Lower Thames Crossing

6.3 Environmental Statement Appendices
Appendix 1.2 - Summary of Section 42 comments and National Highways responses

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Lower Thames Crossing

Appendix 1.2 – Summary of Section 42 comments and National Highways responses

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1 Appendix 1.2 – Summary of Section 42 comments and National Highways responses

1.1 Introduction

1.1.1 This appendix presents National Highways' (the Applicant's) responses to comments made by stakeholders on the Preliminary Environmental Information Report (PEIR) (Highways England, 2018), published in September 2018 as part of the Statutory Consultation held between October and December 2018. The stakeholder comments and National Highways' responses are presented in Table 2.1 to Table 19.1.

1.1.2 The Statutory Consultation 2018 was one of a series of consultations that the Applicant carried out for the A122 Lower Thames Crossing (the Project), to provide stakeholders with the opportunity to help shape the development of the Project and fulfil the 'duty to consult' under section 42 of the Planning Act 2008.

1.1.3 Further design developments, including proposed changes to the design of the Project route and its junctions, utilities diversions and the Order Limits, were subject to a supplementary consultation held between January and April 2020. Changes to the preliminary environmental information were described in the Environmental Impacts Update report published as part of that consultation (Highways England, 2020a). The responses were reviewed and updated to reflect the design following the Supplementary Consultation in 2020.

1.1.4 The responses were reviewed and updated again when the Environmental Impact Update report (Highways England, 2020b) was revised and republished in July 2020 as part of the Design Refinement Consultation held in July and August 2020 and reflected the Applicant's position on the issues raised at the time of the Development Consent Order (DCO) submission in October 2020.

1.1.5 The Applicant has continued to engage with stakeholders where matters remain outstanding and where new issues have been raised in relation to design changes that have occurred since October 2020, including in the Local Refinement Consultation held in May and June 2022.

1.1.6 However, discussions relating to the Environmental Impact Assessment (EIA) have since focused on the impact assessments in the Environmental Statement (ES) prepared as part of the DCO submission in October 2020. The ES contains the latest environmental information and supersedes the preliminary environmental information in the PIER.

1.1.7 The Applicant's current position on issues raised by stakeholders is presented in the Consultation Report (Application Document 5.1). The responses in this appendix have not been updated since October 2020 and do not necessarily reflect the current state of discussions with stakeholders or latest design. The purpose of including this appendix is simply to demonstrate that due process has been followed. For the latest information, the reader should refer the Consultation Report.

2 Anglian Water

Table 2.1 Anglian Water Statutory Consultation

Anglian Water comment	National Highways response
Road drainage and the water environment	
A Flood Risk Assessment (FRA) is to be prepared as part of the Environment Statement. We would ask that the FRA consider the risk of flooding from all sources including sewer flooding (where relevant).	Please refer to Environmental Statement Appendix 14.6: Flood Risk Assessment.
Anglian Water is currently in discussion with National Highways regarding the need for potential foul and surface water connections to the public sewerage network required as part of the construction phase for the above project. In the event that proposed method of foul drainage and / or surface water management relates to Anglian Water operated assets, we would wish to be consulted to ensure that an effective drainage strategy is prepared and implemented.	Anglian Water has been consulted throughout the pre-application phase. Meetings were held to discuss and agree principles for the disposal of foul water arising from the Project in the Essex area to the sewer network. Discussions culminated in the preparation of developer services applications which were submitted in December 2019.
Should a wastewater service be required, and once agreement has been reached, there are a number of applications required to deliver the necessary infrastructure as outlined in the Water Industry Act 1991.	Noted.

3 Brentwood Borough Council

Table 3.1 Brentwood Borough Council Statutory Consultation

Brentwood Borough Council comment	National Highways response
Brentwood Enterprise Park	
Delivery of new employment land at Brentwood Enterprise Park is critical to the creation of new jobs in the Borough, and this location presents a unique opportunity for economic growth that is consistent with local character and can benefit a wider network through connectivity (London and South Essex).	Brentwood Enterprise Park has been considered in ES Chapter 13: Population and Human Health (Application Document 6.1). Brentwood Enterprise Park is classified as being of very high sensitivity by virtue of its size (more than 5ha). Changes to access as a result of construction activities are not considered to compromise the viability of businesses within the future Enterprise Park. The Order Limits have been revised in order to incorporate a new access onto the B186 to allow for future access requirements. A temporary access for National Grid is provided to the western edge of the site, adjacent to the M25. The Applicant would minimise impacts on existing businesses where practicable.
The current Lower Thames Crossing proposals compromise the existing access arrangements to Brentwood Enterprise Park. This risks the delivery of the largest employment allocation in Brentwood Borough, and one of the two largest proposed in Essex.	
The current Lower Thames Crossing proposals also set the need for temporary access through the centre of Brentwood Enterprise Park to service National Grid infrastructure/pylons to the south of the site. This access could be more sensibly located on the western edge of the site, adjacent to the M25, providing the required access during construction of the highways improvements and not constraining delivery of new employment land.	
Brentwood Borough Council is a partner in the Association of South Essex Local Authorities (ASELA), along with Thurrock, Essex County Council, Basildon, Castle Point, Rochford, and Southend. ASELA has been formed to realise long-term growth ambitions across local authority boundaries and to underpin strategic spatial, infrastructure and economic priorities. ASELA is preparing a Joint Strategic Plan to deliver the homes and jobs needed in South Essex through partnership working, not just at a local level, but also with Government, to bring forward key strategic infrastructure improvements needed to support growth, such as transport.	The Joint Strategic Plan has been included within the future baseline of ES Chapter 13: Population and Human Health (Application Document 6.1).

4 Dartford Borough Council

Table 4.1 Dartford Borough Council Statutory Consultation

Dartford Borough Council comment	National Highways response
The proposed mitigations to address the environmental impacts of the proposal are broadly welcomed. However, Dartford Council defers to the appropriate bodies in respect of the detailed impacts and adequacy of mitigation. Dartford Council appreciates that some impacts are difficult to fully address, such as changes to the landscape. However, it is considered that any impacts have to be considered in the round, alongside the benefits of the scheme and related environmental improvements which will occur elsewhere.	Consultation has been ongoing with local authorities and Statutory Environmental Bodies, including the Environment Agency, Natural England and Historic England, as well as the Marine Management Organisation (MMO), Forestry Commission and Port of London Authority, throughout the pre-application phase.
The existing Crossing is in a heavily populated area, with the surrounding community suffering negative health and well-being effects as a result of heavy traffic and congestion in the surrounding area. The environmental impacts of the proposed project need to be balanced against the improvement in air quality and reduced traffic noise resulting from reduced congestion at the Dartford Crossing.	A Health and Equalities Impact Assessment (HEqIA) (Application Document 7.10) has been undertaken. The results of this assessment are summarised in ES Chapter 13: Population and Human Health (Application Document 6.1). ES Chapter 13 has interrelationships with ES Chapter 5: Air Quality and ES Chapter 12: Noise and Vibration (Application Document 6.1).
The model has applied Tempro growth 7.2 which addresses higher forecast growth levels in the south east. Whilst Tempro has been used to forecast trip growth, Dartford Council urges that National Highways continues to work with local authorities to define more accurately the extent of growth and the full impacts on the surrounding road network; and identify the locations where further improvements may be needed. Failure to address issues on the surrounding network will make it less attractive as an alternative to the existing Crossing, will mean that its capacity is not fully utilised and will reduce its effectiveness in making the Strategic Road Network more resilient.	A cordon traffic model was shared with local authorities after both Statutory Consultation and Supplementary Consultation. The model was last shared with local authorities on the 24 April 2020. The Applicant has held meetings with council officers on future growth and traffic modelling. The Applicant remains open to further meetings and discussions on this with Dartford Borough Council and, as appropriate, Kent County Council (as the relevant highway authority).

Dartford Borough Council comment	National Highways response
The traffic impacts during the construction phase will undoubtedly be significant. It is understood that it is difficult to provide accurate information about routeing of construction vehicles in advance of contracts being let and waste sites etc being identified. Dartford Council urges that National Highways liaises with relevant local authorities and keeps them informed as the details become clearer, so that working together, the most appropriate routeing can be agreed and the impacts of the construction phase minimised. The Council is aware of a number of SRN projects currently underway and planned in the future, in close proximity to the proposed crossing. In considering construction impacts, HE should also take into account the longer term impact on drivers of the combined effect of these schemes.	Consultation with Dartford Borough Council has been ongoing through the pre-application phase and assessment work has been shared in workshops and meetings. More information on the traffic impacts during the construction phase was contained in the Supplementary Consultation materials. Dartford Borough Council were consulted on the long and short list of developments used in ES Chapter 16: Cumulative Effects Assessment (Application Document 6.1).

5 Environment Agency

Table 5.1 Environment Agency Statutory Consultation

Environment Agency comment	National Highways response
Baseline data and survey information	
The PEIR does not contain the environmental survey and baseline data for us to fully assess the impacts of the scheme. This information should be used to inform the design of the scheme. We would expect that as more information comes available the scheme design will change to ensure that the environment is protected and enhanced, meeting the needs of people and wildlife. Without this information and design changes we would maintain our objection at the submission stage.	There is no prescribed format as to what a PEIR should comprise and it is not expected to replicate or serve as a draft of the ES. The PEIR is a tool with which to consult stakeholders on the EIA. The PEIR was compiled in accordance with Planning Inspectorate (2017a) Advice Note Seven and meets the requirements of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations). The PEIR reported on the interim stage of establishing baseline conditions and included a review of desk-based studies/data sources, site visits and surveys to understand the characteristics of the study area and consultation with key organisations including meetings, telephone conversations and data requests. An iterative process has facilitated design updates and improvements through information provided by environment assessment.
Environmental protection and enhancement	
We would expect a scheme of this scale and importance to be providing more environmental improvement and benefit than is shown in the current designs. The 25 Year Environment Plan has a commitment to embed net environmental gain into development, including infrastructure. Due to the scale of the scheme and length of time needed for construction we would expect a greater environmental legacy than that proposed. This development has the opportunity to maximize benefits for people, wildlife and the economy. These opportunities should not be missed.	The Project has been presented to National Highways Design Review Panel (HEDRP), firstly within a primarily engineering led approach, using traditional engineering principles. Feedback was given to approach design that delivers enhancement to the local character. The Project was presented again to HEDRP in 2018 with a new landscape led approach. Engineering challenges became subservient to the prevalent context and Project legacy. The Project was presented again to HEDRP in 2019, with representatives from Thurrock Council, Gravesham Borough Council, Historic England and Natural England in attendance. Please refer to the Project Design Report (Application Document 7.4) for more detail on HEDRP.

Environment Agency comment	National Highways response
	Legacy items include signature bridges, additional woodland for public use and enjoyment, reuse of excavated material onsite, and addressing historic severance from the M25 through new footbridges. More information on these legacy items can be found in the Project Design Report (Application Document 7.4). National Highways has committed to achieving no net loss in biodiversity by the end of RIS2 and will work towards net biodiversity gain by 2040 across its estate. Although the construction of the Project would have significant adverse effects on statutory designated sites and irreplaceable habitats, such as veteran trees and some sections of ancient woodland, the design has sought to provide biodiversity gains wherever possible and this has resulted in a 15% increase in habitat value. No likely significant effects are predicted on terrestrial biodiversity during operation. An assessment of baseline biodiversity value and that achieved by the Project's design post development is presented within the Sustainability Statement (Application Document 7.11). Please refer to the Need for Project (Application Document 7.1) for more information.
Safeguarding for the future	
We expect the whole life span of the development to be designed in line with the Thames Estuary2100 plan taking account of the UKCP18 climate change levels. This includes having a robust design that can be retro fitted in line with future information and flood protection changes.	Engagement has been ongoing with the Environment Agency throughout the pre-application stage and TE2100 Plan discussed at numerous meetings The TE2100 Plan and its context in relation to the Project is included in Part 2 of ES Appendix 14.6: Flood Risk Assessment (FRA). A review of the potential impact that the Project may have on the TE2100 Plan is included in Part 6 of ES Appendix 14.6: FRA. The location options for the new Thames Barrier proposed in the TE2100 Plan lie outside the Order Limits so have not been considered in the ES. Data for the climate assessment have been sourced from UKCP18, which was released in November 2018. Further details on how the methods used to establish the climate baseline and assessment can be found in ES Chapter 15: Climate: (Application Document 6.1).

Environment Agency comment	National Highways response
Flood risk – general comments	
The data regarding tidal defences benefitting the project within Essex is not complete and misses the Environment Agency maintained tidal defences at both Star Dam (inland of Coalhouse Fort) and Bowaters Wall/Sluice. Both these locations are 0.1% Annual Exceedance Probability (AEP) defences.	An updated description is included in the ES, ES Appendix 14.6: FRA and supporting figures. ES Appendix 14.6: FRA has considered the operation of these assets, the Standard Operating Procedure (SOP) they provide and the potential for any effects on them.
The Bowaters Sluice outfall which provides drainage to the West Tilbury Main Catchment has suffered from significant subsidence and is no longer functioning correctly. The residual life of the structure is significantly less than the design life of the LTC and will require replacement to provide drainage to the scheme.	The preliminary drainage design for dealing with drainage discharges during construction and operation of the Project, does not rely on draining the Project via the Bowaters Sluice.
We are pleased that the South Portal is located within Flood Zone 1. If there are any surface works within the “temporary use of land required” (LTC #13b Map book 2) and within Flood Zone 2 and 3 we would expect these to be detailed within the Flood Risk Assessment and the flood risk and potential impacts appropriately assessed and mitigated. If any works are proposed near to the flood defences we would want to ensure our ability to access the defences to undertake maintenance is not affected.	Any areas of permanent or temporary works situated in Flood Zones 2 and 3 are included in the scope of ES Appendix 14.6: FRA.
Flood Risk – Flood Risk Activity Permits	
Please also be aware that any new jetty, or modification to an existing jetty, will require consideration from us in terms of the impact this may have on existing flood defence infrastructure and the impact upon the Thames Estuary.	The Project proposals do not include a new jetty. However, the option for the Contractor to make use of the existing East Tilbury jetty at Goshems Farm has been considered as part of the EIA. The effects of the potential use of the existing East Tilbury jetty are set out in the ES, and discussions with the Environment Agency regarding the flood risk management have been ongoing throughout the pre-application phase.
LTC #1 – PEIR Volume 1	
2.13 Flood Risk Mapping - make reference to a Flood Zone Map and include this map	An update to the Project description has been made, please refer to ES Chapter 2: Project Description (Application 6.1).

Environment Agency comment	National Highways response
2.13.2 Refer to the Tilbury Main River not just the Tilbury marshes	
2.13.3 Separate the areas –refer to Tilbury Marshes defences and sluices (Star Dam and Bowater Sluice) and then refer to Orsett Fen Sewer and how it is defended.	
2.13.4 These comments need to be expanded upon. It must be determined that the project will not result in a net loss in floodplain storage. Furthermore, it must show that the proposed development will not impede flood flow and/or reduce flood storage capacity thereby increasing the risk of flooding elsewhere. Where sections of the Project fall within tidal Flood Zone 3 the picture of flood risk will need to be painted to show the changes to risk. How does the flood hazard (depth, rate of onset, velocity) change as a result of what is being proposed. Areas of compensation will be required if there is significant change in hazard category.	The FRA (ES Appendix 14.6) demonstrates compliance with both of these requirements. There has been ongoing engagement with the Environment Agency throughout the pre-application stage which has covered the levels of compensatory storage.
2.13.5 It will need to be shown that any increase in built footprint within the 1% (1 in 100) annual probability flood extent, including allowances for climate change, can be directly compensated for on a volume-for-volume and level-for-level basis to prevent a loss of floodplain storage. If there are no available areas for compensation above the design flood level and compensation will not be possible then a calculation of the offsite flood risk impacts will need to be undertaken.	This has been assessed as part of the FRA (ES Appendix 14.6).
The following should be added to the points in this section: h. connectivity of the flood cells and requirements for culverts through the embankments i. the volume available for breached flows to accumulate behind the sea defences j. how the project will impact the rate of inundation	
2.18.1 The following should be added to the points in this section: g. Flood defence and sluice improvement work	Flood defence and sluice improvement is not considered to be a key part of the Project and therefore these have not been considered.

Environment Agency comment	National Highways response
Compound Locations (page 34) 2.18.15 The following should be added to the points in this section: h. Flood Warning and Evacuation Plan for those locations within Flood Zone 3.	The production of an excavation plan and flood warning system is not a physical component of the construction compounds which is what was included in this section of the PEIR. These plans would be developed by the Contractor during detailed design.
2.20 Rest and Service Area This is in a Flood Zone and will need to be constructed to ensure it is not at risk from flooding or increase the risk of flooding elsewhere	The Rest and Service Area is no longer part of the Project.
Third party asset protection (page 38) Need to mention that there will be monitoring of existing flood defences assets during construction phase to ensure there is no detrimental impact to the defences and that monitoring will be continued post construction phase.	In line with the requirements of the Environment Agency, it is expected that asset condition monitoring for River Thames flood defences would be necessary to establish a pre-construction baseline and monitor for any effects on the structural integrity/condition of the assets during construction of the Project. Please refer to the commitments in the Register of Environmental Actions and Commitments (REAC), which can be found in the Code of Construction Practice (CoCP) (ES Appendix 2.2).
11.5.3 Further baseline information and surveys required. We would welcome the results of any geotechnical/pre-condition surveys undertaken that relate to the flood defences.	Visual inspections of existing Environment Agency assets, including the Bowaters Sluice and other flood defences on the Project route, have been carried out to scope an asset condition monitoring programme. The monitoring is planned to start in late summer 2020 and would collect a robust pre-construction baseline dataset against which any impacts from the Project's construction phase can be monitored.
Table 15.2 in Chapter 14: Road Drainage and Water Environment (Application Document 6.1) Mentions the UKCP09. Needs to be updated to the UKCP18 as they have now been released.	This update has been made in the ES and UKCP18 has been considered in the FRA (ES Appendix 14.6).
15.4.48 and 15.4.60 (Flood risk and flood defences) Please be aware that the proposed drainage outfall mentioned on LTC#13a Map book 1, Sheet 7, General Arrangement Plan would be within the Policy P4 area -Gravesend unit. Therefore, any works should take account of the need to maintain and raise these defences in the future. We would welcome	There has been ongoing engagement with the Environment Agency. Please refer to ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1) for a full summary of engagement.

Environment Agency comment	National Highways response
a conversation to discuss the impact on the tidal defences in more detail.	
Policy P4 area -Gravesend unit: Maintain the current standard of protection which will require raising to take account of climate change.	The raising of Environment Agency flood defences is outside of the scope of the Project.
Policy P3 area –North Kent Marshes unit: Maintain the current height of the defences excepting that the standard of protection will reduce with climate change.	Noted.
<u>Flood risk and Defences (page 509)</u> 15.5.2 We would like the following (shown in italic) to be added into the existing text: *An FRA will be prepared in line with the requirements of the NPSNN and the National Planning Policy Framework Flood Risk and Coastal Change Planning Practice Guidance (Ministry of Housing, Communities and Local Government, 2014). The assessment is currently being scoped in consultation with the Environment Agency and will be informed by hydrological and hydraulic modelling of key river systems including the Tilbury Main, the Mardyke and its tributaries (the Orsett Fen Sewer and the Golden Bridge Sewer). In addition, breach of the Thames' defences will be modelled and the subsequent flood risk to the Project assessed. A topographical survey will be undertaken, and the data used to develop models of these watercourses and their floodplains. The findings of the modelling studies will be reported in an FRA that defines baseline flood risk and informs the design of any flood risk management measures that may be necessary.* These findings will also inform the Road Drainage and Water Environment Chapter of the Environmental Statement.	The FRA (ES Appendix 14.6) has been developed in line with the requirements of the National Policy Statement for National Networks (NPSNN) (Department for Transport, 2014), National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2019) and the Design Manual for Roads and Bridges (DMRB). It should be noted that there are slight inconsistencies across these three documents and where inconsistencies have been observed, the provisions of the most onerous have been adopted. The approach taken is explained in the ES. The Environment Agency has been consulted on this.
The highlighted sentence should also say: *The findings of the modelling studies will be reported in an FRA that defines baseline flood risk and also the as built flood risk which informs the design of any flood risk management measures and mitigation that may be necessary.*	The FRA (ES Appendix 14.6) defines the baseline flood risk and has informed the design of any flood risk management measures that may be required.

Environment Agency comment	National Highways response
Table 15.10 We would expect to understand what monitoring of the tidal defences you will undertake to ensure there is no detrimental impact to the defences (and any associated infrastructure) during and after works have been completed. The applicant would need to agree a programme of monitoring with the Environment Agency and the actions required if any damage to the defences occurs.	There are commitments within the REAC, which can be found in the Code of Construction Practice (CoCP) (ES Appendix 2.2), relating to good practices whilst tunnelling. The Contractor, once appointed, would undertake further consultation with the Environment Agency to agree the programme of monitoring prior to commencement of construction activities.
It also mentions potential scour protection for the tunnel would require works to the bed of the river. Any works should be agreed with the Environment Agency.	Scour protection has been removed from the Project design.
16.2.2 We welcome the project response in table 16.3 that the UKCP18 data will be applied in the ES to cover the estimated lifetime of the project. Please contact the Environment Agency to obtain any potential changes in modelled flood information, approach or impact on flood risk management in the project area as a result of a change in UKCP data.	This update has been made in the ES and UKCP18 has been considered in the FRA (ES Appendix 14.6).
Table 16.11 Must also include 0.1% (1 in 1000) cc	This event has been included in the FRA (ES Appendix 14.6).
LTC #3 – Design consultations and operations	
4.8.4 This watercourse is called the West Tilbury Main. The main rivers crossed close to the northern portal are known as 'West Tilbury Main', 'West Tilbury West Branch Sewer' and 'West Tilbury North Branch Sewer'. We welcome the comments in paragraph 4.8.5 which confirms that these rivers shall be maintained and comply with the requirements of the Environment Agency and other relevant authorities.	Additional information on watercourses has been added to relevant descriptions in ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1), the relevant figures and the FRA (ES Appendix 14.6).
15.5.4	The environmental permits that would be required are detailed in the Consents and Agreements Position Statement (Application Document 3.3).

Environment Agency comment	National Highways response
We note the preferred option for crossing the 3 main rivers in this area. These will require a bespoke permit under the Environmental Permitting Regulations.	
18.3.4 We note a staged approach is proposed for the provision of flood storage. Details of the staged approach will be supported by detailed flood risk modelling, which will provide sufficient evidence to demonstrate that the works will not result in any increases to flood risk, both upon completion of the project and during the construction phases.	Please refer to the FRA (ES Appendix 14.6).
LTC #4a – PEIR Figures (3b)	
Figure 11.10-Slope Stability Sheet 2 of 3 Please provide confirmation of where the data has been sourced to inform this map e.g. was it a desktop study or a detailed investigation.	The data has been sourced from desk study reviews. ES Appendix 10.2: Stability Report reviews the potential risks from land stability and geohazards.
Figure 11.11-Shrink Swell-Running Sands, Sheet 2 of 3 Please provide confirmation of where the data has been sourced to inform this map e.g. was it a desktop study or a detailed investigation.	This data has been sourced from the Landmark/Groundsure report. Please refer to ES Chapter 10: Geology and Soils (Application Document 6.1).
Groundwater and contaminated land – general comments	
The PEIR report identifies lowering of groundwater levels during dewatering could increase the risk of saline intrusion potentially impacting on the designated marshes and surface water features.	As part of the Ground Investigations (GI), further sampling of water in drains and ditches was undertaken. Please refer to ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1).
In order for us to fully assess the likely impacts that may arise from dewatering. Further ecological and water sampling (conductivity) of the drains and ditches in and around the Ramsar need to be undertaken to understand how this sensitive environment works.	Conductivity data has been collected to aid in the understanding of the hydrogeology of the site. This data and the results can be found in ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1) and ES Appendix 14.2: Water Features Survey Factual Report.
Any lowering of groundwater levels must ensure springs and seepages continue to support flow and levels in surface water drains and groundwater-fed ponds.	Noted.

