the extension of retaining walls or other seepage control systems, would be confirmed. If confirmed to be necessary, the detail of such measures will be agreed in consultation with London Borough of Havering and the Environment Agency and implemented as needed to protect groundwater dependent habitat at the LNR.	No detriment to groundwater supply at Cranham Marsh LNR	Contractor	Construction	EMP2 - Requirement 4
Road Drainage and Water Environment	RDWE039	Flood bund at Orsett Fen	A flood bund would be provided to ensure that flood risk outside of land to be retained by Highways England is not increased as a result of the Project. The bund would be located in Orsett Fen, to the west of the route alignment.	SoS approval for details of drainage system following consultation with the relevant planning authority	Contractor	Operation	Requirement 8
Road Drainage and Water Environment	RDWE040	Maintaining floodplain flow connectivity	A flood relief channel would be provided to maintain floodplain connectivity and prevent embankments forming continuous barriers to floodplain flow conveyance. The channel would be formed immediately to the west of the Mardyke at the point it crosses under the proposed viaduct.	SoS approval for details of drainage system following consultation with the relevant planning authority	Contractor	Operation	Requirement 8
Road Drainage and Water Environment	RDWE041	Avoiding scour protection works in River Thames	The main tunnels would be constructed so that the crown of the tunnel is at sufficient depth below the bed of the River Thames to avoid the need for any works within the river to provide tunnel scour protection.	No works within the River Thames channel to provide tunnel scour protection	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
	RDWE042		NOT USED				
Road Drainage and Water Environment	RDWE043	Managing construction drainage	In order not to compromise their function, existing drainage attenuation features (ponds and infiltration basins) on the A2/M2 and M25 highways affected by the Project, as illustrated on the Environmental Masterplan, would not be used to receive construction work site runoff over and above runoff from the existing drained area.	Use of construction site drainage systems, which do not use the existing drainage attenuation features on the A2/M2 and M25 highways.	Contractor	Construction	EMP2 - Requirement 4
Road Drainage and Water Environment	RDWE044	Mammal passages in culverts	To ensure continued mammal passage, mammal ledges and underpasses at locations identified in the Environmental Masterplan would be designed to be set above flood levels at a 1 in 100 year (1% annual probability) flood event, while maintaining 600mm headroom from the top of the mammal ledge to the soffit of the culvert. Following Essex County Council's (2012) Culvert Policy and the Environment Agency Fluvial Design Guide – Chapter 8.6 'Culverting of watercourses' (2019), ledges would be at least 500mm wide and accessible from bank ramps.	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB001	Hedgerow replacement	Hedgerow habitat lost during construction would be compensated by creating new hedgerows at locations shown on the Environmental Masterplan, using native species of local provenance. Planting would be undertaken as early in the construction programme as reasonably practicable, having regard for the completion of potentially damaging construction activities within and adjacent to the planting area, and seasonal requirements for planting.	Successful establishment of new hedgerow.	Contractor	Construction	LEMP - Requirement 5
Terrestrial Biodiversity	TB002	Maintaining integrity of important habitats adjacent to works	Temporary fencing would be used to demarcate important and protected habitats, preventing construction access to protect them from accidental damage. Important and protected habitats include ecological translocation sites, and retained woodland, trees and hedgerows shown on the Environmental Masterplan. Fencing would be installed under the supervision of the Environmental Clerk of Works and in	Successful retention of important habitats.	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
			accordance with good practice guidance such as BS 5837:2012 Trees in relation to design, demolition and construction.				