Environment Agency comment	National Highways response
As of 1 January 2018, previously exempt water abstractors, such as trickle irrigation, dewatering, navigation and others are now a regulated activity to meet the requirements of the Water Framework Directive. Please ensure these new licensed activities, listed under the Water Act 2003, are included in future Water Features Survey.	The details of all licensed abstraction activities within the study area were requested from the Environment Agency in February 2019, and this data was refreshed at Supplementary Consultation (with buffers) in March 2020.
We look forward to receiving the Hydrogeological Risk Assessment report and further proposal details on dewatering in due course.	A Hydrogeological Risk Assessment (ES Appendix 14.5), informed by pump test data and groundwater modelling as appropriate, has been prepared. The findings informed ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1).
The scope of the Environmental Statement and the outline PEIR is accepted as being in line with what is expected for such a significant project for the south bank of the project.	Noted.
In relation to land quality issues, contamination and landfill especially, further ground investigations are crucial to formalising design for the tunnel, roadway and drainage in addition to addressing historic contamination appropriately. Any remediation in the context of the National Planning Policy Framework (NPPF) requirements for sustainable development and environmental betterment and protection must be agreed in detail with relevant regulators prior to any works.	The Project design has been optimised to minimise the land-take required to construct and operate the Project. Current and historic land uses have been considered as part of the evolving design and investigated through desk-based and intrusive ground investigation to establish the soil quality and potential contamination levels. This revealed areas of previously developed (brownfield) sites within the Order Limits. A programme of intrusive GI works was carried out in two phases to help develop the reference design and, where data has been available, support the core assessments of the DCO application. Phase 1, completed between September 2017 – February 2018 and September 2018 – January 2019, was focused on the alignment of the tunnel and the areas surrounding the proposed North and South Portals. Phase 2 of the GI was carried out between April 2019 and April 2020 and included investigations along the whole Project route, as well as further works in the South and North Portal areas. Both phases of ground investigation included a range of intrusive and non-intrusive investigation, *in situ* testing, geotechnical and geo-environmental laboratory testing as well as hydrogeological testing.

Environment Agency comment	National Highways response
	For more information, please refer to ES Chapter 10: Geology and Soils (Application Document 6.1). The Contractor would complete further GI 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 creating pollutant pathways. The Contractor would provide GI method statements for approval from National Highways in consultation with the Environment Agency prior to commencement of the works. Please refer to commitments in the REAC, which can be found in the CoCP (ES Appendix 2.2).
LTC#1 – PEIR Volume 1, Section 2: Project Description	
S.2.7.2 Detailed impact assessments concerning changes to flow and supported surface water body functioning will be required for all cuttings and embankments into the shallow and deep aquifers.	These assessments have been undertaken and are reported in the Hydrogeological Risk Assessment (ES Appendix 14.5), informed by pump test data and groundwater modelling as appropriate. The findings have informed ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1).
S.2.7.3 Full assessments of the impact of below ground structures on the chalk aquifer with regards to flow and the water quality will be required for construction and operation with particular focus needed on the potential for saline intrusion and contamination mobilisation impacts on dewatering.	
S.2.9.1b Details of the methods for the proposed crossings at Tilbury Main and Mar Dyke are required.	Engagement with the Environment Agency has been ongoing since Statutory Consultation. There have been numerous meetings to discuss design options for crossing the Tilbury Main watercourse and to select a preferred option, as well as meeting to discuss the Mardyke proposals.
S.2.9.3	Various meetings were held with the Environment Agency to discuss drainage proposals. Changes to baseline water quality would be prevented through provision of a treatment train that would for example,

Environment Agency comment	National Highways response
The design for all drainage systems will need to be submitted for review and should include sufficient treatment trains prior to discharge to surface water or infiltration to ground; details of operational maintenance programs will also be needed.	remove suspended sediments and Chalk fines. The quality of the discharge would be governed by the conditions of an Environment Agency discharge consent.
S.2.18.11 Any proposals for locating construction or other compounds on East Tilbury (Hazardous) Landfill Site should assess the risks associated with differential settlement of the heterogeneous wastes deposited, potential escapes of polluting leachates as a result of additional loading on the landfill surface reducing the porosity of the wastes and subsequent reduction in leachate storage capacity and possible presence of landfill gas. Any proposals for locating construction or other compounds on East Tilbury (Hazardous) Landfill Site should assess the risks associated with differential settlement of the heterogeneous wastes deposited, potential escapes of polluting leachates as a result of additional loading on the landfill surface reducing the porosity of the wastes and subsequent reduction in leachate storage capacity and possible presence of landfill gas.	The potential for the mobilisation of landfill contaminants has been assessed and is reported in ES Chapter 10: Geology and Soils (Application Document 6.1) along with essential mitigation measures.
S.2.18.15 All soils will need testing prior to determining appropriate storage provisions.	Appropriate soil testing would be undertaken to inform appropriate storage provisions. This measure is secured within the REAC, which can be found in the CoCP (ES Appendix 2.2).
S.2.18.26 Temporary and permanent substations require appropriate design to preclude future pollution risks, especially in sensitive areas with regards to groundwater.	A Pollution Risk Assessment Technical Note was issued to the Environment Agency for comment on 20 December 2019.
S.2.18.29 We would like to see details regarding the nature of the TBM slurry.	Details of the TBM slurry were provided to the Environment Agency on 25 September 2019.
S.2.18.33 We would like to see detailed Hydrogeological Impact Assessments for all dewatering proposals which should include risks to groundwater	A Hydrogeological Risk Assessment, informed by pump test data and groundwater modelling, has been prepared, please refer to ES Appendix

Environment Agency comment	National Highways response
levels and quality, along with monitoring proposals. This is particularly critical for the Northern portal where dewatering is proposed in the area of an historic hazardous waste landfill.	14.5. The findings have informed ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1).
S.2.20.3 We would like to see any proposals for new fuel stations at the proposed Rest and Services area(s).	The Rest and Services Area is no longer part of the Project.
Section 11: Geology and Soils	
S.11.4.5 All site investigation data and reports should be provided for review.	Meetings have been held with the Environment Agency throughout the pre-application phase. The GI, including the scope and methodology, consents required, and the strategy were discussed with the Environment Agency between 2017 and 2018. Site investigation data has been shared and discussed with the Environment Agency.
S.11.4.30 It is imperative that Tilbury Main and its tributaries are protected from any adverse impacts caused by works around East Tilbury landfill.	ES Appendix 10.11: Remediation Options Appraisal and Outline Remediation Strategy provides details on this. Good practice construction techniques are included in the REAC, which can be found in the CoCP (ES Appendix 2.2).
S.11.4.39 Assessment of tidal influences on levels in the chalk aquifer should determine whether they are a result of direct hydraulic continuity or tidal loading. It is imperative that the works do not alter the current hydraulic regime between the Thames and the chalk aquifer.	This has been assessed as part of ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1). Hydrological and hydraulic modelling of the Mardyke, the Tilbury Main and the influence of the tidal River Thames on the flow regimes of these watercourses has been undertaken as part of the environmental assessment; please refer to Part 4 of ES Appendix 14.6: FRA.
S.11.4.89 Gorham's Farm is currently permitted for restoration rather than impermeable capping.	This has been updated in the ES.
S.11.4.105 We would like to see the detailed desk study report that has been compiled concerning potential contamination issues.	The Project has produced a detailed desk study report compiling potential contamination issues across the study area. This is presented within ES Appendix 10.6: Land Quality – Conceptual Site Model and Addendum.

Environment Agency comment	National Highways response
S.11.4.127 We note that soils information has been compiled from existing sources; we would like to see ground investigation reports for soils within the study area.	Site investigation data has been shared with the Environment Agency.
S.11.4.145 We would like to see an assessment in the ES of whether any UXO pose potential land or groundwater contamination issues.	UXO potential has been assessed, please refer to ES Chapter 10: Geology and Soils (Application Document 6.1).
Table 11.11 • Potential effects and mitigation measures for construction • we would like the ES to provide ground investigation data and interpretation regarding sink holes and the potential impacts of the works on the quality of	Site investigation data has been shared with the Environment Agency. The following ES chapters and technical appendices were informed by data obtained through the GI: • ES Chapter 10: Geology and Soils (Application Document 6.1) • ES Appendix 10.7: Contaminated Land Risk Assessments • ES Appendix 10.11: Phase 1 Geo-Environmental Report
• surface and groundwaters and any impacts on abstractions and designated ecological sites.	The potential impacts to surface and groundwaters and any impacts on abstractions and designated ecological sites have been assessed. Please refer to ES Chapter 8: Terrestrial Biodiversity and ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1).
• we would also like to see the proposals for piling designs.	The Environment Agency advised the Applicant they no longer required the piling designs as the Project no longer includes proposals to replace a jetty.
• full consideration of dewatering impacts on water quality and local abstractions and surface and groundwater is required.	The potential impacts of dewatering on water quality have been assessed. Please refer to ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1).
• with respect to East Tilbury Landfill Site, any intrusive investigation should not penetrate confining geological barriers and create pathways for landfill contaminants to enter groundwater. If it is necessary to investigate groundwater or geological strata beneath the landfill site, drilling techniques suitable to maintain the integrity	Engagement with the Environment Agency has been ongoing throughout the pre-application phase. Various meetings have been held to discuss East Tilbury Landfill and it has been fully assessed in the ES. Please refer to ES Chapter 10: Geology and Soils (Application Document 6.1).

Environment Agency comment	National Highways response
of the geological barriers and prevent the creation pathways to groundwater should be agreed with the Environment Agency.	
Section 15: Road Drainage and the Water Environment	
S.15.3.3 and 4 The required water features survey (WFS) area will depend on the exact dewatering proposals; the exact WFS area for the northern portal is still to be finalised with the Environment Agency.	A survey boundary was agreed at a meeting held on 14 July 2019. Details of the survey methodology and results are provided in ES Appendix 14.2: Water Features Survey Factual Report.
Table 15.7 It cannot necessarily be assumed the alluvium and tidal flats deposits effectively confine the chalk in all areas north of the Thames; this requires detailed assessment.	North of the River Thames, in the Tilbury Marsh area, the Project GI data shows a sodium chloride water type. This reflects saline intrusion of the confined Chalk aquifer. A detailed assessment is included in ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1).
S.15.4.30 There are relatively few groundwater monitoring locations in the area north of the Thames; site specific monitoring data from nested piezometers will be required to inform the hydrogeological regime at key sites, especially in the area which may be affected by dewatering.	The groundwater monitoring regime was agreed with the Environment Agency via the permit for the Phase 2 Ground Investigation. The Phase 2 Ground Investigations have informed the ES.
S.15.4.33 and 4 The assessment of aquifer vulnerability needs to consider areas if the chalk north of the Thames that are not covered by low permeability alluvium or London Clay; careful consideration of the degree of protection that is afforded to the chalk by the alluvium is required.	These assessments have been undertaken and are reported in ES Appendix 14.5: Hydrogeological Risk Assessment, informed by pump test data and groundwater modelling as appropriate. The findings have informed ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1).
S.15.5.3 We would like to see the Hydrogeological Risk Assessment as soon as it has been completed please.	A meeting to present the approach to hydrogeological modelling and the scope of Hydrogeological Risk Assessment was held with the Environment Agency 17 July 2019.
S.15.5.8 and 9 We agree with the listed aims of ground investigation and groundwater levels and quality works but would also like these to include reference	This has been noted and groundwater quality has been considered in ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1), including the historical landfill at East Tilbury Marshes.

Environment Agency comment	National Highways response
to groundwater quality and in particular, north of the Thames, the potential issues with the historical landfill at East Tilbury Marshes.	
Table 15.11 Potential construction effects and mitigation north of the Thames. This table should consider the potential for impacts on Mucking Flats and Marshes SSSI to the east of the northern portal site; the sections on groundwater resources, the South Essex Chalk and the Linford public water supply abstraction should also include the potential for mobilisation of contamination due to dewatering near the historical landfill site.	During construction-dewatering, any potential impact on the Mucking Flats and Marshes Site of Special Scientific Interest (SSSI), South Essex Chalk, and Linford Public Water Supply (PWS) has been assessed through groundwater numerical modelling of the North Portal area (construction-dewatering with mitigation measures). Please refer to ES Appendix 14.5: Hydrogeological Risk Assessment. The North Portal groundwater numerical model was discussed at a meeting with the Environment Agency on 14 July 2020.
LTC#2 – PEIR Volume 2	
Water Features Survey. Site visits are required for all sites within the finalised WFS area; a detailed Hydrogeological Risk Assessment for Dewatering (to cover pump testing and construction) will be required before the WFS area can be set.	A detailed Hydrogeological Risk Assessment has been completed (ES Appendix 14.5), which has guided the Water Features Survey (WFS) area. Site visits have been undertaken to all features within the WFS area, with the exception of those features on land that access permission was not granted to the Project. These features have been subject to desk study.
Figures Volume 3a, Figure 2.2b Shows an area of landscaped excavated material on the southern half of East Tilbury Landfill Site. Any such proposals must assess the impact of the additional loading on the landfill and potential emissions. If landscaping leads to increased surface water run-off, the Environment Agency should be consulted with regards to the ability of the existing drainage channels and sluices to cope with this extra volume of water. We do not currently have sufficient detail on the proposals or the site area; this will hopefully be addressed by ground investigations and the Environmental Statement.	ES Appendix 10.11: Remediation Options Appraisal and Outline Remediation Strategy has been prepared based on the findings of the GI to demonstrate that the risk from encountered contamination can be controlled to an acceptable level. The approach to groundwater modelling and the effects of drawdown on East Tilbury Landfill Site were discussed and agreed with the Environmental Agency across various meetings.

Environment Agency comment	National Highways response
Biodiversity	
Marine We have assessed LTCs Preliminary Environmental Information Report (PEIR) consultation documents and are satisfied with their content in terms of marine water quality.	Noted.
The main impacts on marine water quality from the proposals relate to the potential need for a new jetty or similar infrastructure in the River Thames (or there might be potential to reuse an existing jetty) to transport excavated tunnel material. In the longer term it may be that scour protection is needed in the riverbed (to maintain its stability) which is likely to take the form of either rock dumping or using mattress type solutions to cover the tunnel section. The need for scour protection and impact of other river-based construction activities will be further assessed in consultation with relevant statutory bodies.	The Project does not propose a new jetty, but the Contractor may wish to take on use of the existing East Tilbury jetty at Goshems Farm. This would be for the import of concrete tunnel segments only. The vertical tunnel alignment would include a one tunnel diameter depth of cover above the tunnel under the Thames, removing any need for in-river scour protection. All in-river activities have been discussed with the MMO, the Environment Agency and Natural England, and have been fully assessed in the ES.
We note that potential mitigation for impacts from the jetty includes "Jetty design which limits the number of piles and requirement for dredging where practicable. Where possible, use of soft start and vibro-piling techniques to limit extent and duration of noise emissions. Best practice methods for dredging operations."	
LTC is aware that a full Water Framework Directive (WFD) Assessment of the proposals will be required in due course and we note that (Section 15.5.10) "The findings from all the above surveys and assessments will be used to inform a stand-alone Water Framework Directive Compliance Assessment, which is being scoped in consultation with the Environment Agency."	Please refer to ES Appendix 14.7: Water Framework Directive.
Terrestrial ecology	
The PEIR states that the drainage strategy in relation to the southern side of the Thames is still be determined. Surveys are being carried out on the Ramsar to establish risks associated with the final proposed drainage plan.	The drainage strategy was discussed during meetings with the Environment Agency. Part 7 of ES Appendix 14.6: Flood Risk Assessment includes a surface water drainage strategy that details how rainfall runoff generated from the highway would be managed to prevent

Environment Agency comment	National Highways response
	surface water flooding of the Project during its operational phase. The strategy also describes how impacts on the watercourses and groundwater bodies, receiving discharges of highway drainage, would be mitigated to ensure there are no increases in flood risk elsewhere.
It is noted that the plans retain in them a potential drainage route on the western end of the Ramsar/SSSI and this could therefore have a significant impact on the site. Ecological surveys of the area, as well as a full ecohydrological understanding of how this part of the Ramsar works will be required in order for us to determine the likely impacts of any proposed drainage routes. We therefore cannot determine at this stage whether this is an acceptable choice without the completion of surveys and designs.	The full method of establishing the baseline can be referred to in ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1). A site walkover focusing on the River Thames southern frontage, the Thames and Medway canal and the ditch network on Filborough and Shorne Marshes, part of the Thames Estuary and Marshes Ramsar and Special Protection Area, was undertaken in March 2019 to collect information to aid in the understanding of factors that may affect the groundwater and surface water flow regimes at the designated site. The Habitats Regulations Assessment Report (Application Document 6.5) concludes that there would be no significant change to surface water from any groundwater changes, supported by preliminary (stage 2 assessment) hydrogeological and water balance studies (ES Appendix 14.5: Hydrogeological Risk Assessment).
It is noted that green bridges are proposed along parts of the Southern road. It must be determined that these are of sufficient size and design to function for all mammal species that currently utilise the area, as well as providing the necessary corridors for the movement of other species. The design should use contemporary evidence to establish minimum sizes and locations.	Green bridges have been individually designed to provide the greatest benefit at each particular crossing location, for example, North Road and Muckingford Road mixed-use green bridges have been designed to accommodate terrestrial mammals and bats. The green bridge designs have followed best practice and specific guidance from Natural England and others. Full details can be found in the Design Principles (Application Document 7.5).
Volume 1, Chapter 9 Terrestrial Ecology Page 261 It appears that the Essex Field Club, a major source of wildlife records, has not been consulted. They hold millions of records, many not held by the Essex Wildlife Trust Biological Records Centre.	Data from Essex Field Club was received in April 2020.

Environment Agency comment	National Highways response
Page 274 It is highly likely that slender hare's-ear and sea barley are found on the sea wall flood defences.	Noted. An extended phase 1 habitat survey was undertaken for the Project within and up to 50m from the Order Limits. Please refer to ES Appendix 8.2: Plants and Habitats.
Page 278 There is a large population of eels in the main Mardyke channel. This needs highlighting.	Noted. The potential impact to eel populations has been assessed, please refer to ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1).
Page 289 The importance of Tilbury Fort for wildfowl means that measures should be put in place to prevent their disturbance during and after construction.	The potential disturbance of the Project on species including wildfowl has been considered as part of ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1).
Page 302 Given the prevalence of water voles in the development area, serious consideration must be given to avoidance, mitigation and compensation measures.	Noted. The environmental assessment and design has incorporated mitigation measures using a hierarchical system of avoidance and prevention, reduction and mediation (DMRB LA 104 Environmental Assessment and Monitoring (Highways England, 2020c)). Further details regarding the water vole baseline conditions are presented in ES Appendix 8.10: Water Vole. A draft water vole licence has been prepared, please refer to ES Appendix 8.20: Draft Water Vole Conservation Licence Application.
Page 303 There is a reference to two desk-based reports of otters. Given the quality of habitat along the main Mardyke channel, we believe that mammal ledges should be installed along any road culverts.	Mammal ledges have been included in the design – please refer to ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1).
Page 305 Gap-filling surveys are important and should be undertaken as prescribed. We are particularly interested in the otter and water vole surveys.	A full suite of ecological surveys, including otter and water vole, has been undertaken as detailed in ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1).
Page 307 There is a lack of information on the impacts on fish (particularly eels) during construction and operation of the new road. Also what are the	Fish and eels were reported in the PEIR and so were being considered during Project design, particularly for the potential inclusion of jetty.

Environment Agency comment	National Highways response
impacts on the Water Framework Directive potential of the Mardyke main channel and tribs.	However, the Project design has evolved, and a new Project jetty is no longer required. The impact to fish, including eels, has been fully assessed, please refer to ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1). A Water Framework Directive assessment has been undertaken; please refer to ES Appendix 14.7. The scope of this assessment was discussed with the Environment Agency at a meeting in November 2017 and discussed further at a meeting in February 2018.
Chapter 15: Road Drainage and Water Environment	
Page 517 The culverting/pollution for Tilbury Main and Orsett Fen need significant offsetting as does the diversion channels. There must be no barriers to eel passage and enhancements where possible. This could include reprofiling to channel banks to benefit riparian wildlife and creation of fish refuges for eels. All bridges or significant culverts should include mammal ledges. Flood compensation and SuDs should be designed to form ecological features.	A Choosing by Advantage 'Light' Workshop was undertaken with the Environment Agency to appraise the options for a crossing over the Tilbury Main on 16 December 2019, with a follow up meeting held on 13 January 2020. Although the Environment Agency object to culverting, it was acknowledged that a 65m culvert is the least-worst option in this location. Culvert design is explained in Part 10 of ES Appendix 14.6: Flood Risk Assessment. A technical note regarding the Tilbury Main culvert design in relation to fish has been produced. The report outlines current information on culvert design in relation to fish and provides a view on the proposed design for the Tilbury Main culvert. A copy of the Technical Note is appended to Part 10 of ES Appendix 14.6: Flood Risk Assessment (Annex B). The report concludes that it would be important to replicate the current hydraulic conditions of the existing river channel through the proposed culvert. This would facilitate the passage of the existing fish community, be that eels and minor fish species.
Clear span crossings are ideal although shading could be offset by channel enhancements downstream and upstream.	
All new culverts should be accompanied with the creation of new river/stream habitat at a scale of at least 1:1. Where possible recreated habitats should be of higher quality than those lost to the scheme.	
Environmental protection and waste – general comments	
The applicant will need to identify where permissions such as environmental permits and abstraction licences are required. Environmental permit pre-application advice can be found at:	The environmental permits that would be required are detailed in the Consents and Agreements Position Statement (Application Document 3.3).

Environment Agency comment	National Highways response
https://www.gov.uk/government/publications/environmental-permit-pre-application-advice-form and https://www.gov.uk/guidance/waste-environmental-permits#get-help-with-your-application Abstraction licence pre-application guidance can be found at: https://www.gov.uk/guidance/water-management-apply-for-a-water-abstraction-or-impoundment-licence	
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Page 23 drainage 2.9.4 It is good to see that attenuation basins will be provided which will improve water quality.	Noted.
2.9.5 We are pleased to see that facilities will be installed to capture and contain pollutants arising from spillages.	Noted.
2.9.6 Groundwater sensitivity and groundwater source protection zones should also be taken into account when considering drainage options.	Noted.
Page 28 tunnel design 2.14.6 Suitable disposal routes for contaminated water such as that arising from wash down and firefighting activities needs to be identified. Will infiltration water be saline? If so, discharge routes need to be considered as freshwater receptors will not be suitable to receive this water.	Part 7 of the ES Appendix 14.6: FRA includes a Surface Water Drainage Strategy which has been developed in consultation with the Environment Agency and relevant Lead Local Flood Authorities.
Page 493 road drainage and water environment 15.2.1 Table 15.2.1 should be updated to include The Environmental Permitting (England and Wales) Regulations 2016. Under Reg. 38 (1) of EPR 2016, it is an offence for a person to operate a regulated facility	The environmental permits that would be required are detailed in the Consents and Agreements Position Statement (Application Document 3.3). This document refers to the Environmental Permitting (England and Wales) Regulations 2016.

Environment Agency comment	National Highways response
(for example, a groundwater activity or water discharge activity), or cause/knowingly permit a groundwater/water discharge activity, without an environmental permit.	
The Environmental Damage (Prevention and Remediation) (England) Regulations 2015 should be considered.	This has been considered in ES Chapter 8: Terrestrial Biodiversity, ES Chapter 9: Marine Biodiversity and ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1).
Page 511 existing drainage 15.4.57 should also refer to Anglian Water Services Limited.	Noted.
Page 514–524 effects and mitigation Tilbury Main system (main rivers and ordinary watercourses) have been identified as a receptor for mobilised contaminated land leachates. Chalk and gravel aquifers and Linford public supply have not been identified as potential receptors for mobilised contaminated land leachates.	The potential for mobilised contaminated land leachates to impact on aquifers and the public supply at Linford has been assessed, please refer to ES Chapter 10: Geology and Soils (Application Document 6.1).
LTC#13a-13f LTC 13a sheet 9b identifies a rest and service access area at Tilbury junction. Foul water disposal arrangements will need to be considered. Suitably sized and designed oil separators will need to be included in the car park design.	The Rest and Service Area is no longer being taken forward as part of the Project.

6 Essex County Council

Table 6.1 Essex County Council Statutory Consultation

Essex County Council comment	National Highways response
Minerals and Waste Planning	
Minerals	
The Scope of the minerals study areas should include of Thurrock and London (as well as marine aggregates) and not just Kent and Greater Essex.	The study area for the mineral assets and waste assessment comprise the Order Limits (including compounds and temporary land-take) and the local waste infrastructure within a 20km radius of the Order Limits. For more information, please refer to ES Chapter 11: Material Assets and Waste (Application Document 6.1)
ECC would expect the scope to include a materials balance (including minerals) and an understanding and assessment of the likely market areas to supply the necessary aggregates and fill materials. This should cover the wider geographic area and have regard to material landed on the River Thames. This should include consideration and timing with the development of the Aggregates wharf proposed within Tilbury2. This should also have regard to the potential use of Borrow Pits and the need to reduce minerals.	An estimation of materials balance is included in ES Chapter 11: Material Assets and Waste (Application Document 6.1) so to determine import and export requirements. The assessment includes a calculation of materials needed to construct the Project (including offsite and onsite minerals). This assumes minerals excavated onsite would be reused onsite to offset the need to import additional aggregate. The need for borrow pits was considered however the design indicates a net excess of excavated materials. The assessment has considered marine sourced aggregates.
Whilst there is no assessment of the impact of the “off-site” primary extraction materials, ECC would expect the Scope to quantify the amount of material and minerals required and to explore the likely sources. This will provide a better understanding of the mineral supply and demand factors, which will be relevant to all the potentially affected Mineral Planning Authorities and their Minerals Local Plans.	ES Chapter 11: Material Assets and Waste (Application Document 6.1) included an assessment of the consumption of material resources and products (from primary, secondary or recycled and renewable sources); the use of materials offering sustainability benefits and the use of excavated and other potential waste arisings; and the production, treatment and offsite management of waste. Refer to ES Chapter 11: Material Assets and Waste (Application Document 6.1).
Waste	
ECC supports the application of the Waste Hierarchy and the use of Sustainable Management of the excavated materials and waste arisings, including recycling and potential re-use/after-uses. ECC	An estimation of materials balance is included in ES Chapter 11: Material Assets and Waste (Application Document 6.1). The assessment includes a calculation of materials needed to construct the Project (including offsite

Essex County Council comment	National Highways response
would expect this information to be included within a Materials Balance.	and onsite minerals). This assumes minerals excavated onsite would be reused onsite to offset the need to import additional aggregate.
ECC would expect the scope of the waste study area to include Thurrock and London and not just Kent and Greater Essex. Further clarification is required on the use and interpretation of ECC on Essex and Southend on Sea Waste Local Plan capacity data.	The study area for the mineral assets and waste assessment comprise the Order Limits (including compounds and temporary land-take) and the local waste infrastructure within a 20km radius of the Order Limits. For more information, please refer to ES Chapter 11: Material Assets and Waste (Application Document 6.1). The baseline was established via data collection from published sources as well as direct engagement with the waste and minerals industry which include local aggregate assessments for London, Medway as well as Greater Essex (which includes Thurrock) and Kent. The information collected was used to determine the aggregate resource within the Order Limits, the current local landbank and supply of available resources and the anticipated availability in the future.
ECC would anticipate the Scope (and HE) to have regard to their own NSIP projects in the area as well as other NSIP projects (i.e. Tilbury2) to consider the potential cumulative impacts and opportunities.	This has been considered separately in ES Chapter 16: Cumulative Effects Assessment (Application Document 6.1).
Annex 1: Minerals and Waste Planning	
The Minerals and Waste Planning Authority (MWPA) welcome the positive statements made with regard to waste being managed in accordance with the Waste Hierarchy and the planned approach with regard to the re-use of contaminated land.	Noted.
It appears that the matter of Waste Management has not been progressed since the scoping report was issued last year and largely leaves the method of waste disposal undecided as potentially road, rail and or water transport. There could be significant local impact depending on mode of transport and if disposal sites are in Essex and /or Essex network used for transport of waste.	Since scoping and Statutory Consultation, there has been ongoing consultation and engagement with local authorities on the material asset and waste assessment. A summary is provided in ES Chapter 11: Material Assets and Waste (Application Document 6.1). Please also refer to ES Appendix 4.1: The Inspectorate's Scoping Opinion and National Highways Responses.
General support is also given to the Preliminary Environmental Information Report but it is noted that there is significant work required to fully work through certain areas. In particular we would like	In 2018, Essex County Council confirmed that there are no mineral resources located in the host section of the Project, however the reuse of extracted material has been considered, please refer to ES Chapter 11:

Essex County Council comment	National Highways response
to engage with the team in developing a strategy for dealing with extracted material. It is noted in paragraph 2.18.30 and 2.18.45 (pgs 37 & 38) that reuse will be explored further.	Material Assets and Waste (Application Document 6.1). An Excavated Materials Assessment (ES Appendix 11.1) has been developed in order to validate available offsite capacity at third-party potential receiver sites and determine which of these would be capable of receiving excavated materials from the Project This document has been prepared in consultation with the Environment Agency and local authorities, including Essex County Council. Please refer to ES Chapter 11: Material Assets and Waste (Application Document 6.1).
Landfill mining, reclamation or other such re-working are accepted as potentially being required to facilitate the preferred route of the Crossing. Proposals for works which impact on closed landfill sites in Essex will be required to be in conformity with Policy 14 – Landfill Mining and Reclamation in the Essex and Southend-on-Sea Waste Local Plan 2017.	Historic and current landfills as well as several third-party sites with the potential to receive excess excavated materials were considered as part of ES Appendix 11.1: Excavated Materials Assessment.
The title of this section (section 12) does not fully reflect its scope, the section should be renamed “Materials and Waste Management”	In accordance with the issue of the new DMRB standard LA 110 Material Assets and Waste in 2019 (Highways England, 2019c), Chapter 11 of the ES was renamed Material Assets and Waste. Please refer to ES Chapter 11: Material Assets and Waste (Application Document 6.1).
<u>Assessment of the expected Volume of waste arising</u> The MWPA are pleased to note that the requirement of the NPSNN with regard to ensuring that there is sufficient waste capacity to manage waste volumes arising from the construction of the Project has been understood. It is therefore expected that the Environmental Statement will provide an assessment of the expected volume of waste arising from the Project and potential after-uses and disposal routes for this waste.	This has been considered in the waste assessment. Please refer to ES Chapter 11: Material Assets and Waste (Application Document 6.1).
Lead Local Flood Authority – Flood and Water Management	
ECC is the Lead Local Flood Authority in the two tier administrative area of Essex, and is the host authority in respect of the “Brentwood” element of the project as well as a neighbouring authority.	Noted.

Essex County Council comment	National Highways response
ECC would expect the Scope to include provision for above ground attenuation features, and these should be included within the "Redline" boundary of the Application. ECC has raised this in earlier discussions and is concerned that if the space is required for these features is not accounted for at this stage of the process there will be limited scope to increase the extent of the development boundary at a later stage, potentially leading to substandard surface water drainage systems and increase in flood risk or a decrease water quality in these areas. ECC would expect the Scope to explore these issues as previously discussed and for the redline boundary to be amended to facilitate the delivery of a suitable drainage scheme.	Attenuation features have been included within the Project's Order Limits. A strategy for managing operational surface water drainage has been prepared centred on the application of SuDS, appropriate to local conditions. The strategy is summarised in Part 7 of ES Appendix 14.6: Flood Risk Assessment (FRA). The drainage principles have been discussed and agreed with relevant Lead Local Flood Authorities, as detailed in ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1).
Annex 1: Lead Local Flood Authority – Flood and Water Management	
8.1.2 - The PEIR still doesn't acknowledge the Essex SuDS Guide as one of the key documents that the scheme should take account of as part of the assessment methodology. The DMRB was written before responsibility for Ordinary watercourses was placed with LLFAs and therefore doesn't account for local variation to guidance.	The road drainage and the water environment assessment has been undertaken in accordance with the methodologies described in DMRB LA 113 Road Drainage and the Water Environment (Highways England, 2020h). A strategy for managing operational surface water drainage has been prepared centred on the application of SuDS, appropriate to local conditions. The strategy is summarised in Part 7 of ES Appendix 14.6: FRA. The drainage principles have been discussed and agreed with relevant Lead Local Flood Authorities, as detailed in ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1).
8.3.1 No reference to the Essex SuDS Design Guide	A wide suite of guidance documents relevant to flood risk and drainage were also used and are summarised in Part 2 of ES Appendix 14.6: FRA. The Essex SuDS Design Guide has not been referred to within the ES as the proposed SuDS design is not being implemented within Essex County Council's jurisdiction.
8.4.5 Brentwood Borough Council are a risk management Authority Essex County Council are the Lead Local Flood Authority. As such we would expect consideration to be given to our own local standards when considering the impact of the development in relation to flood risk and pollution risk to ordinary watercourses.	
Most sections of the document refer to the use of the DMRB and HAWRAT and make no reference to ECC guidance.	
Public Health and Wellbeing	

Essex County Council comment	National Highways response
ECC is the Public Health advisor in the two-tier administrative area of Essex and is the host authority in respect of the "Brentwood" element of the project as well as a neighbouring authority. ECC Public Health wish to engage with this process in liaison with colleagues in Public Health England and respective Local Authority Public Health advisors.	Essex attended the Community Impacts and Public Health Advisory Group (CIPHAG) organised by the Project, which also involves Kent County Council and Thurrock Council. These meetings have been held throughout 2018-2020 and are detailed in the Health and Equalities Impact Assessment (Application Document 7.10).
• The wider determinants of health including employment and training opportunities for residents across the impacted areas needs to be explored in much more detail as this is one of the most positive potential benefits to health.	This has been included in the Health and Equalities Impact Assessment (Application Document 7.10) under the access to work and training topic.
• There appears to have been no engagement with Public Health as part of the consultation process in Section 13 "People and Communities" which needs to be addressed.	Public Health England has been consulted during Scoping Opinion and Statutory Consultation and subsequent please refer to the Health and Equalities Impact Assessment (Application Document 7.10).
• The current proposals for the human health element of the Environmental impact assessment would benefit from Public Health input, advice and guidance.	
• A more detailed overarching health element is required as either an extended, integrated EIA or a stand -alone health impact assessment.	A separate health and equalities assessment has been completed, please refer to Health and Equalities Impact Assessment (Application Document 7.10).
Annex 1: Public Health and Well-being	
The Director of Public Health and his team are engaged with LTC around health, wellbeing and community impacts arising from the proposal. This ongoing engagement and associated work aims to ensure that both the positive and any unintended consequences on health, wellbeing and communities that may arise from LTC on our population are addressed. This work is being carried out in partnership with multiple other Public Health teams in authorities who may be impacted by the project.	Noted.
Annex 1: Strategic Planning, Economic Growth, Regeneration and Skills	
Section 14: People and communities	

Essex County Council comment	National Highways response
The potential economic benefits of a new Crossing and the increased reliability at the existing crossing, are significant and at this location there is the greatest potential for regeneration and job creation. The proposal also has the potential to have a significant impact and opportunity on the local and wider area of South and Greater Essex in respect of businesses, economic growth, development and planning. It is recommended that engagement as widely as possible is undertaken.	The local and wider economy has been considered, please refer to the Need for the Project (Application Document 7.1) and the Economic Appraisal Package, which is Appendix D of the Combined Modelling and Appraisal Report (Application Document 7.7).
People and Communities – Link with Public Health	
The project objectives of this report include considerations to the economy (to support local development, regional economic growth in the medium to long term). Public Health within ECC has a focus on employment and the health improvement and the positive impact upon wider determinants of health from this. We feel that there are many potential employment opportunities from the construction and operational phases including the actual development, supply chain and the wider economy. This supports ECC's vision of helping the people of Essex prosper by increasing their skills and improving the health of people in Essex.	
Historic Environment	
ECC has engaged with HE to explore the Historic Environment and Conservation elements of the proposal and the proposed methodology for the assessment of the scheme. ECC has made a number of recommendations based on local experience and knowledge to improve the results of the proposed work as described in the scoping report and these are set out in Annex 1.	Essex County Council's comments, submitted in response to the scoping report have been fully considered and the Applicant's responses can be found in ES Appendix 4.1: The Inspectorate's Scoping Opinion and National Highways Responses.
Annex 1: Historic Environment & Archaeolog	
We refer the project team to all of the comments that were submitted on the first of December in our response to the scoping report	

Essex County Council comment	National Highways response
Landscape	
Given the nature, location and scale of this project as well as the extension of the LTC route including land within the two tier area of Essex, ECC welcomes the opportunity to engage with the process and the development of the Landscape and Visual impact assessments.	Engagement with Essex County Council has been ongoing throughout the pre-application phase. Engagement is summarised in ES Chapter 7: Landscape and Visual (Application Document 6.1).
ECC recommend that the Essex Landscape Character Assessment is taken into account, furthermore the assessments should take into account both the temporary and permanent implications of the proposal	The Essex Landscape Character Assessment (Essex County Council, 2003) considers the landscape north of the River Thames at a county scale. Given the length of time since its publication, the regional scale basis of the assessment, and the local assessments which have been published more recently with reference to this study, the Essex character assessment is now outdated and superseded by more recent, local studies.
Natural Environment	
ECC is engaging with the Project and supports the use of nationally agreed guidelines for surveys and assessments to meet the requirements of both the Natural England Standing Advice, and the Essex Biodiversity Validation Checklist using Defra's biodiversity metrics, as well as CIEEM Guidelines for Ecological Impact Assessment (EcIA) 2016. ECC has identified additional matters, issues and opportunities in respect of ecology and biodiversity to be addressed by HE within the Scope and Environmental Statement (see Annex 1).	Noted.
Annex 1: Natural Environment/Green Infrastructure	
Impacts	
There are several general impacts which will substantially effect the open areas and Green Infrastructure on the line of the Lower Thames Crossing and link road bearing in mind most of the land is Green Belt, there are SPA / Ramsar sites adjacent in the River Thames, and numerous Local Wildlife sites and archaeological sites. The general	The effects of the Project have been fully assessed, please refer to the ES (Application Documents 6.1 to 6.3) and the Habitats Regulations Assessment (Application Document 6.5).

Essex County Council comment	National Highways response
impacts are a) Noise b) Fragmentation of habitats for species c) Barriers for recreation links such as paths d) Pollution e) Light Pollution f) Flood issues	The assessment of effects on landscape and visual amenity has been used to inform the assessment of the extent of harm to the openness of the Green Belt by reference to visual as well as spatial impacts assessment of effects which is included within the Planning Statement (Application Document 7.2).
There are strategic GI projects which will be badly impacted by the LTC. Namely: 1) West Tilbury Marshes 2) The Thames Estuary Path 3) The Mardyke Way 4) Thames Chase Community Forest 5) The potential South Essex Marshes project	
1)West Tilbury Marshes will be split north South and their sense of isolation and wilderness lost. The road will fragment the marsh prevent migration of species. It is possible because of the central nature of the road line and the small size of the marsh that the marshes will be obliterated by the development. Visually the flat marshes will be dominated by the motorway construction and the present sense of wilderness and isolation will be lost.	Habitat fragmentation has been assessed, please refer to ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1). Landscape and visual effects of fragmentation on tranquillity and remoteness have been assessed in ES Chapter 7: Landscape and Visual (Application Document 6.1).
2)The Thames Estuary Path broken by the LTC which at this point is on the River and will need to be connected, presumably further north away from the River thus devaluing the experience. In addition, the major site adjacent to Coal House Fort will be also impact the adjacent Thames Estuary Path.	Any Public Rights of Way temporarily and permanently severed by the Project would be restored. This has been assessed as part of the Transport Assessment (Application Document 7.9) and reported in ES Chapter 13: Population and Human Health (Application Document 6.1).
3) The Mardyke Way and the wider Mardyke valley is effected visually and in noise terms, The Mardyke Way and River are crossed by the M25 Link road. Visually the flat valley will be dominated by the motorway construction and the present sense of wilderness and isolation will be lost.	Landscape and visual effects of fragmentation on tranquillity and remoteness have been assessed in ES Chapter 7: Landscape and Visual (Application Document 6.1).
4) The M25 link road enters the Thames Chase Forest north of the A13 as the forest area cover 40 sq miles. The Mardyke valley as a landscape area of Thames Chase is adversely affected as stated above. As the M25 link road sweeps west it passes a number of brownfield sites which have potential for Thames Chase to plant, eg Grangewaters, the Grange Hill Veolia site and the brownfield west of Ockendon Rd. As the road joins the M25 the land-take removes the	The effects of the Project have been fully assessed, please refer to the ES (Application Documents 6.1 to 6.3) and the Habitats Regulations Assessment (Application Document 6.5).

Essex County Council comment	National Highways response
first plantings of Thames Chase which date from 1990 to 2000. These are highly visible from the M25 going south as they sit upon high land called Clay Tye Hill. They are symbolic of Thames Chases's environmental regeneration of Thurrock and Havering and their removal will require sensitive restoration. Further north the land-take impacts on Codham Hall wood(ancient woodland owned by ECC), land north of Cranham which has block TPOs because of the regenerating woodland and land owned by the Forestry Commission (also planted in the late 1990s as part of the Thames Chase FC estate)	

7 Forestry Commission

Table 7.1 Forestry Commission Statutory Consultation

Forestry Commission comment	National Highways response
Ancient Woodland	
One of the most important features of ancient woodlands is the quality and inherent biodiversity of the soil; their being relatively undisturbed physically or chemically. Direct impacts of development that could result in the loss or deterioration of ancient woodland or ancient and veteran trees include: • damaging or destroying all or part of them (including their soils, ground flora or fungi) • damaging roots and understorey (all the vegetation under the taller trees) • damaging or compacting soil around the tree roots • polluting the ground around them • changing the water table or drainage of woodland or individual trees • damaging archaeological features or heritage assets	Noted. The design of the Project has sought to avoid or minimise and localise any impacts associated to changes to drainage regimes and water tables.
It is therefore essential that the ancient woodland identified is considered appropriately to avoid the above impacts. This would be the case with the re-routing of the utilities with potential trenching and ground works. There is the opportunity with this scheme to explore other methods of installing pipework without breaking the surface of the Ancient Woodland which would meet the standing advice hierarchy for ancient woodlands; Avoid, Mitigate and Compensate.	The design of the Project has sought to avoid impacts on ancient woodland wherever possible. Where impacts cannot be avoided, suitable compensation would be provided. Where losses are expected to occur, these have been outlined in ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1), along with appropriate mitigation. For further details, please refer to ES Figure 2.4: Environmental Masterplan (Application Document 6.2) for the location of compensatory habitat measures.

Forestry Commission comment	National Highways response
It is also essential that fuels, chemicals, or waste materials such as topsoil, minerals or hard core are not stored on ancient woodland soils or under the woodland canopy. See the Root Protection Zone below.	A solid barrier would be installed to protect retained ancient woodland and veteran trees from dust and pollution identified in ES Appendix 7.12: Arboricultural Impact Assessment. For each type of tree, an appropriate buffer would be established on which the fencing should be located to protect the Root Protection Area.
We particularly refer you to further technical information set out in Natural England and Forestry Commission's Standing Advice on Ancient Woodland – plus supporting Assessment Guide and Case Decisions.	Noted.
Loss of Woodland	
The "Lower Thames Crossing Map Book 2: Land use plans" shows that two woodlands, which although not designated as Ancient Woodland, will be completely removed from the landscape as they are located entirely within the Development boundary. The woodlands are: 'The Wilderness', which is 2.62 hectares between North and South Ockenden (at Gird Ref. TQ 599839), and 5.6 hectares of woodland at Low Street between West and East Tilbury (at TQ 670775). In addition, part of the Broadfields Farm woodland (Thames Chase Community Woodland) will be removed to enable the connection of the LTC to the M25.	The Wilderness woodland would be subject to habitat loss as a result of the Project. Habitat loss would occur within the entirety of the Low Street woodland. These losses have been outlined in ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1), along with appropriate mitigation. For further details, please refer to ES Figure 2.4: Environmental Masterplan (Application Document 6.2) for the location of compensatory habitat measures.
There is a further loss of woodland identified within the central 'reservation' on the A2 near Brewers Wood. The proposed widened carriageway will create a large physical barrier with the loss of the central reservation woodland. Investigations should be undertaken on the potential implications to priority species that we speculate may be within the woodlands and protected landscape and using this corridor between the important habitats either side of the A2. It would therefore be appropriate to consider options to link the woodland communities with innovating options such as 'living bridges'. We would highlight that this woodland lies within the Kent Downs AONB and the impacts on the protected landscape could be significant.	The decision to remove the central reservation was made to limit the impact on ancient woodland. The M2/A2/A122 Lower Thames Crossing junction has been the focus of extensive design and assessment work. The size of the Thong Lane South and Brewers Road green bridges have been maximised within the existing constraints. The impact of the Project on landscape, nature conservation and the historic environment has been assessed with regard to the sensitivity of the Kent Downs Area of Outstanding Natural Beauty (AONB). The scale of the impact on the sensitive environmental features in the A2/M2 corridor has been reduced as far as reasonably practicable.
The loss of these woodlands identified above should be included in your compensation package. Opportunities to strengthen and buffer existing	Noted. Appropriate compensation for these losses has been outlined in ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1).

Forestry Commission comment	National Highways response
woodland and provide connectivity should be considered. Forest Enterprise will comment on the impact of the proposals on the Community Forest areas	For further details, please refer to ES Figure 2.4 Environmental Masterplan (Application Document 6.2) for the location of compensatory habitat measures.
For any woodland within the development boundary, land required for temporary use or land where rights are required for the diversion of utilities you must take into consideration the Root Protection Zone. The Root Protection Zone (as specified in British Standard 5837) is there to protect the roots of trees, which often spread out further than the tree canopy. Protection measures include taking care not to cut tree roots (e.g. by trenching) or causing soil compaction around trees (e.g. through vehicle movements) or contamination from poisons (e.g. site stored fuel or chemicals).	A solid barrier would be installed to protect retained ancient woodland and veteran trees from dust and pollution identified in ES Appendix 7.12: Arboricultural Impact Assessment. For each type of tree, an appropriate buffer would be established on which the fencing should be located to protect the Root Protection Area.
New Woodland	
The visualisations of the new Lower Thames Crossing shows a new area of woodland by the A2 junction connecting to Claylane Wood (which is ancient woodland). This be would be extremely positive in buffering the woodland, providing a screening from the motorway and expanding public access. The appropriate species should be considered to enhance the boundary with the ancient woodland.	This was noted. Appropriate planting species are proposed, please refer to Appendix A of the Design Principles (Application Document 7.5).
We would encourage the consideration of opportunities to create suitable links to sites that are open to the public such as Shorne Wood, Jeskyns Community Woodland, and the wider Cobham woods. Innovating designs would benefit biodiversity connections and community connectivity from Gravesend.	The location of ancient woodland compensatory planting linking Great Crabbles Wood and Shorne/Brewers Wood is intended to strengthen retained blocks of woodland and enhance connectivity for both biodiversity and the community. Please refer to ES Figure 2.4: Environmental Masterplan (Application Document 6.2) for the location of compensatory planting.
The Defra Group Potential Environmental Legacy Projects has identified a range of opportunities for woodland creation, such as linking Great Crabbles and Randall Woods and Access and habitat enhancements to the Thames Chase Community Forest and we would welcome the opportunity to discuss this further.	The Forestry Commission attended Lower Thames Crossing Environment Legacy and Benefits workshops alongside Thames Chase Community Forest representatives.

Forestry Commission comment	National Highways response
It is important that the right trees are planted in the right locations and it is hoped that this project will be an exemplar of environmental net gain in line with the Government's 25 year Environment Plan by undertaking substantial woodland creation and woodland management.	Any proposals for planting as a mitigation or compensation measure have taken into consideration plant species and siting. For example, the Project has proposed the planting of species-rich grasslands and native woodland to help to compensate for the lost sections of The Wilderness woodland and to maintain connectivity to the woodland. Further details are provided in ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1). National Highways has committed to achieving no net loss in biodiversity by the end of RIS 2 and will work towards net biodiversity gain by 2040 across its estate. Although the construction of the Project would have significant adverse effects on statutory designated sites and irreplaceable habitats, such as veteran trees and some sections of ancient woodland, the design has sought to provide biodiversity gains wherever possible and this has resulted in a 15% increase in habitat value. No likely significant effects are predicted on terrestrial biodiversity during operation. An assessment of baseline biodiversity value and that achieved by the Project's design post development is presented within the Sustainability Statement (Application Document 7.11). Please refer to Need for Project (Application Document 7.1) for more information.
Adjacent Woodland	
We note in your plans the aim of retaining some areas of development to within the existing boundary. This is encouraging in that it does not remove woodland in some locations. However, we would highlight that it will bring some areas of woodland closer to live traffic. As such the appropriate long-term management is important to consider in the proposals.	Some areas within the Order Limits would be used for ecological mitigation such as the installation of bat boxes which would not require the removal of woodland. During construction, suitable management of habitats would be guided by the principles set out by Natural England's (2013) The Mosaic Approach: Managing Habitats for Species, to improve both priority habitats and species (see ES Figure 2.4: Environmental Masterplan (Application Document 6.2)). Following construction, monitoring of newly created habitats would be undertaken in accordance with a habitat management and monitoring plan that would be established in consultation with the relevant local authorities

Forestry Commission comment	National Highways response
	and statutory consultees. The habitat management and monitoring plan would outline the required maintenance operations, control measures and frequency of monitoring surveys to ensure the successful establishment of habitats.