Terrestrial Biodiversity	TB003	Maintaining integrity of important habitats adjacent to works	Work compounds, access tracks, haulage routes, material storage areas, generators and other construction activities would not be located within areas of retained vegetation shown on the Environmental Masterplan.	Implementation of commitment actions.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB004	Breeding birds	Disturbance, and incidental mortality, of breeding birds would be avoided by timing vegetation clearance and structure removal outside of the bird nesting season (March to August inclusive) wherever possible. Where this is not possible, appropriate measures would be taken to avoid harming birds or their nests (such as temporary fencing around nesting sites where they are immediately adjacent to construction works), under supervision by a suitably experienced Environmental Clerk of Works.	Compliance with the Wildlife and Countryside Act 1981 (as amended).	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB005	Invasive species	Invasive species would be identified prior to construction and would be removed or treated to prevent their spread, following the Construction Industry Research and Information Association's (CIRIA) guidance in Wade et al. (Invasive Species Management for Infrastructure Managers and the Construction Industry, 2008)	Implementation of commitment actions.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB006	Environmental Clerk of Works	Employment of suitably qualified and experienced Environmental Clerks of Works (ECoW) throughout the construction phase of the project to supervise implementation of environmental mitigation and protection commitments.	Acceptance by Highways England of the ECoW nominated by the Contractor.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB007	Habitat management	Retained and new habitats would be managed having regard for Natural England's The Mosaic Approach: Managing Habitats for Species (2013) to improve both priority habitats and species.	Implementation of procedures for long term management of habitat created under the landscaping scheme	Highways England	Operation	EMP3 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Terrestrial Biodiversity	TB008	Badger setts	Badger setts identified within the Order Limits for closure would be closed by permanently excluding badgers and then removing the empty setts. The setts would be closed under licence from Natural England outside of the badger breeding season (breeding season takes place between 1 December and 30 June). For any main setts that will be closed with no suitable naturally occurring alternative sett, an artificial sett will be constructed in a suitable location.	Compliance with requirements of Natural England licences.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB009	Bat roosts	Bat roosts that would be lost or heavily disturbed due to construction or operational activities would be removed under licence and alternative roosting structures would be provided in areas indicated on the Environmental Masterplan.	Compliance with requirements of Natural England licences.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB010	Barn owl breeding sites (direct loss)	Barn owl breeding sites that would be lost due to construction would be removed while not in active use. Alternative breeding sites (nest boxes) would be provided >1.5km away from the Project boundary and other major roads, within an appropriate setting and in compliance with Barn Owl Trust advice (2015). As agreed with the Essex Wildlife Trust (EWT), a minimum of 12 artificial nest boxes would be installed in land managed by them. This would provide a replacement ratio two boxes for one lost site; the final number of boxes required would be informed by pre-construction surveys.	Provision of Barn owl breeding sites	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB011	Barn owl breeding sites (disturbance)	Barn owl breeding sites which would not require closure, but that may be subject to disturbance due to proximity to works would be screened by acoustic fencing to prevent disturbance during the breeding season under the supervision of the Environmental Clerk of Works.	Implementation of commitment actions in accordance with Natural England guidance.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB012	Breeding birds (temporary loss of nesting habitat)	Bird nest boxes would be provided within areas of retained woodland and trees shown on the Environmental Masterplan to supplement the habitat creation by offsetting the loss of nesting opportunities whilst newly created habitats establish. A ratio of 10 assorted small nest boxes and one medium open fronted nest box per hectare of lost woodland/scrub would be adopted in accordance with BTO Field Guide No. 23, where it is reasonably practicable to erect this number of nest boxes. For hedgerows, a ratio of 10 assorted small nest boxes per kilometre of hedgerow would be adopted, where it is reasonably practicable to erect these	Implementation of commitment actions in accordance with BTO guidance.	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
			numbers within retained vegetation. The measures would be implemented under the supervision of the Environmental Clerk of Works.				