8 Gravesham Borough Council

Table 8.1 Gravesham Borough Council Statutory Consultation

Gravesham Borough Council comment	National Highways response
Recommendations	
The Council considers the Preliminary Environment Information Report (PEIR) to be deficient in a number of areas and it fails the requirements of the relevant Regulations.	Noted, the assessment provided in the PEIR document was preliminary and represents a point in the iterative process of environmental assessment and contained sufficient information for the purposes of consultation. However, the Applicant does not consider that it was deficient. Engagement with Gravesham Borough Council is ongoing. Regulatory compliance is an essential part of the application. Please refer to Section 1.1.3 to 1.1.5 of this appendix.
The Council considers that further design work, environmental assessment and consultation needs to be carried out on the Thong Lane Bridge north and the tunnel portal to mitigate the impacts of the scheme on local residents through consideration of, amongst other things: • Extension of the tunnel southwards whether bored or cut and cover. • Widening of the Thong Lane green bridge to a minimum of 80m. • Mitigation for Riverview Park and Thong residents from the impacts of noise, disturbance and air quality	Several design changes have been introduced to the Project following statutory consultation. The tunnel has been extended southward, Thong Lane green bridge has been widened to over 80m and an assessment of noise and air quality has been undertaken. The outputs of these assessments and associated mitigation can be found in ES Chapter 5: Air Quality (Application Document 6.1), ES Chapter 12: Noise and Vibration (Application Document 6.1), and Chapter 13: Population and Human Health (Application Document 6.1).
The environmental impact of the new LTC/A2/M2 junction on the A2 corridor is unacceptable and further detailed work is required if an acceptable solution is to be produced, which needs to address, amongst other things: • Design speed of the junction slip roads ensuring free flow. • Width of Thong Lane South and Brewers Road green bridges. • Loss of HS1 landscaping and the overall impact on landscape, nature conservation and historic environment, particularly in the Kent Downs Area of Outstanding Natural Beauty.	The M2/A2/A122 Lower Thames Crossing junction has been the focus of extensive design and assessment work. The design of the Thong Lane South and Brewers Road green bridges have been maximised within the existing constraints. The impact of the Project on landscape, nature conservation and the historic environment has been assessed with regard to the sensitivity of the Kent Downs Area of Outstanding Natural Beauty (AONB). Impact on the sensitive environmental features in the A2/M2 corridor have been minimised as far as reasonably practicable.

Gravesham Borough Council comment	National Highways response
The information about the construction compounds is unclear and there is considerable concern over the implications for local residents and the environment given the long timescale involved and the activities that may take place.	The environmental impacts on the construction phases have been fully assessed and reported within the ES and minimised as far as reasonably practicable.
During the construction phase National Highways should require its contractors to use local labour wherever possible, including the creation of apprenticeships to provide a long term legacy of a higher skills base in the area.	The Contractors will be obliged to consider local employment, apprenticeships and educational initiatives when recruiting staff and supply chain partners for the Project. This is secured in the Code of Construction Practice (CoCP) (ES Appendix 2.2).
Preliminary Environment Impact Report (PEIR)	
The consultation is accompanied by a PEIR. Advice issued by PINS provides guidance on the requirements in relation to the PEIR and the role it plays in the consultation process. When preparing their Statement of Community Consultation (SoCC), the applicant is required to state whether the proposal is a development requiring EIA and, if so, how it intends to publicise and consult on the PEIR.	There is no prescribed format as to what a PEIR should comprise and it is not expected to replica or draft of the ES. The PEIR is a tool with which to consult with stakeholders on the EIA. The PEIR was compiled using Planning Inspectorate (2017a) Advice Note Seven and meets the requirements of the EIA Regulations. It described the likely significant effects based on baseline data known at the time of writing and provided sufficient information to enable consultation bodies to provide informed responses. A full EIA and Habitats Regulations Assessment have been undertaken. Please refer to Volume 6 of the DCO application.
The PEIR is required to contain sufficient information that is reasonably required for consultation bodies to develop an informed view of the likely significant environmental effects and any associated development.	
Whilst the form the PEIR takes is not prescribed and it is not expected to contain the same level of detail as the completed Environmental Statement (ES), it still has to be sufficient for the consultees to understand the likely significant environmental effects of the development so that it helps to inform their responses at the pre-application stage.	
Unfortunately, the current PEIR lacks sufficient information, detail and analysis of the likely significant environmental effects in a number of areas. For example, whilst the way in which the development may impact upon the environment is set out, there is often no consideration of the potential severity of that impact on sensitive receptors, so the reader is unable to understand whether it is significant or not. This is	

Gravesham Borough Council comment	National Highways response
aside from the fact that the development assumptions fed into the transport model are very light and are likely to understate impacts arising from traffic flows.	
Also, whilst an Outline Environmental Masterplan is provided (Figure 2.4 of PEIR) providing information on mitigation measures, there is no way of understanding how these have been developed in response to actual impacts or their severity.	ES Figure 2.4: Environmental Masterplan (Application Document 6.2) contains embedded mitigation (measures that form part of the engineering design, developed through the iterative design process) which has informed the ES. Embedded mitigation is secured within the Design Principles (Application Document 7.5). The geographical locations where the embedded mitigation measures discussed in this chapter are included in the design are indicated on the illustrative Figure 2.4: Environmental Masterplan (Application Document 6.2). Essential and good practice mitigation has been captured as commitments in the REAC, which can be found in the CoCP (ES Appendix 2.2).
It should be noted that there is very little discussion within the PEIR on the in-combination impacts of the scheme with other projects. This will need to be addressed as work on the ES progresses and agreement reached on what other schemes will have to be considered.	The cumulative effects of the Project with other projects have been considered in ES Chapter 16: Cumulative Effects Assessment (Application Document 6.1).
Air Quality	
Air Quality is driven by the traffic modelling data. Environmental Health and our consultants Bureau Veritas have considered the results and in general the main comment is that, on the traffic numbers used, the levels worsen considerably at some locations, including those along the A2 Trunk Road at the boundary of Gravesham and Medway. Whilst the worsening does not create any new or additional exceedances of the National Air Quality Standards outside of the current A2 Trunk Road Air Quality Management Area it does cancel out much of the improvement already achieved to date.	Since the PEIR, a more detailed traffic model has been developed and the air quality impacts modelled. These are reported in ES Chapter 5: Air Quality (Application Document 6.1).
Annex 4: Air Quality Report – PEIR	
Baseline	

Gravesham Borough Council comment	National Highways response
The baseline conditions have been established within 200m of the ARN as per the DMRB guidance. Annual mean air quality monitoring data for the year 2016 has been obtained from LAQM monitoring locations from 22 local authorities, National Highways historic air quality monitoring sites and project specific air quality monitoring sites. Data collected from local authority sites is made up of both NO2 diffusion tubes and automatic monitoring sites.	Noted.
Background NO2 concentrations have been calculated by undertaking a comparison of monitored background NO2 and Defra background mapped NO2 at 31 background monitoring sites across the study area. Based on this comparison Defra mapped concentrations have been uplifted by a factor of 1.45 for all modelled scenarios. Following model verification an uplift in assumed background values from the Defra mapped concentrations will result in a lower component from modelled road sources, which in turn will result in a smaller change in NO2 concentrations between the DM and DS scenarios. It is therefore necessary that any uplift to background concentrations is subjected to the correct level of scrutiny to ensure it is appropriate across the full extent of the study area.	Vehicle emission factors assume that air quality improves in future years, as older vehicles are replaced with modern cleaner vehicles. However, UK monitored roadside NO_2 concentrations have generally not declined as would be expected. This trend is thought to be related to the increased use of modern diesel vehicles, which emit more NOx than expected and have higher primary NO_2 emissions than petrol vehicles. To address this uncertainty and to ensure that future pollutant concentrations generated by the air quality model are not too optimistic, DMRB LA 105 (Highways England, 2019a) provides an approach to uplift modelled future NO_2 concentrations. The approach requires a gap analysis to be undertaken whereby adjustment factors are applied to uplift the modelled results to account for the gap between measured roadside NO_2 concentrations and the concentrations predicted in the future when using Defra air quality modelling tools.
All air quality monitoring data utilised presently in the PEIR has been collected in, or adjusted to, the year 2016. It is assumed that 2016 will remain the base year of assessment in the revised air quality assessment to be presented in the ES. It is not clear how the revised assessment will therefore take into account any changes in monitored concentrations between 2016 and 2018. Additionally it is not clear if the revised assessment will consider the use of any monitoring sites commissioned after 2016 such as sites GR137, GR138, GR141 and GR142 commissioned by GBC in 2017. It may therefore be appropriate for the revised version of the modelling assessment presented in the ES to consider a later base year of 2017 or 2018.	The base year has remained as 2016 in the air quality assessment. The data from sites GR137, GR138, GR141 and GR142 commissioned by Gravesham Borough Council in 2017, have been used to establish the air quality baseline. Please refer to ES Appendix 5.2: Air Quality Baseline Conditions for the full list of data used.

Gravesham Borough Council comment	National Highways response
Construction Phase	
Construction Dust Assessment	
PEIR Vol 1 para 6.6.3 details that although the project has the potential to affect air quality due to emissions from construction dust, these effects have not been considered in the PEIR. It is further stated that they will be considered as part of the ES to be submitted with the DCO application.	Construction dust has been assessed, please refer to ES Chapter 5: Air Quality (Application Document 6.1). This section of the air quality assessment was undertaken in accordance with DMRB LA 105 (Highways England, 2019a) which requires the construction dust risk potential of the Project to be determined (either 'large' or 'small') and also requires the sensitivity of the receiving environment to construction dust to be determined. Good practice dust management measures are included in the REAC, which can be found in the CoCP (ES Appendix 2.2), which are based on the measures outlined in the Institute of Air Quality Management's (2014) Guidance on the assessment of dust from demolition and construction.
An appropriate assessment of construction dust should be included as part of the ES utilising guidance such as the Institute of Air Quality Management: Guidance on the assessment of dust from demolition and construction (2014). Following the construction dust assessment, appropriate mitigation measures should be outlined to inform the Code of Construction Practice (CoCP) to be submitted as part of the ES. A list of mitigation measures that will be considered is provided following PEIR Vol 1 para 6.6.4, this broadly follows the types of measures outlined in the IAQM guidance and so is considered appropriate subject to the further assessment.	
Construction Emissions from Non-Road Mobile Machinery	
PEIR Vol 1 para 6.6.3 details that although the project has the potential to affect air quality due to emissions from Non-Road Mobile Machinery (NRMM), these effects have not been considered in the PEIR. It is further stated that they will be considered as part of the ES to be submitted with the DCO application.	Construction air quality effects associated with Non-Road Mobile Machinery (NRMM) are not expected to significantly affect local air quality and would be temporary and minimised through the application of industry standard mitigation measures. These mitigation measures are presented in the REAC, which can be found in the CoCP (ES Appendix 2.2).
An appropriate assessment of NRMM emissions should be included as part of the ES where appropriate taking into account the requirements of the London NRMM standards as outlined in the Mayor of London's The Control of Dust and Emissions during Construction and Demolition SPG.	

Gravesham Borough Council comment	National Highways response
Construction Emissions from vehicle movements on road, river and rail	
PEIR Vol 1 para 6.6.3 details although the project has the potential to affect air quality due to emissions from construction vehicle movements by road, river and rail, that these effects have not been considered in the PEIR, but that they will be considered as part of the ES.	Construction air quality effects associated with river transport were considered, however an assessment has not been completed because the number of barge movements during construction of the Project is expected to be below 5,000 movements per year, which is outside of the threshold for consideration based on Local Air Quality Management Technical Guidance (TG16) (Defra, 2016). ES Chapter 5 Air Quality (Application Document 6.1) assesses the construction phase traffic and traffic management. The Scoping Report referred to the possibility of transporting materials by rail. This has since been discounted by the Project as it would have involved upgrading the Tilbury Loop railway line and creating additional access roads.
An appropriate assessment of emissions from construction traffic should be undertaken. As no traffic figures or detailed construction phasing have been provided it is not possible to indicate what an appropriate assessment method would be. GBR comments provided in the scoping report have indicated that as the construction phase will be 6 years it is not appropriate for construction impacts to be considered as temporary. Additionally, as the construction period will occur before the assessment year of 2026, less of a shift to cleaner vehicles will have occurred and so a greater impact is likely to occur than if construction traffic was assessed for the year of 2026. It may therefore be appropriate for the assessment of emissions from construction road vehicles to consider the earliest possible year of peak construction.	The method for assessing the construction traffic is presented in ES Chapter 5: Air Quality (Application Document 6.1). The following traffic scenarios were considered in the construction assessment: • Do-Minimum – the without construction traffic scenario, which is based on the traffic data used in the operational assessment. The Do Minimum 2027 traffic data has been taken as representative of 2024, which is a conservative approach as 2027 data includes the additional growth in traffic that is expected to occur between 2024 and 2027. • Construction Phase – the construction phase traffic data includes traffic management and construction traffic. One traffic dataset was generated for each of the five construction phases, as described in ES Chapter 5 Air Quality.
As no details of the required construction vehicle movements for river or rail is provided it is not possible to indicate what an appropriate impact assessment method would be. Where appropriate, however, impacts of emissions from vehicle movements from river and rail should be	Construction air quality effects associated with river transport were considered, however an assessment has not been completed because the number of barge movements during construction of the Project is expected to be below 5,000 movements per year, which is outside of the

Gravesham Borough Council comment	National Highways response
included in the ES submitted as part of the DCO, or suitable justification provided for their exclusion.	threshold for consideration based on Local Air Quality Management Technical Guidance (TG16) (Defra, 2016). The Scoping Report referred to the possibility of transporting materials by rail. This has since been discounted by the Project as it would have involved upgrading the Tilbury Loop railway line and creating additional access roads.
Operational Phase	
Emissions from Roads Vehicle Movements	
It is understood that a revised assessment of impacts from emissions from operational road traffic will be presented in the ES. The assessment presented in the PEIR therefore only provides an indication of assessed impacts at key receptors. Due to the fact that all modelled results are likely to change in the ES assessment submission this review has focused on the proposed assessment methodology, rather than the preliminary results at specific a receptors.	Noted.
The air quality modelling assessment presented in the PEIR has utilised base data for the year 2016 and assumed an operational assessment year of 2026. As pollutant concentrations are in general expected to show a marginal decrease year on year, 2026 is considered an appropriate assessment year in light of the current provisional opening year of 2027.	Noted. DMRB LA 105 (Highways England, 2019a) states that the construction traffic assessment should be proportionate and limited to areas at risk of exceeding air quality thresholds. Therefore, in addition to applying the DMRB ARN screening criteria to the construction traffic phases, the Do-Minimum NO_2 results from the operational assessment were projected back from the operational assessment year of 2027 to 2024 using the Long Term Trend (LTT) roadside NO_2 adjustment factors available from the National Highways LTTE6 Gap Analysis Tool.
Key changes to traffic to the South of the River Thames are presented in para 6.6.12. Of particular pertinence to GBC are points d, e and f. Traffic data presented in PEIR Vol 1 chapter 6, presented as Annual Average Daily Traffic (AADT), have been rounded to the nearest 1000 vehicles. AADT traffic flows have only been presented at key receptor locations in the PEIR but it is acknowledged that full traffic data will be made available in the ES submitted with the DCO application.	Please refer to Combined Modelling and Appraisal Report (Application Document 7.7) for the traffic data.

Gravesham Borough Council comment	National Highways response
Although it has not been possible to consider fully traffic data changes at receptors as part of this review there appears to be an error in Table 6.15 in relation to receptor PEIR0023. The tables seems to suggest that an increase in traffic of "<100" results in a decrease in NO2 concentration from 68µg/m3 to 66.7µg/m3.	Noted.
GIS traffic data files have been made available for review with the PEIR submission however this data is only for peak hours, and only for future year (2026) scenarios. In order to effectively review the air quality modelling results, and confirm that all appropriate receptor locations have been included, 24 hour AADT data should be made available for both base year (2016) and future year scenarios.	Gravesham Borough Council was provided with a cordon model after Statutory Consultation in 2018 and an updated version of a cordon model after Supplementary Consultation 2020. A future year of 2027 was selected for air quality modelling as this represents the earliest anticipated opening year of the Project. Background pollutant concentrations and emissions from newer vehicles (alternative fuelled and Euro 6/VI) are expected to improve air quality over time as older more polluting vehicles are replaced in the vehicle fleet. Therefore, 2027 would represent the worst-case in terms of air quality impacts.
PEIR Vol 1 para 6.3.43 – 6.3.45 provides detail on the road traffic emission factors which the air quality assessment has for NO2 and PM10. The study has utilised emission factors derived from an update to the speed band emission factors published in the National Highways (HE) Interim Advice Note (IAN) 185/15. These factors were released following the publication of the latest version of the Defra's Emissions Factors Toolkit (EFT). Uncertainty in future year NO2 projections has been considered by utilising the methodology outlined in HE IAN 170/12 v3. The method outlined in the IAN 170/12 involves undertaking NO2/NOx gap analysis, based on the adjustment of modelled NO2/NOx for both the 2026 DM and 2026 DS scenarios. Para 6.3.61 states that "although the IAN 170/12 was released prior to the latest version of Defra's EFT if has still been utilised in the air quality assessment as it provides more pessimistic modelled concentrations than relying solely on Defra modelling tools". The assessment therefore does not make use of the latest COPERT emissions factors and modelling tools provided by Defra but seeks to provide more pessimistic predictions for future year	Road traffic emission factors for NOx and PM_{10} were derived from the speed band emission factors published by National Highways. The latest version of the speed band emission factors was used, which is generated from the Emission Factor Toolkit (EFT) v9.0 (released May 2019). EFT provides emission factors for 2017 to 2030, and the developers of the tool (Bureau Veritas) provided National Highways with a version to allow speed band emissions to be calculated for 2016 based on EFTv9.0. Since Statutory Consultation, the DMRB has been updated. The air quality assessment used DMRB LA 105 (Highways England, 2019a) in devising the methodology for data collection and assessment of air quality impacts.

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scenarios through use of the gap analysis. As the Defra modelling tools have been updated a number of times since the release of HE IAN 170/12 further analysis should be presented to verify the statement that its use still represents a more pessimistic approach.	
185 roadside diffusion tube and automatic monitoring sites have been used for the purpose of model verification. Table B4 in PEIR Vol 2 provides model verification factors for 13 zones across the modelled area. These factors range from 0.97 (a model over prediction) at the A127 Junction to 5.92 (a large model under prediction) at Dartford urban gradient. Although the table provides the number of receptors and verification points associated with each of the verification zones the data presented in the PEIR does not detail which receptors and verification points are linked to which zones. It has therefore not been possible to undertake a full analysis of model verification using the data presented as part of the PEIR submission, so whilst the method presented is in agreement with that presented in LAQM.TG (16) it cannot presently be tested fully.	Meetings were held in April, June, July and September 2020 with local authorities to update them on the air quality assessment. These meetings provided an overview of air quality assessment methodology for the ES, including baseline monitoring survey, construction and operational assessment, a discussion on the study area, model verification process and receptor selection. There was also a presentation of assessment findings, including significance and compliance risk assessment, as well as mitigation requirements.
Other than the mention of the Dartford urban gradient zone in Table B4 of PEIR Vol 2 the assessment does not make any reference as to how emissions from vehicles on roads of different gradients have been considered in the assessment. LAQM.TG (16) para 7.250 onwards provides a methodology for considering changes in emissions from vehicles on roads of different gradients. The impact of different road gradients on pollutant emissions should be considered in the revised assessment to be presented in the ES.	The traffic data used in the air quality assessment is explained in ES Chapter 5: Air Quality (Application Document 6.1).
Compliance Risk Assessment	
An indicative Compliance Risk Assessment is detailed in PEIR Vol 1 paras 6.6.43 - 6.6.44, however this only considers the maximum predicted concentrations in the Do Something (DS) scenario and the maximum increase in concentrations predicted by the scheme. The indicative assessment concludes that the project is considered to have a low risk of leading to noncompliance with the EU Directive on Ambient	In line with the DMRB LA 105 (Highways England, 2019a), the Compliance Risk Assessment has determined whether the Project affects the UK's reported ability to comply with the Air Quality Directive in the shortest timescale possible.

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Air Quality. A full compliance risk assessment taking into account of all receptors will be undertaken for the ES.	The compliance risk assessment is limited to links modelled by Defra in their Pollution Climate Mapping (PCM) tool, which correspond with roads modelled in the Project affect road network (ARN) In the construction phase traffic and traffic management assessment, 23 qualifying features were modelled at locations where NO_2 concentrations are expected to be highest (typically closest points to roadside). The qualifying features are displayed on ES Figure 5.5: Construction Traffic Receptors and Results (Application Document 6.2). A total of 82 qualifying features were modelled in the operational assessment as shown in ES Figure 5.6: Operational Phase Receptors and Results (Application Document 6.2).
Cultural Heritage	
There are concerns that the PEIR does not address impacts on heritage assets particularly well and this should be revisited in discussion with key stakeholders. It is not clear how impacts have fed into the scheme design or how mitigation has been informed. There would also appear to be inconsistencies with the work on landscape in terms of severity of the impact.	Discussions with heritage stakeholders have continued and the baseline information and assessment of impacts have been further discussed and developed. A series of design workshops have been held with consultees. The landscape assessment has followed the DMRB LA 107 (Highways England, 2020e).
Annex 5a: Heritage Issues note	
Comments on Applicant's Preliminary Assessment	
As noted above, Volume 11, Section 3, Part 2 of the Design Manual for Roads and Bridges (DTp document HA208/07) is a dated document and not entirely consistent with the approach set out in the NPSNN etc. This will need to be addressed by the applicant.	DMRB LA 106 Cultural Heritage Assessment (Highways England, 2020d) is the new standard used for the cultural heritage assessment. Please refer to ES Chapter 6: Cultural Heritage (Application Document 6.1) which presents the planning policies and guidance at a national level that are relevant to the cultural heritage assessment and includes the Applicant's response.
It should be noted that Gravesham BC made extensive comments on heritage assets that might be affected by the project south of the River Thames at the EIA Scoping Stage. It is not intended to repeat those comments here, although regard should still be had to them.	Please refer to ES Appendix 4.1: The Inspectorate's Scoping Opinion and National Highways Responses.

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The area within which the LTC would run in Gravesham is particularly historic, with heritage being multi-faceted and multi-layered. Many designated and non-designated heritage assets inter-relate within this context and need to be understood in combination. Cumulative harm to the significance of these assets in terms of how they are understood and appreciated for their historic, archaeological, architectural or artistic interest is therefore an important consideration.	Noted.
Whilst the appendices contain a significant amount of information on the historic environment, the schedule of non-designated heritage assets is difficult to negotiate or interpret. Also, the mapping doesn't appear to include the full list of entries. Given the nature of the information provided it would also have been useful if a commentary could have been provided detailing whether there are thought to be any significant clusters and how this has informed the approach to further investigations.	The existing baseline in relation to cultural heritage was established based on desk-based studies, fieldwork and modelling. A detailed description of the sources and methods for obtaining desk-based baseline information are contained in ES Appendix 6.1: Cultural Heritage Desk-based Assessment, ES Appendix 6.2: Aerial Investigation and Mapping Report, and ES Appendix 6.3: Archaeological Desk-Based Assessment of 20th Century Military Archaeology.
There are also a number on non-designated heritage assets that are missing from the list – presumably because they do not as yet appear in the Kent HERS. These are: • Within Thong lies the site of Mounken Barn, a medieval tithe barn used to collect a portion of corn and grain as payment of tithe to Rochester Cathedral/Priory from lands located in Shorne, Cobham and Chalk. As noted below, this appears to provide a longstanding connection between Randall Manor and what was known as the 'Borough of Thong'. This relationship needs to be understood as it contributes towards the significance of the Thong Conservation Area. The site of the barn and yard is shown on the 1842 tithe map for Shorne (entry number 301) as lying immediately north of footpath NS167 as it joins the west side of Thong Lane.2 The tithe barn appears to have been demolished in the period 1842-63 with the back of the site now occupied by two modern farm buildings. • Thong Lodge lies to the east of Thong Lane, accessed by a track that once formed the carriage entrance to the Cobham Hall Estate	The most recent information was obtained from Kent Historic Environment Record (HER) in late October and early November 2019, with a small amount of additional information in March 2020. The baseline for designated and non-designated heritage assets has been established using data from the sources listed in ES Appendix 6.1: Cultural Heritage Desk-based Assessment. The non-designated heritage assets that are presented in this comment are included in the cultural heritage assessment baseline.

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through the woods. This was built around 1816 and is believed to be to a design by one of Humphry Repton's sons. An engraving of the lodge is contained in J.C. Loudon's The Landscape Gardening and Landscape Architecture of the Late Humphry Repton Esq (1839). 4 The Medway Archives also has a similar tinted oval print. • Further to the south down Thong Lane lies a 1930s house called Thong Mead. This is of interest because it is believed to have been designed by the eminent architect Sir Herbert Baker of Owletts, Cobham for a member of his family. Baker was a contemporary Edwin Lutyens and friend of T.E. Lawrence.6 He also designed the tombstone of Ivo Bligh (later 8th Earl of Darnley and England cricket captain responsible for bringing back the Ashes in 1882/3) in Cobham churchyard and (amongst other things) the 1926 grandstand at Lords Cricket Ground – donating the weathervane depicting Old Father Time.	
Whilst it is accepted that the PEIR only provides a preliminary view and that work is still on-going, what has been presented within the consultation material appears to be very superficial and lacks depth. As such, it is difficult to understand how the preliminary view on impacts and the effectiveness of mitigation have been reached. The consultation material provides very little analysis of the significance of heritage assets either individually or in combination and what contribution setting makes to their significance.	Noted.
For example, the Thong Rural Conservation Area Appraisal SPD (2017) states that the following positive features form the wider setting of the conservation area: • The open arable fields to the east of the village, along the east edge of which, parallel to the line of Thong Lane, is rising ground on which is the view-enclosing feature of Shorne Woods; and • The wide, flat, arable country west and north-west of the village from within which the village appears to stand 'islanded' in the open landscape.	Noted.