Terrestrial Biodiversity	TB013	Displacement of protected/notable species	Where habitats that are known or assumed to support protected or notable species, clearance would take place in a phased, directional manner towards areas of contiguous retained habitat. This would encourage mobile species to actively move from the construction site into the wider landscape. These measures would be implemented under the supervision of the Environmental Clerk of Works.	Compliance with requirements of Natural England licences.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB014	Natural England licences	All required Natural England licences and associated working practices and method statements would be in place prior to any related construction works starting in areas where licensable species occur.	Compliance with requirements of Natural England licences.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB015	Monitoring of pre-existing protected species and important habitats	Monitoring of protected species during and post-construction would be in line with the requirements of the protected species mitigation licence.	Compliance with requirements of Natural England licences.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB016	Translocation of protected species	Where the approach to habitat clearance referred to in REAC ref. TB013 is not considered appropriate to avoid potential mortality of protected species, a programme of trapping and translocation would occur to move animals away from the construction site and to established receptor sites with sufficient carrying capacity prior to habitat clearance occurring. Species or groups which may be subject to trapping and translocation are GCN (and all other native amphibian species found during this process), water voles and dormice.	Compliance with requirements of Natural England licences.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB017	Translocation of notable species	Where protected species licences are not required, the approach to habitat clearance and the potential need to trap and translocate non-licensable species (reptiles and/or native amphibians species excluding GCN) to established receptor sites with sufficient carrying capacity would be determined and undertaken by the Environmental Clerk of Works.	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Terrestrial Biodiversity	TB018	Translocation of habitat features of value to protected/notable species	Habitat features of value to protected species that can themselves be moved to mitigation areas/receptor sites (for example dead-wood features for terrestrial invertebrates, and refugia for amphibians and reptiles) would be translocated where appropriate, to be determined by the Environmental Clerk of Works.	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB019	Translocation of acid grassland	An area (approximately one hectare) of priority Biodiversity Action Plan acid grassland in Low Street Pit would be translocated to a receptor site. The receptor site is an area of grassland located between the sea wall and the Parish Church of St. Catherine (centred on Grid Reference TQ 69011 77146), approximately 100m to the north of Coalhouse Fort. This would be achieved by removing turf from the acid grassland and replanting it on the receptor site shown on the Environmental Masterplan.	Successful re-establishment of acid grassland at the donor site within 24 months of planting	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB020	Translocation of important lichens	Where important lichen species, <i>Usnea cf. esparantiana</i> , present within woodland south-west of the M25 junction 29, and <i>Physconia</i> the landowner, unless otherwise agreed by the Secretary of State.	Plot reinstated with habitat enhancements to satisfaction of landowner.	Contractor	Construction	EMP2 - Requirement 4
	TB023		NOT USED				
	TB024		NOT USED				
	TB025		NOT USED				
	TB026		NOT USED				
Terrestrial Biodiversity	TB027	Construction of replacement air raid bunker	An air raid bunker within Shorne Woods containing a hibernation bat roost would be lost as a result of the Project. A replica bunker would be constructed, prior to demolition of the existing structure, within land between Shorne Wood and Great Crabbles Wood at a location to be agreed with Natural England. The bunker would be constructed from brick with block work covering, designed to provide similar internal temperatures and humidity levels to the existing air raid bunker. Internally there would be additional brick work timber boarding approximately 150 x 75mm in size, on angles within the bunker allowing access behind them for bats. There would be 20 bat bricks installed in the internal walls.	Construction of bunker to meet design specifications and to provide similar internal temperature/humidity levels to existing air raid bunker.	Contractor	Construction	EMP2 - Requirement 4

Topic	REAC ref no.	Issue	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Terrestrial Biodiversity	TB028	Ancient Woodland Soil Translocation	Areas identified on the Environmental Masterplan for compensatory ancient woodland planting to offset the loss of ancient woodland would be inoculated, where reasonably practicable, with soils from ancient woodland sites within Order Limits that would be disturbed by construction activity. The suitability of the soil from the donor sites would be determined by a soil scientist prior to commencement of works in those areas, with consideration for existing ground flora composition and diversity and potential contamination. The soils would be translocated in advance of construction activities commencing at the donor sites, avoiding weather constraints e.g. heavy rainfall; timing conflicts with protected species licensing activities (e.g. capture and translocation of dormice); and only once any essential mitigation required for buried archaeology identified within the receptor sites has been completed. Soils would typically be stripped to approximately 300mm, disturbing the soil structure as little as reasonably practicable and carefully placed within the pre-prepared adjacent receptor sites, following guidance from CIRIA within Habitat Translocation - A Best Practice Guide (C600).	Evidence of establishment of typical ancient woodland ground flora indicator species within 60 months of soil translocation and tree planting in compensatory area.	Contractor	Construction	EMP2 - Requirement 4

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Highways England Complaints Procedure

<https://highwaysengland.co.uk/about-us/complaints-procedure/>

Glossary

Term	Explanation
AONB	Area of Outstanding Natural Beauty: Statutory designation intended to conserve and enhance the ecology, natural heritage and landscape value of an area of countryside.
BS 5489	British Standard for the Design of Road Lighting
CaPS	Consents and Agreements Position Statement
CA05	Compound Area 5
CCS	Considerate Constructors Scheme
CCTV	Closed-Circuit Television
CEMP	Construction Environmental Management Plan
CEP	Communications and Engagement Plan
CES	Communications and Engagement Strategy
CLG	Community Liaison Group
CLOCS	Construction Logistics Community Safety
CoCP	Code of Construction Practice
DCO	Development Consent Order
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges: A comprehensive manual (comprising 15 volumes) which contains requirements, advice and other published documents relating to works on motorway and all-purpose trunk roads for which one of the Overseeing Organisations (Highways England, Transport Scotland, The Welsh Government or the Department for Regional Development (Northern Ireland)) is highway authority. The DMRB has been developed as a series of documents published by the Overseeing Organisations of England, Scotland, Wales and Northern Ireland. For the Lower Thames Crossing the Overseeing Organisation is Highways England.
EIA	Environmental Impact Assessment
EMP1	First iteration of the Environmental Management Plan as defined by the Design Manual for Roads and Bridges, LA 120.
EMP2	Second iteration of the Environmental Management Plan as defined by the Design Manual for Roads and Bridges, LA 120.
EMP3	Third iteration of the Environmental Management Plan as defined by the Design Manual for Roads and Bridges, LA 120.
EMS	Environmental Management System
ES	Environmental Statement

Term	Explanation
HEMP	Handover Environmental Management Plan
HRA	Habitats Regulations Assessment: A tool developed by the European Commission to help competent authorities (as defined in the Habitats Regulations) to carry out assessment to ensure that a project, plan or policy will not have an adverse effect on the integrity of any Natura 2000 or European sites (Special Areas of Conservation, Special Protection Areas and Ramsar sites), (either in isolation or in combination with other plans and projects), and to begin to identify appropriate mitigation strategies where such effects were identified.
HS1	High Speed 1 rail line (formerly Channel Tunnel Rail Link (CTRL))
ISO 9001:2015	International Organisation for Standardisation's standard for quality
ISO 14001:2015	International Organisation for Standardisation's standard for environment
ISO 45001:2018	International Organisation for Standardisation's standard for health and safety
JOF	Joint Operations Forum
LEMP	Landscape and Ecology Management Plan
LTC EMS	Lower Thames Crossing Environmental Management System
MCHW	Manual of Contracts Documents for Highways Works
NSIP	Nationally Significant Infrastructure Project: major infrastructure developments in England and Wales, such as proposals for power plants, large renewable energy projects, new airports and airport extensions, major road projects etc.
OEMP	Outline Environmental Management Plan
oLEMP	Outline Landscape and Ecology Management Plan
PRoW	Public Rights of Way
REAC	Register of Environmental Actions and Commitments
SMART	Specific, Measurable, Attainable, Realistic and Time-bound
SoS	Secretary of State
SPA	Special Protection Area: a designation under the European Union Directive on the Conservation of Wild Birds.
STEM	Science, Technology, Engineering and Maths
TBM	Tunnel boring machine
ToR	Terms of Reference
UXO	Unexploded Ordnance

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