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The Thong Conservation Area (CA) therefore derives much of its significance from its farmland setting in the lee of Shorne Woods. This relationship has endured for a significant period of time, as shown on the original 1797 Ordnance Survey drawings in the British Library; the 1842 Tithe Map of Shorne Parish; and subsequent Ordnance Survey plans of the area.	This was noted. Specific Design Principles (Application Document 7.5) are incorporated that consider the historic landscape such as the village of Thong and Thong Conservation Area. For example, the open rural setting would be retained by use of open grassland and meadow planting which would reference the historic layout of Royal Air Force (RAF) Gravesend.
The new LTC link road would sever the farmland to the west of Thong whilst mitigation in the form of the creation of false cuttings etc. and woodland planting to both the east and west of the hamlet would fundamentally alter its setting and detract from its significance.	The impact of the Project on the setting of Thong Conservation Area has been fully assessed. Please refer to ES Chapter 6: Cultural Heritage (Application Document 6.1). The landscape design for the Project seeks to avoid or reduce adverse impacts on designated and non-designated heritage assets as a result of change within their setting that would negatively affect their significance. This landscape design mitigation would include earthworks and planting as shown on ES Figure 2.4: Environmental Masterplan (Application Document 6.2).
On this, whilst the proposed mitigation may be required (in part) to address adverse impacts in terms of landscape, visual intrusion, noise and natural environment, a more nuanced approach is required when considering impact on the historic environment – it should not be assumed that 'one size' of mitigation 'fits all' types of harm. The ES should properly assess therefore not only the impact of the main elements of the development itself but also the proposed mitigation measures, which may have a positive, neutral or negative effect depending on what harm it is they are supposed to mitigate	Area-specific Design Principles for Sections 1 to 5 and 7 to 14 which include measures such as the retention or planting of woodland and other vegetation, careful design of new landforms within the setting of Cobham Hall, sensitively-design retaining structures, retention of existing open views where possible, reinstatement of historic hedgerows, integration of portal structures within the landscape and the creation of views to heritage assets which reflect the military history of the River Thames. Refer to the Design Principles (Application Document 7.5).
When looking at the Thong CA, consideration also needs to be given to its inter-relationship with the archaeological site of Randall Manor set at a higher level within Shorne Woods. There is clearly a relationship here given the tithes of the area were assigned to Rochester Cathedral/Priory and both therefore fell within the area known historically as the Borough of Thong.	Randall Manor forms part of the baseline and has been assessed in ES Chapter 6: Cultural Heritage (Application Document 6.1).

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As such, anything that adversely affects the setting of Thong CA also has the potential to adversely affect the significance of Randall Manor. Inter-visibility here is not critical in this relationship given setting can also have wider historic and socio-cultural dimensions.	
Historic England should also be asked for their view as to whether Randall Manor should be assigned the same status as a Scheduled Monument for the purposes of the DCO application given this could affect that weight accorded any harm to significance through development within its setting in the overall planning balance.	Historic England have been consulted throughout the pre-application phase.
2. Concern is also expressed over the preliminary assessment of the impact of the proposal on the significance of the Grade II* Cobham Hall registered park and garden and other associated designated and non-designated assets. The PEIR assumes that whilst these impacts would be negative, they would be comparatively small and unlikely to be significant given the works lie on the northern boundary of the park/woodland and represent a comparatively small change from the current setting.	The potential impact of the Project on Grade II* Cobham Hall Registered Park and Garden and other associated designated and non-designated assets has been fully assessed in ES Chapter 6: Cultural Heritage (Application Document 6.1).
However, this preliminary analysis completely ignores the wider setting of the registered park and garden and other associated assets to the north of what is now the A2 trunk road. The hamlet of Thong was a small estate village with the adjoining woods and farmland forming part of that estate along with the lands now lying to the south of the A2. The historic park and garden therefore needs to be understood in that context.	A full understanding and description of Grade II* Cobham Hall Registered Park and Garden is presented in ES Appendix 6.1: Cultural Heritage Desk-Based Assessment. This designated heritage asset is considered to be of high value within the assessment. Although the Grade II* Registered Park and Garden has been assessed as designated asset, the asset has been considered in its wider context (setting) within the cultural heritage assessment. Impacts to the historic landscape of Cobham Hall Registered Park and Garden are assessed within the built heritage section of ES Chapter 6: Cultural Heritage (Application Document 6.1).
Baseline information on Cobham Hall (no response required)	
As noted above, the original carriageway to Cobham Hall from the north-west is now the private driveway to Thong Lodge – the 1839/40 engraving mentioned above actually refers to it as the park keeper's lodge. From this point, the carriageway passed through the woods to the main Shepherd's Gate entrance to the more formal part of Cobham Park designed by Repton in the 1790s. That this part of Shorne Woods appears to	

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have been considered part of Cobham Park itself is also evidenced by the 1842 Tithe Apportionment which refers to the ponds here as being 'ponds in the park'.	
The corridor now formed by the A2 trunk road was prior to the 1920s occupied by a far more modest country lane reflecting the original alignment of Watling Street. Around 1924/25 a new 2 to 3 lane A2 trunk road was constructed as part of an unemployed workers scheme to improve strategic infrastructure. A roadhouse called the Laughing Waters providing refreshments for people travelling on this new road was developed as a speculative venture on the site of what is now occupied by the Inn on the Lake at the southern end of Thong Lane in the 1930s.	
Subsequently, the A2 was turned into a dual carriageway road in the 1960s and then widened further up to the present day. Some of these works were permitted under the Channel Tunnel Rail Link Act 1996, which also provided for the construction of the HS1 railway line adjacent. This resulted in the destruction of the old Watling Street country lane in the vicinity of Repton's Ponds and a significant change in the context of the historic Grade II* registered park and garden both at this point and to the west.	
The continued widening of the A2/HS1 transport corridor has therefore resulted in an incremental deterioration of the context within which heritage assets in this area are understood and appreciated, both through increased severance and intrusion through noise, light, fumes, and other associated activity.	
It is wrong to suggest therefore that LTC will only have a minor adverse impact on the Grade II* registered park and garden because the LTC works only affect its northern edge – it further severs the designated asset from its wider context and the way it is appreciated and understood.	A full understanding and description of Grade II* Cobham Hall Registered Park and Garden is presented in ES Appendix 6.1: Cultural Heritage Desk-based Assessment. This designated heritage asset is considered to be of high value within the assessment. Although the Grade II* Registered Park and Garden has been assessed as designated asset, the asset has been considered in its wider context within the cultural heritage assessment. Impacts to the historic landscape of Cobham Hall Registered Park and Garden are assessed within the built heritage section of ES Chapter 6: Cultural Heritage (Application Document 6.1).
In this respect, the advice set out in Historic England's advice note GPA3 on The Setting of Heritage Assets (2nd edition, 2017) is relevant: *Cumulative change* *Where the significance of a heritage asset has been compromised in the past by unsympathetic development affecting its setting, to accord with NPPF policies consideration still needs to be given to whether additional change will further detract from, or can enhance, the significance of the*	The Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning Note 3 (Second Edition) (GPA3) (Historic England, 2017b) has been used in the devising the methodology and assessment of cultural heritage impacts and the impacts of cumulative change have been considered.

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asset. Negative change could include severing the last link between an asset and its original setting; positive change could include the restoration of a building's original designed landscape or the removal of structures impairing key views of it (see also paragraph 40 for screening of intrusive developments).	
The LTC works would clearly represent an additional change which is likely to further detract from the significance of multiple assets which needs to be properly considered and addressed within the ES.	A full assessment of designated and non-designated heritage assets has been undertaken. Please refer to ES Chapter 6: Cultural Heritage (Application Document 6.1) and ES Appendix 6.1 Cultural Heritage Desk-based Assessment.
In this respect, the conclusions reached within the historic environment and landscape section of the PEIR would appear to be completely at odds with each other in terms of appreciation of severity of impact.	ES Chapter 6: Cultural Heritage (Application Document 6.1) and ES Chapter 7: Landscape and Visual (Application Document 6.1) have interrelationships and have collaborated to ensure a consistent assessment of the relative topics. It should be noted that the criteria and methodology for assessment for the two topics are different and therefore it is possible that the assessment will not exactly match.
Baseline information – no response required	
For example, Table 7.6 deals with construction impacts south of the River Thames and in terms of the Grade II* registered park and garden states that whilst there would be a negative effect, this is unlikely to be significant given the comparatively small change from the current setting. Similarly, in terms of impact on the Thong CA and White Horse Cottage (Grade II listed) the preliminary assessment states that whilst these could be negative and significant during construction, they are likely to change in nature and potentially reduce in magnitude when the scheme is operational.	
Paragraphs 7.6.3 – 7.6.5 then provides a very short assessment of operational impacts, stating that 'there will be no additional impacts to any heritage assets during the operation phase of the Project'. Whilst it is recognised that the nature of impacts may change from the construction to operational phase, it is suggested that these will reduce in magnitude with remaining adverse effects mitigated through earthworks and landscaping.	
This is rather different from the landscape appraisal which in terms of the operational phase at Table 8.14 states the following in respect of the Kent Downs AONB (LCA 4 West Kent Downs) area – including the setting of the Thong CA: *The 14-lane carriageway within the AONB, along with the realignment of the adjacent local roads, the encroachment within the HS1 land to the south, the longer overbridges at Brewers Road and Thong Lane, the associated loss of important established mature trees and HS1 mitigation planting, would result in a major alteration in the scale and rural appearance of the A2 corridor through the AONB.*	

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The loss of the important trees and the HS1 mitigation planting would also result in greater physical severance between the landscapes on either side of the A2 as well as a reduction in the containment of the road infrastructure, such as gantries, signs and street lighting, resulting in the A2 and HS1 corridor having a greater presence in the adjacent rural landscape. In addition, the increase in traffic flows along the A2/Project route, through the AONB may result in increased traffic noise within the adjacent landscape and recreational areas as well as within the historic Cobham Hall and Park. The A2/Project route junction on the eastbound side of the A2 and the loss of linear vegetation on the westbound side up to HS1, within the Higham Arable Farmlands (Thong), would have a major alteration to the scale and rural appearance, resulting in urban encroachment into the immediate western setting of the AONB. It is considered that the operational impacts of the Project route within the area and the adjacent Higham Arable Farmlands (Thong), would have a direct Major Negative change on the character of the A2 corridor through the AONB and its immediate setting.	
Given the Grade II* registered park and garden lies within the AoNB (and this extends to the north of the A2 to include parts of Shorne Woods, that once formed part of the historic park but remain an important part of its setting) it is difficult to reconcile how the landscape impact can be Major Negative but impact on the historic environment is far less.	The Project design has changed since the PEIR was prepared and this, along with these comments, has been considered in the preparation of the assessment presented in ES Chapter 6: Cultural Heritage (Application Document 6.1). Therefore, the assessment of impacts has changed since the PEIR. ES Chapter 6: Cultural Heritage (Application Document 6.1) and ES Chapter 7: Landscape and Visual (Application Document 6.1) have interrelationships and have collaborated to ensure a consistent assessment of the relative topics. It should be noted that the criteria and methodology for assessment for the two topics are different and therefore it is possible that the assessment will not exactly match.
This anomaly becomes increasingly odd when it is considered that the heritage designation itself relates to the significance of the area in landscape terms – is the PEIR really trying to say that the operational impact on landscape in general is Major Negative but is less in terms of effects on the historic landscape?	
Also, as set out above, the setting of the Thong CA would also be fundamentally changed by the LTC and associated mitigation and this will adversely affect the significance of this designated asset – along with other designated and non-designated assets in combination with it.	
Once again, it is difficult to understand how the landscape impact is considered to be Major Negative but that on the historic environment is less when setting makes such a major contribution towards the significance of the assets.	
Overall, Gravesham BC would argue that the PEIR significantly underestimates the impact of the LTC scheme on the historic environment and that the proposed mitigation measures may in	A collaborative approach has been undertaken to designing embedded areas of mitigation such as land for habitats creation and noise barrier/landscape screen locations.

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themselves contribute toward harm. Whilst these mitigation measures may be required for other legitimate reasons, the potential residual harm in terms of the significance of heritage assets should be recognised and a comprehensive package of compensatory measures agreed.	The landscape design for the Project seeks to avoid or reduce adverse impacts on designated and non-designated heritage assets as a result of change within their setting that would negatively affect their significance. This landscape design mitigation would include earthworks and planting as shown on ES Figure 2.4: Environmental Masterplan (Application Document 6.2). If adverse impacts to heritage are unavoidable due to the mitigation requirements of other topics these have been included in assessment in ES Chapter 6: Cultural Heritage (Application Document 6.1).
One aspect of the historic environment that does not appear to have been considered is the existing pattern or roads, paths and trackways within the area and whether these have significance as non-designated heritage assets. For example, the A2 follows the line of the Roman Watling Street; Scotland Lane is an ancient sunken north-south track connecting through to Thong Lane; and Brewers Road/Shorne Ridgeway is an ancient track extending out from Watling Street to hold sites around Hoo St Werburgh on the Hoo Peninsula. Such features (including the pattern of footpaths) may also be important in terms of how the landscape and settlement of the area is understood.	The baseline of cultural heritage assessment has been established using a number of data sources, fieldwork and modelling. Data sources are listed in ES Appendix 6.1: Cultural Heritage Desk-based Assessment. Roman Watling Street has been identified in the baseline of the cultural heritage assessment.
The LTC project has the potential to increase severance in terms of how non-motorised users (NMUs) move through the landscape and understand/appreciate the historic environment. It is important therefore that this aspect is not ignored within any analysis of the historic environment because poor choices in terms of design for NMUs could adversely affect significance of heritage assets and the historic environment in general.	Views and experiences of the historic environment from Public Rights of Way have been considered in ES Chapter 6: Cultural Heritage (Application Document 6.1).
This extends to the way in which Green Bridges are designed to reduce severance across the A2 to land to the south so that they are capable of performing a variety of functions – i.e. improving landscape, nature conservation, and NMU connectivity. On this, it is suggested that LTC should be used to explore best practice in Green Bridge design,	The landscape design for the Project, including green bridges, seeks to avoid or reduce adverse impacts on designated and non-designated heritage assets as a result of change within their setting that would negatively affect their significance.

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following advice set out in publications by Natural England and the Landscape Institute.	
Another aspect that requires further attention is the impact of increased traffic flows on the local road network. These also have the potential to adversely impact on the historic environment some distance away from the project itself and these effects need to be properly understood both under normal operating conditions and during times when incidents cause 'rat running'.	The impact of views of the road and associated traffic on the setting of heritage assets has been considered as part of ES Chapter 6: Cultural Heritage (Application Document 6.1). Indicative construction routes have been developed in consultation with stakeholders and the environment disciplines, with an aim to route construction traffic away from conservation areas. Where this has not been possible this has been accounted for in the assessment.
For example, increased traffic flows through the Thong CA would have an effect not only on road safety but also on how the CA is perceived, understood and appreciated. Increased traffic flows also bring with them the potential for damage to buildings, boundary walls and verges whilst traffic calming to mitigate adverse impacts also have the potential to incrementally change the character of an area detrimental to significance.	
Further away from the scheme itself, increased traffic flows through CAs such as at Cobham; Shorne; Chestnut Green, Shorne and along the A227 Wrotham Road could also have an adverse impact that needs to be understood.	
Local traffic modelling should be sufficiently robust to understand such impacts and a package of measures or mechanism included within any DCO to ensure that these are mitigated should issues arise.	Please refer to the Combined Modelling and Appraisal Report (Application Document 7.7).
The PEIR suggests that the Grade II listed Shorne/Cobham boundary stone may be affected by works to the south of HS1. It is understood that this was originally put in place following a dispute between the parishes in 1808 over who was responsible for maintaining parts of Watling Street. Unfortunately, the boundary stone was broken, repaired and moved to its current location when HS1 was constructed. Should it be necessary to move it again, it is suggested that this should be discussed with Gravesham BC and the parish councils prior to submission of the DCO.	The Project would not need to move or otherwise physically impact the asset during construction, and to ensure no accidental damage occurs, the asset would be temporarily fenced. Please refer to ES Chapter 6: Cultural Heritage (Application Document 6.1).

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Annex 5b: Heritage Conservation	
The current PEIR assessment of the historic environment is inadequate in several key aspects: There is no assessment of the collective impact of the whole scheme on the integrated historic environment. The cultural heritage assessment covers individual components or heritage assets, not the whole.	The methodology for the cultural heritage assessment adheres to DMRB LA 106 (Highways England, 2020d). An Historic Landscape Characterisation (HLC) study has been undertaken and is presented in ES Appendix 6.1: Cultural Heritage Desk-based Assessment. The assessment of the historic landscape is presented in ES Chapter 6: Cultural Heritage (Application Document 6.1).
The ES Chapter 7 on the historic environment provides a baseline description of heritage assets along the route and within vicinity. There is also a Table of potential effects and mitigation for designated heritage assets (Table 7.6). Although the baseline description includes designated and non-designated heritage assets there is no assessment of the collective impact of this scheme of the historic environment as a whole. Heritage assets have individual value but they are also key components of a much broader picture of interconnecting groups with complex interrelationships. These components make up the “place” and give the distinctive character of an area. The land which this scheme runs through has a distinctive character and unique history. This broader historic mosaic can be reflected through historic landscape assessments which describe heritage assets within their setting, both landscape and chronological settings. But the PEIR does not seem to include any assessment of the historic landscape of the route South of the Thames.	
It is essential the Cultural Heritage assessment in the final ES includes assessment of the collective impact of a significantly larger transport link on the multi-dimensional historic environment as a whole, not just on individual heritage assets. For example, what is the historic relationship of medieval Cobham Hall and parkland to Shorne Wood and to the surrounding fields and local routeways, and what is the impact of the A2 LTC junction on this relationship? Another example, what is the impact of LTC on Gravesend Airfield heritage; not just the surviving structures but also on the relationship between the structures; on the understanding, awareness and appreciation of the airfield within the local community and national enthusiasts. The LTC is extending across	An Historic Landscape Characterisation (HLC) study has been undertaken and is presented in ES Appendix 6.1: Cultural Heritage Desk-based Assessment. A focus is given to identifying a range of historic landscape themes to allow for an integrated understanding of the Project’s landscape which comprise: • landscape management (reclaimed land, woodland, parklands commons, recreational land uses and farming) • settlements • military activities and defences

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open fields and is going to have a major impact visually, as well as in terms of noise and lighting, and the full range of impacts need to be described not just on individual heritage assets but also on the wider historic environment as a whole.	• infrastructure and industry Please also refer to ES Chapter 7: Landscape and Visual (Application Document 6.1).
The proposed historic landscape assessment of the land south of the Thames is not of sufficient depth	The PEIR contained preliminary information and assessment. It provided the likely significant effects based on baseline data known at the time of writing. A full cultural heritage assessment has been undertaken, please refer to ES Chapter 6: Cultural Heritage (Application Document 6.1).
There are proposals to use the current Kent HLC but this is not detailed and very broad brush. There are also intentions to use the Hoo Peninsula data which does cover most of the LTC south of the Thames but there are a few areas, such as Jeskyns Wood, which are not covered. It would be beneficial to undertake a targeted HLC for the area south of the A2/LTC junction, for example around Jeskyns Wood, and to add the data to the Hoo Peninsula data.	An Historic Landscape Characterisation (HLC) study has been undertaken and is presented in ES Appendix 6.1: Cultural Heritage Desk-based Assessment. The DMRB methodology and the Hoo Peninsula Historic Landscape Project methodology (English Heritage, 2013) have been employed in the assessment of historic landscapes. The detailed methodology for the historic landscape assessment is contained in Annex C of ES Appendix 6.1: Cultural Heritage Desk-based Assessment.
However, HLC provides only a baseline and there is a need for a far more rigorous assessment of the landscape affected by the LTC scheme. Landscape evidence of Early Prehistoric activity is not likely to be on the surface but visual evidence and connections to later prehistoric activity through to 20th century use is present in the form of clusters of cropmarks, ancient field systems, historic woodland, routeways, field boundaries, military sightlines and runways etc. HL assessment should also include wider analysis of setting and key views, historic and literary associations and community value. The historical and literary associations of heritage assets should be considered e.g. use of certain buildings as models for locations or key events in Dicken's novels and life.	An Historic Landscape Characterisation (HLC) study has been undertaken and is presented in ES Appendix 6.1: Cultural Heritage Desk-based Assessment. A focus is given to identifying a range of historic landscape themes to allow for an integrated understanding of the Project's landscape which comprise: • landscape management (reclaimed land, woodland, parklands commons, recreational land uses and farming) • settlements • military activities and defences • infrastructure and industry

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Therefore I recommend that the historic landscape assessment uses and updates the Hoo Peninsula HLC but then provides an assessment of the prehistoric through to 20th century military, settlement and agrarian landscape as it can be perceived today and then how the LTC will impact on that understanding.	The DMRB methodology and the Hoo Peninsula Historic Landscape Project methodology (English Heritage, 2013) have been employed in the assessment of historic landscapes.
The proposed mitigation is far too limited. It focuses on designated heritage assets and does not include all impacts from noise, light, vibration during construction and long-term use. The mitigation needs to be proportionate and reasonable and it should also be inclusive and cover both individual heritage assets and the wider historic environment.	Noise, light and vibration impacts on heritage assets have been assessed. Please refer to ES Chapter 6: Cultural Heritage (Application Document 6.1). The landscape design for the Project, including embedded mitigation measures, seeks to avoid or reduce adverse impacts on designated and non-designated heritage assets as a result of change within their setting that would negatively affect their significance.
For example, mitigation should include measures to compensate for harm to Gravesend Airfield, through retention and conservation of individual structures wherever possible and establishment of a heritage trail, thereby raising awareness and appreciation of this WWII heritage. Another example of improving and broadening the mitigation measures could be recognition of the use of the ridgeway as a variety of distinctive routeways over 1000s of years, not just as the Roman Watling Street but as prehistoric trackways through to post medieval telegraph routes.	The site of Gravesend Airfield (the former RAF Gravesham) has been considered as part of the cultural heritage baseline. Please refer to ES Chapter 6: Cultural Heritage (Application Document 6.1).
A variety of mitigation measures should be considered and should be informed by the nature and character of the heritage asset(s), including the perception of the wider landscape as certain viewpoints. Screening may be acceptable for some assets but unlikely to be appropriate for military sites and historic landscape elements unless woodland is a key component.	The landscape design for the Project, including embedded mitigation measures, seeks to avoid or reduce adverse impacts on designated and non-designated heritage assets as a result of change within their setting that would negatively affect their significance.
Mitigation should seek to include conservation measures wherever possible and identify opportunities for enhancement. This scheme does present opportunities to raise awareness and understanding of the historic environment through artwork or activities, which can provide some offset to unavoidable harm.	A collaborative approach has been undertaken to designing embedded mitigation such as habitat creation and noise barrier/ landscape screen locations to reduce their impact to the setting of historic landscape. The assessment of buried archaeology in ES Chapter 6: Cultural Heritage (Application Document 6.1) has been undertaken on a robust

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Mitigation for heritage needs to include all impacts, including impacts from ecological and SuDs measures. The consequences of all mitigation measures need to be fully understood and described. There may well be areas where mitigation for ecology will have an impact on archaeology, for example, establishing areas for environmental mitigation and/or translocation of soils, tree planting etc, will have impact on heritage assets and especially on buried archaeology.	and precautionary basis. Further trial trenching will continue after the submission of the DCO application, for completeness, and enabling works would not take place until that is completed. Please refer to ES Appendix 6.8: Trial Trenching Reports. This included a mix of targeted trenches based on the results of the aerial mapping study and geophysical survey, and percentage sampling of areas in which other sources had not revealed details of archaeological remains. This has included areas that are proposed for environmental mitigation. As detailed in ES Appendix 6.9: Draft Archaeological Mitigation Strategy and Outline Written Scheme of Investigation, a proportionate programme of outreach activities, commensurate to the findings of the archaeological mitigation works, will be provided by National Highways. This measure is secured in the REAC, which can be found in the CoCP (ES Appendix 2.2), as part of the proposed Written Scheme of Investigation (WSI).
As such mitigation for heritage needs to be appropriately broad ranging and inclusive, in order to ensure suitable mitigation is appropriately integrated into construction programmes and long term land management and restoration programmes.	
We welcome the opportunity to comment on the scheme details at this early stage but emphasise that our comments are based on the current heritage data, including the present HER, which may not necessarily highlight all significant heritage sites along the route.	The baseline of cultural heritage assessment has been established using a number of data sources, fieldwork and modelling. Data sources are included in ES Appendix 6.1: Cultural Heritage Desk-based Assessment.
The assessment data provided so far is arranged in a manner which is not entirely helpful in comparing details and assessing the impact of the chosen design on the currently known heritage. The detail scheme plans are at a different scale to the heritage plans, making it challenging to consider the impacts on the heritage resource. It would be more helpful in the final ES data to have one section on Cultural Heritage (archaeology, historic buildings and historic landscapes) with a single plan showing all heritage constraints and the HER, then with another plan of showing the heritage data with the basic scheme superimposed on top. This would be more conducive to comparing the potential impacts on the historic environment. Therefore, we recommend that any forthcoming full EIA provides plans which clearly show the scheme	ES Chapter 6: Cultural Heritage (Application Document 6.1) is supported by ES Figures 6.1 to 6.9 (Application Document 6.2). ES Figure 6.2: Built Heritage Assets Assessed as Likely to Experience an Effect (Application Document 6.2) displays the locations of built heritage. ES Figure 6.3: Historic Landscape (Application Document 6.2) displays the historic landscape classifications. Archaeological remains and trial trenching areas are displayed in ES Figure 6.1, 6.4, 6.6 and 6.7 (Application Document 6.2).

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impacts on one plan showing all known heritage assets, including an up to date HER.	
In conclusion, there is a need for more in-depth and integrated assessment of the historic environment; archaeology, historic buildings and historic landscapes and the interrelationships, to ensure the ES reflects a sound understanding of the heritage assets affected by the LTC scheme. The assessment carried out so far is not sufficiently detailed to enable informed decisions on the mitigation for the chosen route. Although we understand the heritage assessment will include preliminary fieldwork, LiDAR, selected geophysical survey and other specialist assessments, etc, we are currently not aware of the range of the preliminary fieldwork nor viewed the results. The majority of the proposed route has not been subject to formal investigations and the data on the archaeological resource in particular is limited. Therefore, we would suggest there is potential for significant as yet unknown archaeology to survive and final decisions on preferred design options and mitigation should not be made until more detailed field assessments have been undertaken.	Since Statutory Consultation, a full cultural heritage assessment has been undertaken. This has included archaeological remains, built heritage, historic landscapes and the palaeoenvironmental/ geoarchaeological resource. The settings of heritage assets are also identified and the contribution that they make to an asset's value assessed. Desk based studies, archaeological walkovers, heritage asset setting survey, historic buildings surveys, geophysical survey, trial trenching, geotechnical ground investigation. Methodologies for the archaeological walkover and setting survey are contained in ES Appendix 6.1: Cultural Heritage Desk-based Assessment, the geophysical survey in ES Appendix 6.7: Geophysical Survey Reports, the trial trenching in ES Appendix 6.8: Trial Trenching Reports and the geoarchaeological assessment is in ES Appendix 6.5: Lower Thames Crossing: Palaeolithic and Quaternary Deposit Model (PQDM) and Desk-based Assessment of Palaeolithic Potential.
The rural nature of this scheme significantly increases the risk of encountering as yet unknown archaeology which may be of importance. There are a number of cropmarks south of St Mary's Church which indicate the presence of an extensive multi-period occupation site and post-medieval brick kilns are thought to survive in the former Shorne brickfields. We recommend that fieldwork is needed to support any desk-based assessment for the EIA to clarify the potential for significant buried archaeology along the chosen route, especially of all the cropmarks known within the location of the two site compounds south of the Thames.	A preliminary Palaeolithic and Quaternary Deposit Model (PQDM) was developed. The PQDM was divided into two phases: a preliminary overview (to support the cultural heritage assessment as submitted with this ES) and a more detailed PQDM proposed to be developed following submission of the DCO application: The initial model can be found in ES Appendix 6.5. For the archaeological trial trenching, Written Scheme of Investigation (WSIs) were prepared for all land parcels within the Order Limits, which were approved by the archaeological advisors to the local planning authorities. WSIs have also been agreed for the geophysical surveys.
In general there is insufficient consideration of the Thames and Medway Canal, 20th century defensive lines and Gravesend Airfield, or the Milton Rifle Range; their settings, character and wider landscape context. It will be a requirement to clarify the impact of the scheme on the canal and	The Thames and Medway Canal, former Gravesend Airfield and Milton Rifle Range have been considered as part of the built heritage baseline, south of the Thames.

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other “larger heritage assets”, including the airfield and the full historic Cobham Parkland, not just the current designated area.	Specialist military archaeology studies have been undertaken and are presented in ES Appendix 6.3: Archaeological Desk-Based Assessment of 20th Century Military Archaeology and ES Appendix 6.4: Coastal Fortifications Statements of Significance. These present an assessment of the value of the military archaeology of the study area and are focused on two key topics. Firstly, the late Medieval – Post-Medieval defences of the Thames Estuary in the study area, between Gravesend, Tilbury, Coalhouse and Cliffe Forts. Secondly, the value of the remains of the 20th century military activity within the study area, including Gravesend Airfield, the scheduled anti-aircraft battery at Bowaters Farm and two First World War landing grounds at Orsett and North Ockendon.
There is a need for broader and more detailed consideration of impact on historic landscape from lighting. This could be a major harm factor for a variety of receptors, including setting of designated heritage assets, especially listed buildings, and the Grade II* Cobham Park. In addition, as this scheme runs through a rural area, lighting could have a wider impact on the historic character of the landscape, including the historic marshland and open field system south of the Thames.	The impact of lighting on the setting of heritage assets has been considered as part of ES Chapter 6: Cultural Heritage (Application Document 6.1). Essential mitigation is proposed for the construction phase to ensure there is good design in the layout and appearance of night-time lighting at compounds and during night-time construction activities to avoid light glare, light spill and light pollution. Please refer to the REAC, which can be found in the CoCP (ES Appendix 2.2).
Mitigation should not just include adding more trees. There needs to be mitigation considered appropriate for open landscapes as “screening” is not necessarily going to be most appropriate and could be detrimental to the significance of some military heritage assets and historic long views from Cobham and Shorne.	A collaborative approach has been undertaken to designing embedded mitigation such as habitat creation and noise barrier/ landscape screening locations to ensure there is minimal detriment to long views and heritage assets.
Historic landscapes south of the Thames are not fully highlighted as a cultural heritage issue throughout this PEIR. There are considerations of landscape and visual impacts, covering ancient woodland etc, and the setting of Listed Buildings is raised but there is no clarity in how assessment of historic landscapes would be covered. We recommend assessment adheres to the DMRB Volume 11 and associated guidelines and to the 2013 GLVA (although there is a distinct difference between natural landscape assessment and historic landscape assessment.) In	An Historic Landscape Characterisation (HLC) study has been undertaken and is presented in ES Appendix 6.1: Cultural Heritage Desk-based Assessment. As there is no single, fixed methodology for this process the assessment uses the methodologies employed for non-road schemes, such as the Hoo Peninsula Historic Landscape Project (English Heritage, 2013) as recommended by heritage stakeholders. The study describes:

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addition, the HLC for Kent is not of sufficient detail. We recommend that the assessment for historic landscapes includes a detailed HLC, as recommended by the DMRB. This is particularly needed in view of the green field and rural nature of the scheme.	• the 'time-depth' profile of the landscape (i.e. how long it has been subject to human activity) • past landscape change and land use • the chronology and process of land enclosure • the present land use
We welcome the appreciation of the potential impact on marine archaeology from the bridge and immersed tunnel and the acknowledgement that there could be an impact on significant geoarchaeological deposits. We note the proposed programme of geoarchaeological assessment (PEIR chapter 7)	Noted.
There is no mention of options to consider impact on Bluebell Hill from increased traffic to the M2 from the M20. We welcome this in terms of the potential reduction of impact on the historic environment but maintain that any off-line works to the A229 Bluebell Hill could have a major impact on the historic environment, especially the nationally important Medway Megaliths. The impact of increased traffic between the M20 and M2 as a direct result of the Lower Thames Crossing should be part of the assessment.	National Highways acknowledge the concern raised by Gravesham Borough Council. Plates 5.7, 5.8 and 5.9 of the Traffic Forecasts Non-Technical Summary (Application Document 7.8) present the forecast percentage change in flows as a result of the Project, and an increase is indicated along the A229. Any future development of the A229 would be subject to the requirements of the National Planning Policy Framework (Ministry of Housing, Communities and Local Government, 2019) if developed by Kent County Council, or the National Policy Statement for National Networks (Department for Transport, 2014) if developed by National Highways. Both of these policy frameworks only allow for development in exceptional circumstances and where it can be demonstrated that it is in the public interest.
5.128 Requirement (p128) I note that the ES will include the results of suitable field evaluation. I would welcome clarification of what is “suitable” field evaluation. I welcome the proposals to undertake geophysical surveying but I recommend there is a need for targeted trial trenching and/or test pitting. Non-intrusive field techniques cannot always clarify date and nature of heritage assets, especially cropmarks. As such some intrusive archaeological fieldworks may be useful.	WSIs have been agreed for the geophysical surveys. For the archaeological trial trenching, WSIs were prepared for all land parcels within the Order Limits, which were approved by the archaeological advisors to the local planning authorities. Trial trenching is continuing post DCO submission. Please refer to ES Appendix 6.7: Geophysical Survey Reports and ES Appendix 6.8: Trial Trenching Reports for Priority 1 areas.

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5.129 Requirement (p128) states that the DBA and ES will provide an assessment of the value of the heritage assets, including descriptions of the nature of their significance. Assessment of the "value" of the heritage assets needs to be based on Historic England national criteria.	The value assigned has followed the requirements within DMRB LA 104 Environment Assessment and Monitoring (Highways England, 2020c), which describes medium as '*medium or high importance or rarity, regional scale, limited potential for substitution*'.
7.4.9 The Dairy at Cobham Hall is currently subject to a planning consent for conservation and conversion to residential and works are underway.	Noted.
It is essential that documentary and cartographic assessment is thorough. Early maps from the Cobham Estate must be an essential information source.	The full data source list is included in ES Appendix 6.1: Cultural Heritage Desk-based assessment.
7.5.2 It is essential that the walkover survey includes all the proposed mitigation areas as well as the main scheme. Creation of habitats and receptor site mitigation can have major implications for archaeological mitigation. As such mitigation for natural environment needs to be taken in to account throughout the heritage assessment.	The archaeological walkover covered the extent of the Order Limits, which includes areas of mitigation and a surrounding 50m survey area. The results of this are presented in ES Appendix 6.1: Cultural Heritage Desk-based Assessment.
7.5.3 It is not acceptable for the assessment of setting to simply focus on designated heritage assets. It is essential that the setting of all heritage assets is considered, especially in view of the range of heritage assets, from Gravesend Airfield to Historic England identified historic farmsteads. Assessment of the setting of historic assets may well merge with a suitable historic landscape assessment.	The assessment considers both designated and non-designated heritage assets. Please refer to ES Chapter 6: Cultural Heritage (Application Document 6.1).
Table 7.6: Effects and mitigation of key heritage assets south of the River Thames	
Receptor: Non-designated heritage assets within the Development Boundary: Potential mitigation south of the Thames will need to be covered by WSIs agreed with the County Archaeologist.	Monthly meetings were set up in December 2019 between all heritage stakeholders, which were ongoing up to DCO submission. On completion of trial trenching, further mitigation would be proposed which would be shared and agreed with the County Archaeologist.
Receptor: Cobham hall registered park and garden – there needs to be consideration of impact beyond the existing northern edge of asset. It is believed Cobham Park extended north of A2 routeway and remains directly associated with the designated parkland, such as earlier park	The landscape design for the Project seeks to avoid or reduce adverse impacts on designated and non-designated heritage assets as a result

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pales or access points, might require mitigation equivalent to its significance.	of change within their setting that would negatively affect their significance. The Project-wide Design Principles (Application Document 7.5) are relevant to cultural heritage, specifically: • Connecting People, which includes a design principle to celebrate local heritage and to provide interpretation material for selected historic features. • Connecting Places, which includes a design principle to reveal and enhance the value of heritage assets. • Structures, which includes design principles aimed at: integrating components within the landscape; the creation of green bridges; and balancing the requirements for noise barriers against visual impact. • Lighting, which aims to preserve historic rural character of the landscape at night as far as possible. • Landscape which includes design principles to: minimise removal of existing vegetation; integration of earthworks with the local topography; planting to minimise the visual impact of the Project; reinstatement of land used during construction; and landscape design which reflect the local historic landscape. Area-specific Design Principles (Application Document 7.5) for Sections 1 to 5 and 7 to 14 which include measures such as: retention or planting of woodland and other vegetation; careful design of new landforms within the setting of Cobham Hall; sensitively-design retaining structures; retention of existing open views where possible; reinstatement of historic hedgerows; integration of portal structures within the landscape; and the creation of views to heritage assets which reflect the military history of the River Thames. Other good practice mitigation measures relating to cultural heritage are included in the REAC, which can be found in the CoCP (ES Appendix 2.2).
Receptor: Cobham Hall including Temple, Engine House, Aviary The Dairy The Mausoleum The Mount Bowl Barrow, Romano-British villa and 19th century reservoir are an extremely varied collection of heritage assets with different attributes and needs. Mitigation for these heritage assets should not be lumped together. Some of the historic buildings are at a distance and may just require mitigation for visual impact but the Romano British villa is very close to the scheme. There is high potential for associated archaeological remains which could be considered to be of equivalent importance. As such I recommend that the heritage assets within Cobham Hall are dealt with separately.	
Receptor: Church of St Mary Chalk – the assessment needs to include impact from increased noise, vibration and lighting during construction and operation. Consideration of visual screening only is not sufficient. This heritage asset is so close to major works including the tunnel entrance, there needs to be a comprehensive assessment of all possible short term and long term impacts.	
Receptor: Tilbury Fort, Gravesend Blockhouse New Tavern Fort - assessment of these designated assets needs to thoroughly consider their function and especially the need for their visual relationships. Sight lines are a key factor in the significance of these assets and “visual screening” is likely to be more harmful.	
Receptor: Coalhouse Fort Battery – again assessment needs to thoroughly consider function and especially the need for visual relationships. Sight lines are a key factor in the significance of these military assets and “visual screening” is likely to be more harmful.	
Receptor: Cliffe Fort: assessment needs to thoroughly consider function and especially the need for visual relationships. Sight lines are a key factor in the significance of these military assets and “visual screening” is likely to be more harmful.	

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Other heritage sites requiring greater consideration	
St Thomas' Well – Cobham Park – conserved as part of HS1 works but may now be impacted by new scheme. Need appropriate details of mitigation for this heritage asset.	St. Thomas' Well, a Medieval holy well, is recorded in the southern part of the Application Site, off Thong Lane. The well has been capped and is preserved beneath the mitigation earthworks associated with HS1. It is of medium overall value due to its evidential value and its associative historical value with Thomas Becket. Due to its location beneath modern earthworks, its setting no longer contributes to its value.
Chapter 7 baseline heritage assessment does not mention the Thames and Medway Canal, 20th century defensive lines or the Milton Rifle Range in sufficient detail. The immersed tunnel may well have an impact on the Thames and Medway Canal and Milton Rifle Range although the details of the impact are not clear at this stage.	The Thames and Medway Canal, former Gravesend Airfield and Milton Rifle Range have been considered as part of the built heritage baseline, south of the Thames. Please refer to ES Chapter 6: Cultural Heritage (Application Document 6.1) and ES Appendix 6.1: Cultural Heritage Desk-based Assessment.
In addition, there is no specific mention of historic landscapes assessment for the land south of the Thames in Kent. As this scheme runs through an open landscape there could be major impacts from built development. The landscape approaching the river is rich and distinctive with multi-period sites visible or close to the surface of green fields. This could potentially be highlighted as being of high sensitivity. We recommend the guidance in DMRB Volume 11 on historic landscapes is adhered to. In particular there should be consideration of cumulative impacts and post-operational or long-term impacts on this open space east of Gravesend and west of Rochester.	An Historic Landscape Characterisation (HLC) study has been undertaken and is presented in ES Appendix 6.1: Cultural Heritage Desk-based Assessment. Please refer to ES Chapter 6: Cultural Heritage (Application Document 6.1) for the assessment of the historic landscape.
Annex 5C: Heritage Conservation additional	
On historic environment grounds we support the selection of the preferred route as other route options, particularly Options B, D1, D2 and E, would on current evidence have a greater negative effect on the historic environment.	Noted.
We strongly support the extension of the bored tunnel beyond the alluvial deposits south of the Thames and St Mary's Church as this should with appropriate design provide protection for buried	Noted.

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archaeological landscapes, important waterlogged palaeoenvironmental evidence, important heritage assets such as the Milton Rifle Range and St Mary's Church.	
It is important that structures such as bridges, viaducts and embankments are designed to minimise the adverse impact on important heritage assets such as Cobham Park and nearby Scheduled Monuments and listed buildings; as noted in our comments on the PEIR it will be important to consider impacts in relation to historic landscapes rather than just individual assets.	An Historic Landscape Characterisation (HLC) study has been undertaken and is presented in ES Appendix 6.1: Cultural Heritage Desk-based Assessment.
It is important the tunnel portal is designed to minimise negative effects on St Mary's Church – it should not be assumed that screening through earth bunding or tree planting will mitigate any adverse impact as such features may be inappropriate in the landscape context.	A full assessment of designated heritage assets has been undertaken. Please refer to ES Chapter 6: Cultural Heritage (Application Document 6.1).
It is important that proposals for habitat creation and other environmental mitigation measures do not adversely affect important heritage assets and landscapes.	A collaborative approach has been undertaken to designing embedded areas of mitigation such as land for habitats creation and noise barrier/landscape screen locations. The landscape design for the Project seeks to avoid or reduce adverse impacts on designated and non-designated heritage assets as a result of change within their setting that would negatively affect their significance. This landscape design mitigation would include earthworks and planting as shown on the ES Figure 2.4: Environmental Masterplan (Application Document 6.2).
Landscape	
The entire scheme in Gravesham is either within, or within the setting of, the Kent Downs Area of Outstanding Natural Beauty (AoNB). The current arrangement on the A2 corridor was the result of careful consideration and negotiation at the time of construction of HS1 and the A2 widening in the late 1990s. The A2 carriageways were already separated and at different level, for geological reasons, which softens their impact. Whilst not entirely successful, it attempted to maintain landscaping between the differing elements to soften impact and to	The Kent Downs Area of Outstanding Natural Beauty (AONB) was taken into consideration and the design of the Project has strived to create a balance between the Project's cost, environmental and social impacts, and deliverability. The integration of the Project into the surrounding landscape, including the inclusion of new landforms between the Project and HS1 has been

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provide habitat. Under the proposed scheme, the transport corridor would become far more urban in character and much of this landscaping would be lost.	considered and land-take and vegetation removal reduced as far as possible. Please refer to Design Principles (Application Document 7.5).
The current junction design expands to fill the entire area between the current northern boundary of the highway and HS1. This extends west on the south side to Marling Cross junction. The actual junction would be a major intrusion to the south of Riverview Park. The LTC approach road to the southern tunnel portal would be in deep cutting from Thong Lane northwards, which would be an intrusive and jarring feature in the local landscape which would be difficult to mitigate.	
Whilst Green Bridges are proposed at strategic crossing points it is unclear what has informed their design. Overall, these could be significantly wider to provide better mitigation in terms of landscape and nature conservation impact.	Further information on the green bridges associated with the Project were provided at Supplementary Consultation. Further details of the proposed green bridges can be found in ES Chapter 7: Landscape and Visual (Application Document 6.1) and ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1).
It has not been possible at this stage to take a view on the position of signage, gantries or lighting given the lack of information provided. This will need to be looked at very carefully given it was an issue at the time of construction of HS1 and the A2 widening in the past.	Further information on the position of signage, gantries or lighting associated were provided at Supplementary Consultation.
Annex 6a: Landscape report from Val Hyland Assoc.	
General points	
The Landscape chapter is not easy to read. The information is not laid out in a way that makes the assessment and its stages clear. It is not clear which methodology is used in the assessment. This can cause some confusion. For example, there needs to be a clear distinction between the terms ‘impact’ and ‘effect’, and a consistent approach in their use. This follows best-practice national guidance and is important in conveying information to a non-technical audience. Terms used to describe landscape and visual effects vary and it is not easy to follow which guidance has been used.	All ES topic chapters have followed the same format to ensure consistency and clarity. The terms ‘impact’ and ‘effect’ have been used consistently. All standards and guidance are clearly listed in ES Chapter 7 Landscape and Visual (Application Document 6.1). This is separate to the reference list.

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Comments on methodology used in the PEIR	
Baseline Study: To assess landscape, there needs to be an understanding of the value of the landscape. This is assessed from a range of factors including condition, quality and perceptual and other factors. National Character Areas (NCAs) are referenced in the PEIR, with extracts from the Statement of Environmental Opportunity (SEO) for each NCA3. However, the descriptions and key characteristics of the NCAs are missing. The descriptions are vital in highlighting the important features of the areas and must not be discounted. For example, the Greater Thames Estuary NCA describes the rich historical associations of the area, including the distinctive military heritage along the coastline. The retention of views between these historic forts is a part of the heritage of the forts, but it is not mentioned and not reflected in the assessment.	The National Character Area (NCA) profiles in which the study area for the landscape and visual assessment falls is provided in ES Appendix 7.4: National Character Baseline including Seascape Character.
The PEIR barely mentions heritage in its use of the NCAs. Similarly, there is no information on field patterns; a significant issue in an open, flattish landscape. Also, the NCA landscape change data is not mentioned. These are significant omissions, as the pressures on the landscape and the current landscape quality should be important factors in the assessment.	
The use of local landscape characterisation is better as it includes a wider range of issues. Characteristics of nine of the 23 Local Character Areas (LCAs) have been considered. It is stated that those not considered will be reviewed at a later stage	The Local Landscape Character baseline is provided in ES Appendix 7.5: Local Landscape Character Baseline.
The evaluation of landscape needs to consider both the LCA and the historic landscape characterisation. The assessment also needs to address the many historic features which are important in their own right as well as features of the landscape.	The assessment of effects on the historic landscape is included in ES Chapter 6: Cultural Heritage (Application Document 6.1). The presence of cultural heritage assets have been considered in the determination of value of the landscape resource. Please refer to ES Chapter 7: Landscape and Visual (Application Document 6.1).
Historic Landscape Characterisation Reports are not included, but they are available for this area and should be considered. Sites of heritage importance, Registered Parks and Gardens and Conservation Areas are	

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included in the PEIR, and sites with sensitive biodiversity are mentioned. However, the issue of impacts on the historic environment, and the effects on the setting of heritage assets of the proposal – including the proposed mitigation - do not appear to be considered in the assessment process.	
ii. Legislation and planning policy context: National and local policy requirements are included in the PEIR. However, legislative requirements are also included in the list of NPSNN requirements, and it is unclear as to whether the current version of the assessment responds to the NPSNN requirements, other than to list them.	Please refer to ES Chapter 7: Landscape and Visual (Application Document 6.1) which presents the planning policies and guidance at a national level that are relevant to the landscape and visual chapter. This table lists out each requirement with the Applicant's response.
In addition, the assessment does not include GBC Local Plan Policy CS02 which relates to the scale and distribution of development and includes reference to development being compatible with national policies for protecting the Green Belt.	Green Belt is referenced within ES Chapter 7: Landscape and Visual (Application Document 6.1) in relation to baseline analysis of the landscape character and visual amenity. This has been used to inform the assessment of the extent of harm to the openness of the Green Belt. This assessment within the Planning Statement (Application Document 7.2) considers the visual as well as spatial impacts on the Green Belt.
Also missing from the PEIR, the requirements in Policy CS12 include account to be taken of the KDAONB Management Plan (2014-2019), The Gravesham Landscape Character Assessment (2009), and the Cluster Studies (notably The Shorne to Shore Cluster Study). Other important and relevant guidance documents not referenced in the PEIR include Local Plan policy evidence documents - Gravesham Green Belt Study, PPG 17 Open Space, Sport and Recreation Study 2010, and Gravesham Landscape Sensitivity and Capacity Study by LUC (March 2016)	ES Chapter 7: Landscape and Visual (Application Document 6.1) has considered: • Kent Downs Joint Advisory Committee & Kent Downs AONB Unit (2014) Kent Downs AONB Management Plan 2014-2019, Second Revision 2014 • Gravesham Borough Council (2009), Gravesham Landscape Character Assessment Local Plan policy evidence documents have been reviewed where relevant.
iii. Extent of study area: Visual Baseline is informed by Landscape Character Assessment data and the potential extent of visibility of the project. See Table 1.0 responses to questions 2 and 3 (below).	Noted
iv. Identify landscape and visual receptors: See Baseline Study section above for information on landscape receptors	

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Visual Receptors (i.e. people who might be able to see the proposal and be affected by it) and the extent and quality of their views are identified, and with the exception of road users in vehicles and HS1 train passengers (who are not considered) appear to be representative of the range of receptors that might be affected by the project.	Please refer to ES Appendix 7.13: Views from the Road Assessment.
Visual Receptors: A number of viewpoints were selected to illustrate the effects of the proposal on 'visual receptors'. 18 viewpoints were selected in the Gravesham area (i.e. the LTC area south of the Thames); 6 of which were reproduced as visualisations with proposals shown in place, and 5 of the 18 views were also taken at night to show the effects of lighting.	Noted.
The results of the selection of viewpoints: • View 2 visualisation fails to provide a realistic image. Existing screening vegetation is shown in place. In reality the viewer may be able to see the parallel feeder roads to the A2 and possibly the HS1 track.	After Statutory Consultation, in January 2019, landscape and visual assessment representative viewpoints were shared with all of the host local authorities, including a refined Project ZTV and analysis and justification for the rationale on the selection of the study area. The feedback received in April 2019 was incorporated into the selection of 88 representative viewpoint locations to be used for the assessment of impacts on visual amenity and inform the landscape character assessment. In June 2019, a site walkover was undertaken with Gravesham Borough Council, Natural England, and Kent Downs AONB Unit to view and agree the viewpoints and discuss methodologies further.
• View 4 should provide a night view as it could be affected by lighting and the loss of screening vegetation	
• View 5 visualisation shows a view from a bridge that will be demolished; and shows the view of a nearby proposed bridge. This is very unhelpful and should show the viewpoint from the new bridge (which might reveal an expansive view of the proposed A2/LTC junction).	
• View 6b is a view from Jeskyn's Woodland towards the proposed A2/LTC junction. Again, it may be misleading in retaining the HS1 screening vegetation. The reality may be a starker view of the junction infrastructure.	
• View 7 visualisation of a view from Thong Village provides little for the reader to understand, and it is not clear at what stage of the project the view is meant to represent.	

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• Views 8 and 9 should also show night views, so that the potential contrast may be seen	
• View 12 visualisation is unhelpful. All the existing vegetation is in place, and the landform has not changed.	
• View 17 from the Saxon Shore Way should be added to with a view north across the Thames to Essex, as the works north of river may have visual effects on the visual receptor along the south coast.	
• There are only 2 viewpoints along the A2 transport corridor. This is a key part of the AONB where significant changes can be anticipated as a result of this proposal.	
It is recommended that further work be carried out to increase the number of viewpoints, and to address the issues set out above.	
v. Project description: This is not included in Chapter 8 but is found elsewhere in the PEIR suite of documents	Please refer to ES Chapter 2: Project Description (Application Document 6.1) which describes the Project in full.
vi. Identification of landscape and visual effects:	
The significance of landscape effects is assessed from a combination of landscape character, sensitivity to change, and value, considered with the magnitude of the proposal.	Noted.
Landscape Value: All AONB landscape receptors are assessed as being of High Value (this is the highest value in the scale from IAN 135/10). Other areas outside the AONB are assessed as either High or Medium Value. This is considered appropriate.	Noted.
The PEIR states that some issues relating to the valuing of the landscape are to be considered at a later stage of the PEIR. It is recommended that the approach taken includes additional issues that may contribute to understanding value (see Appendix X). These are also set out in the GLVIA.	The full methodology of assigning value is set out in ES Appendix 7.2: Landscape and Visual Assessment Methodology which is based on the Guidelines for Landscape and Visual Impact Assessment (GLVIA3) (Landscape Institute and Institute of Environmental Management and Assessment, 2013).

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The significance of visual effects is assessed by considering the sensitivity of the receptor with the magnitude of the proposal.	
Visual Sensitivity: With the exception of the Golf Course receptor (Medium Sensitivity) all visual receptors and viewpoints are assessed as having High Sensitivity. This is the highest category in the scale used (IAN 135/10) and is considered appropriate.	Noted.
vii. The scale, extent and duration of the project proposal, and the magnitude and type of its potential landscape and visual effects at various stages:	
The scale and detail necessary to fully assess the effects of the proposal are not yet finalised. It is therefore impossible to fully assess the effects on landscape and visual receptors with any certainty.	Noted.
It is understood that the construction phase is estimated at 7 years. However, more detail will be required as to the programming of the different elements of work and their potential effects.	Please refer to ES Chapter 2: Project Description (Application Document 6.1) which describes the Project's approach to construction phasing.
Areas of concern, where more information is needed to adequately assess effects, include: The scale, mass and height of the proposed junction of the A2 and LTC; the land-take, removal of screening vegetation, change in character and effective severance of the AONB along the A2 transport corridor; the extent, depth and type of cuttings at the main road junction and northwards along the route to the tunnel south portal, the new landforms created by the route and its proposed mitigation over the short, medium and long-term.	All of these aspects have been assessed as part of ES Chapter 7: Landscape and Visual (Application Document 6.1).
It is recommended that more realistic photomontages and 3D modelling are developed to better represent the proposal.	Please refer to ES Figure 7.19: Photomontages – Winter Year 1 and Summer Year 15 (Application Document 6.2).
viii. Assessment of significance of effects	
The PEIR has assessed the potential likely significant effects of the project, both in its construction phase and when operational. However, the PEIR makes clear that the process of assessment is ongoing and is subject to change.	Noted.

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The guidance in IAN 135/10 (Section 3.29) states that "In general, more significance is likely to be placed on large long term or permanent changes than small short-term temporary ones".	DMRB LA 107 Landscape and Visual Effects (Rev 2) (Highways England, 2020e) superseded IAN 135/10. The full assessment document has been rewritten to make it compliant with the new National Highways drafting rules, and therefore DMRB LA 107 has been considered as the basis for this assessment and determines the methodology set out in ES Appendix 7.2: Landscape and Visual Assessment Methodology.
For Landscape effects: Construction Phase: All landscape effects are considered to be negative (or adverse, depending on the guidance followed), and either Major, Moderate or Minor in their significance. This is considered acceptable given the criteria and guidance used. However, it is recommended that this be reviewed when revised views and photomontage images are available.	Noted.
At completion: All landscape effects are considered to be negative (or adverse, depending on the guidance followed), and either Major, Moderate or Negligible in their significance. This is considered acceptable given the criteria and guidance used. However, it is recommended that this be reviewed when revised views and photomontage images are available.	Consultation and engagement with Gravesham Borough Council has been ongoing throughout the pre-application stage. For a summary of this consultation in regard to the landscape and visual assessment, please refer to ES Chapter 7: Landscape and Visual (Application Document 6.1).
For Visual effects: Construction phase: All visual effects are considered to be negative (or adverse, depending on the guidance followed), and either Major, Moderate or Minor in their significance. This is considered acceptable given the criteria and guidance used. However, it is recommended that this be reviewed when revised views and photomontage images are available.	
At completion: All visual effects are considered to be negative (or adverse, depending on the guidance followed), and either Major, Moderate or Minor in their significance. This is considered acceptable given the criteria and guidance used. However, it is recommended that this be reviewed when revised views and photomontage images are available.	

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Points to note from the assessment of significance of effects include: Construction phase: the removal of existing vegetation; in particular the removal of vegetation that is part of the mitigation for the route of HS1 (and may still be part of an agreement for its retention) and along the A2 transport corridor will result in significant impacts to the landscape and visual quality of the area as experienced by a range of users/receptors. This is recognised by the PEIR as a significant issue but is repeated here for emphasis.	Noted.
All significant effects are assessed as Negative.	Noted.
The guidance (IAN 135/10) indicates that at worst the 'Major Negative' category 4, would: Be at complete variance with the character (including quality and value) of the landscape. Cause the integrity of characteristic features and elements to be lost. Cause a sense of place to be lost A Moderate Negative effect would: Conflict with the character (including quality and value) of the landscape. Have an adverse impact on characteristic features or elements. Diminish a sense of place This will require a strategic and large-scale approach to mitigation. The PEIR, however, considers each element of mitigation separately.	DMRB LA 107 Landscape and Visual Effects (Rev 2) (Highways England, 2020e) superseded IAN 135/10. The full assessment document has been rewritten to make it compliant with the new National Highways drafting rules, and therefore DMRB LA 107 has been considered as the basis for this assessment and determines the methodology set out in ES Appendix 7.2: Landscape and Visual Assessment Methodology.
The results of the assessment would suggest that overall, the size, massing and siting of the proposal appears to be out of scale and character with the surrounding landscape. A junction comprising large, multi-level, hard-built elements within the setting of the AONB, with deep cuttings, and set against a flattish, open landscape will be problematic to mitigate.	The design has wherever possible avoided impacts and further reduced residual effects through the embedded mitigation measures as identified on ES Figure 2.4: Environmental Masterplan (Application Document 6.2). These measures establish the reference design of the design principles set out in the Design Principles (Application Document 7.5). The landscape and visual effects consider the reasonable worst-case situation as a result of the Project including those within the Kent Downs Area of Outstanding Natural Beauty (AONB) and its setting, both on its landscape character and landscape features, and those experienced from visual receptors. It considers the embedded and essential mitigation measures identified. It is noted that refinement to the design during the detailed design stage could further mitigate the reported effects further.

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	Please refer to ES Chapter 7: Landscape and Visual (Application Document 6.1).
ix. Proposed mitigation: Initial mitigation measures are shown in the PEIR document - Outline Environmental Masterplan (EMP), and mitigation proposals are listed for each landscape receptor at construction and completion stage.	Noted.
It is considered that the listed proposals are overly detailed and premature; and the EMP is too broad-brush and may be inappropriate for the character of the landscape. For example, the land take constraints imposed on the scheme in the A2 corridor mean that vertical elements of mitigation are proposed to reduce the impact of noise and visual intrusion through the corridor. Elements which may not be appropriate for the setting should not be used in order to improve a poor choice of route.	The design has wherever possible avoided impacts and further reduced residual effects through the embedded mitigation measures as identified on ES Figure 2.4: Environmental Masterplan (Application Document 6.2). These measures establish the reference design of the design principles, please refer to the Design Principles (Application Document 7.5).
Mitigation should not disrupt or change the character of this landscape (e.g. by extensive coverage of woodland planting in a traditionally open landscape with Green Belt status, or by introducing new landforms). The current proposals (in the EMP) do not appear to take account of the heritage interest of the area or the setting of important heritage features or landscape elements	
In addition, large-scale acquisition and mitigation could affect the archaeological interests of the area.	Please refer to ES Chapter 6: Cultural Heritage (Application Document 6.1).
The guidance in the NPSNN (Sections 5.159-5.161) states that the reduction in scale of the proposals or otherwise amending the design may help to mitigate the visual and landscape effects of the proposal. It is recommended that options are developed to reflect this guidance.	Please refer to ES Chapter 7: Landscape and Visual (Application Document 6.1) which sets out the relevant policies to the landscape and visual assessment with the Applicant's response. An iterative process has facilitated design updates and improvements, informed by environmental assessment and input from the Project engineering teams, stakeholders and public consultation. The landscape design for the Project seeks to avoid or reduce adverse impacts.

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Explanation is required as to how mitigation is to be secured, and the means by which land management in the operational phase is to be secured (i.e. retained within the highways estate or returned to management by other landowners).	The REAC is included within the CoCP (ES Appendix 2.2). This lists items, including mitigation proposed in the ES and other DCO Application Documents, and states how they are secured in the draft DCO (e.g. through DCO Requirements) (Application Document 3.1). The REAC, which forms part of the CoCP (ES Appendix 2.2), would be implemented through the construction and operational phases of the Project. Please refer to the Statement of Reasons (Application Document 4.1) which sets out which land would be temporarily and permanently acquired by National Highways.
Although mitigation is mentioned as should be the first resort, compensation should also be considered.	Compensation planting has been proposed, please refer to ES Chapter 7: Landscape and Visual (Application Document 6.1) for more details.
The guidance (NPSNN Section 5.162) indicates that improvements to local access and open space may assist in providing mitigation. In this way Green Infrastructure as part of the mitigation scheme could provide positive environmental and economic benefits. This is an important area for consideration by the promoters of this proposal, as Gravesham BC has made clear its aspirations to develop the Green Grid within an overall Green Infrastructure Network in the area included in the proposal.	Please refer to ES Chapter 7: Landscape and Visual (Application Document 6.1) which sets out the relevant policies to the landscape and visual assessment with the Applicant's response.
NPSNN Section 5.175 requires the protection of green infrastructure networks from development, and for strengthening of the networks. This section of the guidance also refers to the value of linear infrastructure in supporting biodiversity and ecosystems.	
The proposed severance of the KDAONB along the widened A2 corridor and A2/LTC junction, and removal of central reservation from the A2 along this section, will not only have a significant effect on the landscape, and on access routes, but may also have an effect on the biodiversity interests of sites to the immediate north and south. In addition, the experience of walkers, riders and cyclists crossing the	Please refer to ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1) for the assessment of the potential impacts of the Project on biodiversity and ES Chapter 13: Population and Human Health (Application Document 6.1) for the assessment of the potential impacts on walkers, cyclists and horse riders (WCH).

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newly widened road corridor will be significantly affected by the proposal.	
If the proposal goes ahead, there will be a need for a green crossing (or more than one crossing) of the transport corridor. The crossing would need to be carefully designed to ensure that it could function as a wildlife corridor, as well as a landscape function in providing a continuation of the landscapes to either side of the road corridor. So, it would need to be big. The green bridge could be an exemplar, and a lasting legacy for the future. The Landscape Institute has published advice on best practice in Green Bridge Design.	Embedded mitigation measures include new green bridge structures along the Project route (3 structures south of the River Thames and 4 to the north). The design of green bridges shall be developed to address the Summary of Findings within the Natural England (2015) Report NECR181 Green Bridges: A Literature Review (NECR181) or such best practice guidance that is published prior to detailed design.
The above issues are further reinforced by the guidance in NPSNN Section 5.164 which refers to the Green Belt and the aim to keep land permanently open, and section 5.178 regarding Green Belts and inappropriate development. The guidance thus supports mitigation proposals that provide open space, access opportunities and retaining an open landscape.	Green Belt is referenced within ES Chapter 7: Landscape and Visual (Application Document 6.1) in relation to baseline analysis of the landscape character and visual amenity. This has been used to inform the assessment of the extent of harm to the openness of the Green Belt. This assessment within the Planning Statement (Application Document 7.2) considers the visual as well as spatial impacts on the Green Belt.
Sections 5.180 and 5.184 are relevant to the access network. The functionality and connectivity of the network will be compromised by the proposal. Diversions of routes must be carefully designed with the involvement of a range of stakeholders to ensure that the network is viable, and the experience of users is not unduly compromised	Please refer to ES Chapter 7: Landscape and Visual (Application Document 6.1) which sets out the relevant policies to the landscape and visual assessment with the Applicant's response.
Noise is considered in a separate topic report. However, there is a link with the enjoyment of the landscape, in particular those areas of the landscape that are currently tranquil. This is relevant to areas of the KDAONB, and notably areas within Shorne Woods Country Park. Mitigation proposals should consider how to minimise the noise pollution to these areas.	Within ES Chapter 7: Landscape and Visual (Application Document 6.1), the impacts to landscape and visual receptors as a result of increased audibility from the Project during construction and operational phases resulting in impacts to perceived tranquillity within the study area have been considered. A series of baseline landscape noise surveys were undertaken at key locations where the defining characteristics include a perceived level of tranquillity. These locations and survey durations were discussed with stakeholders and include locations within the Kent Downs AONB and within its setting, locations adjacent to the River Thames, and within Orsett Fen. Locations are identified on ES Figure 7.5: Tranquillity

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	Campaign to Protect Rural England (Application Document 6.2) and noise results summarised in ES Appendix 7.5: Local Landscape Character Baseline.
The guidance provided by IAN 135/10 requires mitigation measures to be developed as part of an iterative design process. This is useful, as the full extent and significance of effects may not be fully appreciated until further stages of design are developed.	DMRB LA 107 Landscape and Visual Effects (Rev 2) (Highways England, 2020e) superseded IAN 135/10. The full assessment document has been rewritten to make it compliant with the new National Highways drafting rules, and therefore DMRB LA 107 has been considered as the basis for this assessment. Design and mitigation hierarchy outlined in DMRB LA 104 Environmental Assessment and Monitoring (Highways England, 2020c) has been applied to avoid, reduce or remediate (offset) potential effects on the landscape, views and visual amenity.
The PEIR states that a fully detailed assessment of mitigation required will be undertaken before submission of the DCO. This is to be supported. It is recommended that local stakeholders are consulted - in the case of professional stakeholders, this should be both individually and collectively - during this process.	Relevant stakeholders to the landscape and visual assessment have been consulted throughout the pre-application phase, and this includes consultation on mitigation proposals and design. Please refer to Table 7.2 in ES Chapter 7: Landscape and Visual (Application Document 6.1).
Given the factors outlined in the previous sections plus the complexity of this project, its ongoing development and refinement, an approach to mitigation which aims to address the issues individually and by topic is unlikely to be effective. The setting and scale of proposals are important, as the landscape is so varied across the study area. It is recommended that a mitigation strategy is needed for a project of this scale and complexity.	Environmental considerations have influenced the Project throughout the design development process, from early route options assessment through to refinement of the Project design. An iterative process has facilitated design updates and improvements, informed by environmental assessment and input from the Project engineering teams, stakeholders and public consultation. The proposed Project as submitted with the DCO application includes a range of environmental commitments. Commitments of relevance to landscape are set out in this section under the following categories: • Embedded Mitigation: measures that form part of the engineering design, developed through the iterative design process summarised above. • Good Practice: approaches and actions identified to avoid or reduce potential impacts, typically applicable across the whole Project.
This approach accords with the aims outlined in the NPSNN to mitigate environmental and social impacts, improve accessibility, support sustainable transport, reduce severance, retain and enhance landscape character and retain the openness of the landscape as required of its Green Belt status.	
A Mitigation Strategy (which may extend beyond the scope of works associated with the road scheme) could:	

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• take a strategic approach to the whole landscape to be affected and the wider impacts, • be in place to take short, medium and long-term actions forward as necessary over the life of the scheme and beyond, and develop alongside the road design, • address the severance of the protected landscape, • address the loss of local amenity use to adjoining populations, • address the severance and diversion of access routes, and the qualitative impacts on users (receptors) • reconnect and enhance habitats, the setting of heritage features and enhance landscape character, maintain and enhance long views and local views; to include long views to and across the Thames and from the Kent Downs, • make links with the biodiversity and cultural heritage topics affected by this proposal, • examine the remaining open space, cultural, environmental and access assets, and propose new, coherent networks that will make a positive contribution to the Green Network • support the investment needed for infrastructure in the Green Network • contribute to modal shift and promote sustainable transport in the area • address the needs of cyclists and pedestrians • have the potential to address local deficits of open space and recreational facilities identified in the Gravesham Open Space, Sport and Recreation Study	• Essential Mitigation: 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. Essential mitigation has been identified by environmental topic specialists, taking into account considering the embedded mitigation and good practice commitments. During detailed design, a Landscape specific Management Plan would also be developed building on the principles outlined in the CoCP and REAC (ES Appendix 2.2). This would include information on long-term operational management of the landscape and ecological resource associated with the Project. This would be in accordance with Manual of Contract Documents for Highway Works, Volume 1, Series 3000 Landscape and Ecology (Highways Agency, 2006).
Terrestrial and Marine Biodiversity	
There is loss of ancient woodland and intrusion into the Ashenbank and Shorne Wood SSSI. There is additional noise, poor air quality and	

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disturbance to the area. A Habitat Regulations Assessment is also promised for DCO submission. However, overall the PEIR provides insufficient information on what the level of impact on habitats and species is likely to be and how mitigation measures have been designed to deal with this.	Please refer to the Habitats Regulations Assessment (Application Document 6.5). There is no prescribed format as to what a PEIR should comprise and it is not expected to replicate or be a draft of the ES. The PEIR is a tool with which to consult with stakeholders on the EIA. Please refer to the full assessments; ES Chapter 8: Terrestrial Biodiversity and ES Chapter 9: Marine Biodiversity (Application Document 6.1). Consultation and engagement with relevant stakeholders including Natural England, the Kent Wildlife Trust and RSPB has been ongoing throughout the pre-application stage.
Whilst the Council would normally defer to the expertise of Natural England, the Kent Wildlife Trust and other bodies such as the RSPB on such issues, the lack of more detailed analysis at this stage is worrying. This is particularly the case as one might have expected a more thorough understanding would have informed the choice of preferred route in April 2017.	
A key issue may be the impact of the LTC on water levels on the marshes both during construction and operation. This will need to be fully understood.	The impact of the Project on water levels has been assessed as part of ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1). The impact of potential changes in water levels to the marshes has been considered as part of ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1).
Geology and Soils	
The Cobham / Ashenbank area is well known for geological instability which caused a number of issues for HS1 in both design and construction. In particular the cutting through Ashenbank Wood had to have much gentler slopes than originally proposed, and therefore became much wider.	The study area for geology and soils is based on the standard outlined in DMRB LA 109 Geology and Soils (Highways England, 2019b). The study area considered the Order Limits (which includes the construction compounds and the temporary land-take), the locations of contaminative sources outside the Order Limits that could migrate onsite and affect receptors, and the locations of offsite sensitive receptors. The existing baseline in relation to geology and soils was established based on a review of existing data sources provided to the Project, stakeholder consultation and fieldwork comprising data collection from site walkover surveys and ground investigations. Please refer to ES Chapter 10: Geology and Soils (Application Document 6.1) for more information on how the baseline was established.
Work has been done on the Thames tunnel but it is not clear whether the geology in the AoNB on the A2 corridor has been fully understood. There are also deposits of geological interest in the area which were investigated at the time of building HS1/A2 widening in the 1990s and the applicant will need to consult interested parties as they would appear to extend north of the A2 in the vicinity of the Inn on the Lake and may be present elsewhere on the A2 corridor.	

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Materials	
The project needs to consider both the sources of materials used to build it (cement, aggregates, steel etc.) as well as the disposal of waste. The latter includes the chalk that will come from the deep cutting leading up to the portal. There is little information on this area yet as it requires a firmer design and construction arrangements. A Site Waste Management Plan will be produced, which will need to relate to the Code of Construction Practice	Please refer to ES Chapter 11: Material Assets and Waste (Application Document 6.1) which assesses the consumption and use of material assets and the management of waste associated with the Project. It assesses the consumption of material resources and products (from primary, secondary or recycled and renewable sources); the use of materials offering sustainability benefits and the use of excavated and other potential waste arisings; and the production, treatment and offsite management of waste.
Noise and vibration	
As with air quality, noise impacts depend, to a large extent on traffic volumes, speed, composition of traffic (i.e. percentage HGV's) etc. Given the identified deficiencies in the transport modelling, this will also require an updated assessment at which time the effectiveness of mitigation measures will need to be assessed.	Consultation on the traffic model has been ongoing. The cordon traffic model was shared with all local authorities after Statutory Consultation and an updated version after Supplementary Consultation.
The noise report submitted with the DCO application should include proper noise contour mapping to allow impacts to be assessed, with and without the proposed mitigation to allow its effectiveness to be assessed. Noise impacts during construction would, of course, differ from those once the scheme becomes operational.	Please refer to ES Chapter 12: Noise and Vibration (Application Document 6.1) which assesses the Project in terms of noise and vibration during construction and operation in accordance with DMRB LA 111 Noise and Vibration (Revision 2) (Highways England, 2020f). The assessment considers potential changes to noise and vibration levels at identified noise sensitive receptors due to construction activities, vehicle traffic and the tunnel ventilation system required during operation. Please refer to ES Figure 12.6: Future Baseline Noise Change Contour Without Project (DMFY minus DMOY) (Application Document 6.2) which presents the changes in road traffic noise in this comparison without the Project and ES Figure 12.8: Opening Year Noise Change Contour (DSOY minus DMOY) (Application Document 6.2).

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Annex 7a: Noise and Vibration	
PEIR	
Baseline	
As stated in Table 1, additional baseline noise surveys will be conducted to inform the ES. This should include long-term unattended measurements (minimum 4 days) to allow for the variation in local meteorological conditions. It is understood that no additional consultation has been held with GBC Environmental Health department to agree monitoring locations and durations. It is expected that additional monitoring will include locations west of the proposed highway, at residential areas at Singlewell, Riverview Park and Chalk.	A summary of stakeholder consultation is provided in ES Chapter 12: Noise and Vibration (Application Document 6.1). Baseline noise monitoring locations were consulted with Gravesham Borough Council in August 2018. The baseline noise monitoring locations include locations west of the Project at Singlewell, Chalk and Riverview Park and are shown in ES Figure 12.5: Baseline Noise Monitoring Locations (Application Document 6.2). A variety of 3 hour, 24 hour and 7 day surveys were undertaken as detailed in ES Chapter 12: Noise and Vibration (Application Document 6.1). As committed in the REAC, which can be found in the CoCP (ES Appendix 2.2), 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, and during the construction phase, day and night time noise and vibration monitoring would be undertaken at locations established in consultation with the relevant local planning authorities to ensure that the mitigation measures suggested are working effectively.
Long-term surveys are required to understand both the road noise levels and the diurnal pattern. Further related comment is provided in Section 3.2.3b below	
Construction Phase	
Construction Noise Assessment	
PEIR Vol 1 para 13.3.16 states that only preliminary construction information is currently available, and therefore the assessment presented in PEIR Vol 1 Table 13.15 is of a qualitative nature. A detailed assessment, using noise prediction modelling will be undertaken once further information becomes available. This assessment should consider potential intra-project effects associated with various construction sites that may be active at the same time, including construction compounds.	Cumulative construction noise impacts would be localised to within 300m of the activities being undertaken within the Project at the time. The locations of potential cumulative developments are shown on ES Figure 16.1: Short List of Other Developments and Cumulative Zones of Influence based on Order Limits (Application Document 6.2).

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	Cumulative construction noise and vibration impacts would be controlled through the CoCP and REAC (ES Appendix 2.2). Cumulative impacts can occur due to the Project in combination with other existing and/or approved development. These are known as 'inter-project' effects and are considered separately in ES Chapter 16: Cumulative Effects Assessment (Application Document 6.1).
PEIR Table 13.15 discusses "the potential for temporary changes in noise levels around areas identified for the potential jetty". It is not clear from the information provided whether there is an option for a jetty on the south bank of the Thames Estuary, and this looks more feasible on the north bank, given the physical barriers that are the North Kent Railway and Thames Medway Canal.	The Project does not include a new jetty option, but the environmental assessment has taken into account river transport using the existing East Tilbury jetty at Goshems Farm, and the refurbishment/maintenance, operation and decommissioning of this jetty. It has been assumed that the operation of this jetty would be used for the import of concrete segments to the supply the tunnelling only. The barge movements would be constrained by the tide and would coincide with high tide, limited to two a day (one movement per tie cycle).
PEIR Vol 1 para 2.18.15 identifies that a concrete batching plant (continuous operation) may be required at one or both of the tunnel portal construction compounds. As identified in PEIR Vol 1 Table 13.15, noise from this operation as well as that of a tunnel segment production facility will result in noise impacts over an extended duration. Likewise, if slurry Tunnel Boring Machines (TBMs) are required, operation of the slurry treatment plant would be continuous. PEIR Vol 1 Plate 2.6 indicates that the tunnelling phase will provisionally be from Q3 2021 to Q4 2026, albeit that it is expected that tunnel boring and lining would only take place for a portion of this period (not defined in the PEIR). Given the number and proximity of residential receptors south of the River Thames, impacts are likely to be less significant if these operations were to occur within the north tunnel portal compound.	Preliminary layouts for construction compounds have been considered in the noise modelling. However, during detailed design there would be a commitment to carefully consider the layout of compounds to separate noise generating equipment from sensitive receptors.

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Vibration Assessment	
This issue is discussed in Table 1 above. The assessment of potential impacts from tunnel boring operations should consider both vibration and ground borne noise. There have been a number of research papers 1, 2 produced on the potential noise and vibration effects of tunnelling which should be considered.	Construction noise and vibration from the TBM, and construction vibration from piling has been assessed. Please refer to ES Chapter 12: Noise and Vibration (Application Document 6.1).
Temporary Road Noise Assessment	
PEIR Vol 1 Table 13.15 identifies potential noise impacts associated with temporary construction traffic required for deliveries and to transport excavated material off site. It is understood that the final solution for the transport of excavated material is still to be decided, although it must be expected that some road transport will be required. It is recommended that the assessment presented in the ES should consider a worst-case scenario (in accordance with the Rochdale Envelope principle approach as stated at PEIR Vol 1 para 2.1.16), as well as the likely scenario (mix of road and river), so that an informed decision can be made at the DCO Examination stage.	Construction vehicle noise, both on and offsite has been assessed. Please refer to ES Chapter 12: Noise and Vibration (Application Document 6.1). There are no longer plans to move materials via rail. The Project does not include a new jetty option, but the environmental assessment has taken into account river transport using the existing East Tilbury jetty at Goshems Farm, and the refurbishment/maintenance, operation and decommissioning of this jetty. It was assumed that the operation of the jetty would be used for the import of concrete segments to the supply the tunnelling only. The barge movements would be constrained by the tide and would coincide with high tide, limited to two a day (one movement per tie cycle).
Operational Phase	
Permanent Road Noise Assessment	
Whilst it is understood that a full assessment will be presented in the ES in accordance with the Detailed Assessment methodology defined within DMRB, no preliminary indication of the potential road noise impacts at night is presented within the PEIR. Furthermore there was no consideration of night time noise effects presented in the SR, which is a requirement of DMRB para 7.7.	An operational night-time road traffic noise assessment has been completed, please refer to ES Chapter 12: Noise and Vibration (Application Document 6.1).
Understanding the diurnal pattern of the future traffic flow will be critical to the assessment of night-time noise impacts. Due to the significant volume of HGV traffic likely to use the new highway at night to connect to and	With regard to night-time road traffic noise levels the requirements of DMRB LA 111 (Highways England, 2020f) recommends the use of the methods proposed in the Transport Research Laboratory (TRL) Limited

Gravesham Borough Council comment	National Highways response
from Dover port, it is unlikely that TRL3 Method 3 would be appropriate. The assessment of future scenario road noise at night should be assessed using Method 1, which relies on hourly traffic data. The method to be adopted is not stated in the PEIR	(2002) research report PR/SE/451/02 Converting the UK traffic noise index dB LA10 18 hour to EU noise indices for noise mapping.
PEIR Vol 3 Figure 13.3 shows the operational noise effects within the DMRB study area (600m from the carriageway edge). However, it appears that the presented boundary lines, and therefore the receptors they cover, are not consistent. For example, Sheet 3 of this figure presents the preliminary 'Potential Short Term Operational Road Traffic Noise Impacts' along the proposed highway to the east of Gravesend. Where the route bends, the boundary line does not remain parallel, so that the actual area of impact identified is much less (approximately 470m) than the 600m required. This results in a misleading representation of the scale of the adverse noise impact, which should include many more properties in Chalk.	This was noted and has been resolved during the full noise and vibration assessment.
No reference is made to tunnel portal reflection effects in the PEIR. However, as there are no receptors within 100m of the proposed tunnel portal, the reflection effects would not be perceptible and therefore a detailed analysis of such effects is not required (DMRB para 4.8).	Noted.
Permanent Road Vibration Assessment	
In the SR, the Applicant sought to scope out further assessment of operational vibration effects, however it is noted that the PINS (Scoping Opinion Section 4.7 ID 1) rejected this approach, requesting that operational ground borne vibration be assessed within the ES. The report referenced within PEIR Vol 1 para 13.3.23 describes measurements of vibration propagation from cut and cover tunnels and not tunnels bored through the bedrock, which may have a solid connection (higher vibration transmissibility) to building foundations. It is acknowledged however that vibration generated by a new operational road, both at surface level and within tunnels, is unlikely to generate significant ground vibration, due to the lack of discontinuities in the road surface. Therefore, due to the low probability of adverse effects, further	Noted.

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detailed prediction and assessment of vibration from road traffic in the operational phase is not considered to be necessary.	
People and Communities	
Whilst this section of the PEIR provides background information on affected assets and the local community in general, there is very little proper analysis of actual impacts. This will need to be addressed properly at the DCO stage.	Please refer to ES Chapter 13: Population and Human Health (Application Document 6.1) which fully assesses the impacts of the construction workforce on local communities.
There would clearly be a significant impact on public rights of way used by non-motorised users and alternative routes both during construction and subsequently will need to be carefully looked at.	Please refer to ES Chapter 13: Population and Human Health (Application Document 6.1) which fully assess the impact of the Project on walker, cyclists and horse riders including Public Rights of Way. The assessment identified the sensitivity of individual routes, taking into account usage levels (including by vulnerable travellers), temporary and permanent closure of Public Rights of Way, associated diversions and changes in journey length (increase or decrease).
No information has been provided as yet on the impact of the proposals on farm businesses in the area, only on the loss of the best and most versatile agricultural soils (Grades 1, 2 & 3a).	Please refer to ES Chapter 13: Population and Human Health (Application Document 6.1) which fully assesses the impacts of the Project on agricultural land holdings in line with DMRB LA 112 (Highways England, 2020g). Consideration was given to the proportion of each land holding that would be affected during construction, and the nature of the land use (including access to key farm infrastructure), as well as potential severance impacts.
Also, it is important that the final ES provides a realistic assessment of the impact of the project on the economy and people of Gravesham during both the operational and construction phases. At the current time, the impression is one of all pain and very little gain.	The local and wider economy has been considered, please refer to the Need for the Project (Application Document 7.1) and the Economic Appraisal Package, which is Appendix D of the Combined Modelling and Appraisal Report (Application Document 7.7).
Road Drainage and Water Environment	
It is anticipated that the Environment Agency will be the main lead in terms of protection of the water environment, with potential input from KCC under its SUDS remit.	Engagement and consultation with the Environment Agency and Kent County Council has been ongoing throughout the pre-application stage. Please refer to ES Chapter 14: Road Drainage and the Water

Gravesham Borough Council comment	National Highways response
	Environment (Application Document 6.1) for a summary of stakeholder engagement relevant to road drainage and the water environment.
The water environment in the area of Shorne / Ashenbank Woods is complex given the presence of perched water tables. Care will be needed to ensure that the hydrology of water bodies in this area is understood and impacts mitigated. As noted above, the impact of the project on the water environment of the marshes also needs to be fully understood given their nature conservation interest.	The existing drainage and water environment have been established through data collection, consultation, modelling studies and site surveys to gather data to characterise the existing qualities of the water environment. The fieldwork included a site walkover in March 2019 which focused on Shorne Marshes. The impact of the Project on the water environment has been fully assessed, please refer to ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1).
Climate	
This chapter highlights the potential impacts that the scheme will have to be designed to deal with. The NPSNN highlights that this is both the contribution to climate change due to Green House gases both from construction and the traffic that will use it over the years.	The scope of ES Chapter 15: Climate (Application Document 6.1) is in line with DMRB LA 114 Climate (Highways England, 2019d) and considers the impacts of the Project on climate through its Greenhouse Gas (GHG) emissions and the resilience of the Project to climate change. The GHG assessment assesses operation and 'use' of the Project, including those emissions resulting from mechanical and electrical energy use such as tunnel lighting and ventilation and the impact from a variation in vehicle journeys travelling on the road and surrounding area. The climate change resilience assessment assess how the Project design would be adapted to take account for the projected impacts of climate change. Please refer to ES Chapter 15: Climate (Application Document 6.1) for more information.
There are also the impacts of more extreme weather, in particular handling water from runoff (having created a channel to underneath the Thames) and also flooding, including rising sea levels. The PEIR currently identifies issues but does not address them.	

9 Historic England

Table 9.1 Historic England Statutory Consultation

Historic England comment	National Highways response
Introduction	
We have been engaged in continuing pre-application discussions with the relevant members of the Lower Thames Crossing Team regarding the proposed development and the preparation of an Environmental Impact Assessment (EIA), namely: the scope of the study area, the identification of known heritage assets (in particular designated heritage assets) methodologies for the identification of currently unrecorded heritage assets which might be affected by the proposals; together with assessments of their significance, the likely impacts of the proposals on that significance and the scope for mitigation.	Noted
This letter contains our advice on the consultation material to date, including the PEIR, cross- referenced to comment we previously gave regarding the historic environment in our response to the scoping opinion (dated 27 November 2017), as well as recommendations as to what further work needs to be done to ensure that the impacts of the proposed scheme on the historic environment are fully assessed in the relevant chapters of the Environmental Statement (ES).	Noted
Summary of Project Proposals	
The project proposals are set out in the PEIR. In summary the proposals are for a 31km long, six lane highway which would connect the A2 in Kent, east of Gravesend, crossing under the River Thames by means of two bored tunnels 4km in length, with a new road through South Essex, joining the M25 south of junction 29 in the London Borough of Havering. A Rest and Service Area (RaSa) and maintenance depot would be sited 1km north of the tunnel portal at the new Tilbury Junction. There would also be very extensive land-takes for utility and service diversions, compounds and other enabling works. Both tunnels are to be driven from the Essex side.	Noted

Historic England comment	National Highways response
The Development Consent Order (DCO) is to be assessed and determined on the basis of “A Rochdale Envelope", that is to say parameters for the worst-case scenario in terms environmental impacts.	
Identifying and Assessing Significance of the Historic Environment within the Study Area	
The River Thames and its estuary has formed the most important artery in the development of settlement, trade and invasion and defence of England since early prehistory; a role which assumed even greater significance after the establishment of London as the capital in the early Roman period. Its pre-eminence has shaped the history, form and density of the settlement, industrial and military landscape which continues to this day. As a result, the landscape through which the proposed road would be built is one which is of great importance for the Nation’s story, the significance of which must be fully identified, assessed and explained in the forthcoming EIA. In our response to the Scoping Report we stressed the need for an EIA in which application of the assessment methodology contained within the DMRB Volume 11 is accompanied by a narrative informed by national and regional research frameworks which fully explains 'what is important and why’.	The EIA has been undertaken in accordance with DMRB LA 101-119. An Historic Landscape Characterisation (HLC) study has been undertaken and is presented in ES Appendix 6.1: Cultural Heritage Desk-based Assessment. The historic landscape has been fully assessed in ES Chapter 6: Cultural Heritage (Application Document 6.1). National and regional research frameworks have been used to establish the baseline of the cultural heritage environment. Those utilised are listed in ES Chapter 6: Cultural Heritage (Application Document 6.1).
At the present time the Cultural Heritage chapter and Appendix of the PEIR (Chapter 7), does not go very much beyond the enumeration of relevant policy and those designated heritage assets within and adjacent to the site boundary and how these may be affected by the Lower Thames Crossing, together with references to methodology and existing baseline conditions. We note Table 7.4 which lists data held for the Cultural Heritage (now including as requested the 2011 MOLA East London Gravels monograph in the work as a key indicator of archaeological potential for all pre-modern periods). However, there is as yet no attempt to describe the significance of heritage assets and we are concerned that a very considerable amount of future baseline information and survey is outstanding (section 7.5 - not 7.6 as stated in 7.3.5). It is stated that the design has been developed to minimise impact on designated heritage assets, although the PEIR does not state in detail what these impacts will	The cultural heritage impact and the wider landscape context have been fully assessed and reported within ES Chapter 6: Cultural Heritage (Application Document 6.1).

Historic England comment	National Highways response
be or how they are minimised beyond the tabular form in tables 7.6-7.8. We would expect all these matters to be discussed in far greater detail in the forthcoming ES, both in terms of the significance of individual assets and their wider landscape context set against national and regional research objectives.	
Built Heritage	
The information provided within Chapter 7, largely in tabulated form, provides baseline information with regard the Heritage Assets that will be affected by the Lower Thames Crossing. Table 7.2 sets out the key requirements of the National Planning Policy Statement for National Networks (NPSNN) with regard to cultural heritage. These requirements place great emphasis on the work to be done at ES stage, particularly with regard assessment of impact and/or harm (5.133-5). These sections also give appropriate weight to assessment of significance of Conservation Areas affected by the proposals. The assessment of significance is key in the consideration of harm to Listed Buildings and other, non-designated heritage assets which would be affected by the proposals.	ES Chapter 6: Cultural Heritage (Application Document 6.1) presents the planning policies and guidance at a national level that are relevant to the assessment of cultural heritage. The cultural heritage assessment identifies the level of impact on designated heritage assets through assessment of the magnitude of impact, determined based on the degree to which this would adversely affect (harm) the value (significance) of heritage assets.
As we advised in our response to the Scoping Report, the Cultural Heritage and Landscape and Visual Chapters should present and draw on a fully integrated and cross-referenced understanding of the landscape history; the way in which land use and settlement patterns have evolved, their historical significance and their contribution to historic character. There is no cross referencing between the Historic Landscape Characterisation (HLC) work in Chapter 7 and Chapter 8 on Landscape where this would help to inform landscape mitigation options. HLC will identify important historic land use, landscape grain and features that may often merit preservation and enhancement. We consider failing to recognise the contribution of HLC in this chapter would be a missed opportunity and should be addressed.	The cultural heritage team worked closely with other environmental specialist areas. ES Chapter 6: Cultural Heritage (Application Document 6.1) has interrelationships with: • ES Chapter 7: Landscape and Visual (Application Document 6.1) • ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1) • ES Chapter 10: Geology and Soils (Application Document 6.1) • ES Chapter 12: Noise and Vibration (Application Document 6.1) • ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1) The above interrelationships have been considered as part of the assessment reported in this chapter.

Historic England comment	National Highways response
	An Historic Landscape Characterisation (HLC) study has been undertaken and is presented in ES Appendix 6.1: Cultural Heritage Desk-based Assessment. The historic landscape has been fully assessed in ES Chapter 6: Cultural Heritage (Application Document 6.1).
South of the Thames, the proposal will have a direct physical impact on the registered garden at Cobham Park which will need to be comprehensively assessed. We also consider that the proposal would have an adverse effect on both the setting of Thong Conservation Area and St Mary's Church at Chalk, in particular, we consider that the effect to St Mary's with be greater. We highlight these as heritage assets south of the river which require particular attention to identify the level of harm and the mitigation required. This is noticeable when examining the verified views in the Report Figures: Chapter 8: Landscape, Figure 8.7 Sheets 10 and 11 (viewpoints 7 and 12), which illustrate the impact of change on the rural characters of Thong and of St Mary's Church. We would expect these verified views to feed into and inform the cultural heritage assessment in the ES. We also suggest that further views looking towards St Mary's Church from where the proposed new route would intersect the Lower Higham Road are included, and we would be pleased to indicate locations for these views on a map if this would help	The impact of the Project on Grade II Registered Park and Garden Cobham Park, the setting of Thong Conservation Area and St Mary's Church at Chalk have been assessed in ES Chapter 6: Cultural Heritage (Application Document 6.1). Site visits for South of the Thames were carried out on 18 February 2019 and 3 December 2019 with Kent County Council, and a meeting was held with Historic England on 8 May 2019 to agree the key areas for addressing setting issues and to address viewpoints from a heritage perspective and referencing to landscape viewpoints.
North of the Thames in Essex, the scheme would result in the total demolition of Thatched Cottage, 1 & 2 Grays Corner Cottages and Murrells Cottage, all Grade II listed buildings. The total loss of a listed building would represent substantial harm to the individual assets, and the Cultural Heritage section should be amended to reflect this. We believe that this should be acknowledged within the Cultural Heritage chapter (un-numbered paragraph on p154: Potential nature of Impact), rather than the current wording ('this would have a negative effect on the asset, which would be significant'), which we consider downplays the inevitable harm of total demolition.	A site visit with Historic England, Essex Place Services and Greater London Archaeology Advisory Service (GLAAS) was held on 29 June 2018 to address a selection of heritage assets affected by the Project. Two further meetings were held on this topic on 17 June 2020 and 07 July 2020 to scope out built heritage assets in Essex from further assessment. The total removal of these high value assets would cause a major magnitude permanent impact, resulting after mitigation in a large adverse significance of effect. This is assessed in ES Chapter 6: Cultural Heritage (Application 6.1).

Historic England comment	National Highways response
Consideration of significance, and therefore a proper understanding of harm, should be central to the assessment carried out in the ES. The setting of a listed building may also contribute to its significance. The understanding of a building within the landscape traditionally associated with it is crucial to a full understanding of the heritage asset. An illustration of this can be seen in the mediaeval church site at West Tilbury, placed in a commanding position on the escarpment, and visible in long views from the south where it had an important 'parochial' function for the inhabitants of Tilbury Fort. In assessing impacts on listed buildings, both during construction and permanent changes, we would expect due weight be given to the importance of setting on their significance.	The cultural heritage assessment considers the significance of heritage assets and any harm to their significance, including through harm to their setting. The assessment identifies the level of impact on designated heritage assets through assessment of the magnitude of impact, determined based on the degree to which this would adversely affect (harm) the value (significance) of heritage assets, in order to identify any total loss of value.
We consider that comprehensive assessment of the impacts of the scheme on the setting of important designated historic military installations on both the north and south bank of the river is required, in particular Tilbury Fort, whose seventeenth century defences are of international importance, Coalhouse Fort which we consider nationally to be the pre-eminent exemplar of a Victorian casemated fort, and the battery at Bowaters Farm, all of which are scheduled monuments. The ES should fully assess the significance of these assets individually and their contribution to national defence, acting with other fortifications within the study area.	Tilbury Fort and Coalhouse Fort has been fully assessed within ES Chapter 6: Cultural Heritage (Application Document 6.1).
Buried Archaeological Remains	
It is possible likely that the greatest direct impact of the scheme on Cultural Heritage, numerically (and potentially in terms of significance) would arise from the disturbance of buried archaeological remains, both designated, undesignated and as yet unidentified. It is essential that the ES, in addition to enumerating the individual archaeological sites which will be affected and the impact of the scheme upon them, gives proper consideration to their significance on a landscape scale in the context of national and regional research frameworks. This will be essential to ensure that the assessment and mitigation strategies contained in the ES are in line with	ES Chapter 6: Cultural Heritage (Application Document 6.1) presents the planning policies and guidance at a national level that are relevant to the assessment of cultural heritage complete with the Applicant's response of how this has been addressed in the assessment. Trial trenching for sensitive areas has been completed. The assessment of buried archaeology in ES Chapter 6: Cultural Heritage (Application Document 6.1) has been undertaken on a robust and precautionary basis. Further trial trenching will continue after the submission of the DCO application, for completeness, and enabling

Historic England comment	National Highways response
policy on the treatment of the historic environment in the National Planning Policy Statement for National Networks (NPSNN).	works would not take place until that is completed. Please refer to ES Appendix 6.8: Trial Trenching Reports. National and regional research frameworks have been used to establish the baseline of the cultural heritage environment. Those utilised are listed in ES Chapter 6: Cultural Heritage (Application Document 6.1). An Historic Landscape Characterisation (HLC) study has been undertaken and is presented in ES Appendix 6.1: Cultural Heritage Desk-based Assessment. The historic landscape has been fully assessed in ES Chapter 6: Cultural Heritage (Application Document 6.1).
One of the areas of multi-period settlement, revealed by aerial photography at Orsett is designated as a scheduled monument. The impact of the scheme would result in substantial harm to the significance of this designated heritage asset. We believe that this should be acknowledged within the Cultural Heritage chapter (un- numbered paragraph on p154: Potential nature of Impact), rather than the current wording ('this would have a negative effect on the asset, which would be significant'), 5.2 One of the areas of multi-period settlement, revealed by aerial photography at Orsett is designated as a scheduled monument. The impact of the scheme would result in substantial harm to the significance of this designated heritage asset. We believe that this should be acknowledged within the Cultural Heritage chapter (un- numbered paragraph on p154: Potential nature of Impact), rather than the current wording ('this would have a negative effect on the asset, which would be significant'),	National Highways has acknowledged the scheduled monument in Orsett in ES Chapter 6: Cultural Heritage (Application Document 6.1) which also details the impacts of the Project on the asset.
We welcome consultation with the relevant Historic Environment Records, including the Greater London HER. For the area south of the Thames, Kent County Council Heritage Team are best placed to advise the applicants about their detailed scheme design and archaeological work, but we are ready to contribute if we can add value, particularly if archaeology of national significance emerges.	Throughout the development of the Project, National Highways has engaged with GLAAS for the London Borough of Havering, Kent County Council and Essex Place Services.

Historic England comment	National Highways response
Chapter 7 on Cultural Heritage reviews baseline information and sets out further information which will be included in addition to a desk-based assessment to support the ES. It is stated that (7.5.7) 'the project will seek to agree the scope of all surveys and assessments with stakeholders. The results of these assessments will be presented in the ES and included in the assessment and in 7.6.2 that 'a full detailed assessment will be undertaken before the DCO application which will identify the mitigation requirements and this will be set out in the ES.'	Noted. ES Chapter 6: Cultural Heritage (Application Document 6.1) examines the potential effects of the Project on cultural heritage during both construction and operational phases.
Our Comments on Cultural Heritage Assessment Methodology are set out below (7.0) We note that we have not yet been consulted on the following draft methodologies which were due to be sent to us for review in October/November, namely: Technical note on Geophysical Team, Evaluation Strategy, Palaeolithic Specialist, Specification, Palaeoenvironmental / geoarchaeologist Specification and Military Archaeologist Specification.	The methodologies mentioned were submitted to stakeholders including Historic England between October and December 2018. The comments received were taken on board and resubmitted for re-review. Appropriate (further) geophysical survey techniques have been agreed with stakeholders including Historic England following receipt of magnetometer survey results (south of river) and aerial mapping study (north of river). The geoarchaeological has addressed the deposit model. The methodologies for these surveys/assessments can be found in: • ES Appendix 6.3: Archaeological Desk-Based Assessment if 20th Century Military Archaeological • ES Appendix 6.5: Lower Thames Crossing: Palaeolithic and Quaternary Deposit Model (PQDM) and Desk-based Assessment of Palaeolithic Potential • ES Appendix 6.6: Lower Thames Crossing, Standalone Palaeolithic Archaeological Assessment and Research Framework (SPAA-&-RF) • ES Appendix 6.7: Geophysical Survey Report
It is noted that the majority of the archaeological assessment work still needs to be completed to inform the Desk Based Assessment. In general, the approaches cited that will be used appear sensible and appropriate (see Section 7.5.6) but additional information is required in terms of the	National Highways discussed approaches to archaeological trial trenching with Historic England on 5 October 2018 and 14 March 2019.

Historic England comment	National Highways response
work that will be carried out and the specific approaches/techniques that will be used. For example, a number of deep penetrating geophysics techniques were recommended following receipt of the Scoping Stage document, such as Electromagnetic Induction (EMI) or Electrical Resistance Tomography (ERT) in order to understand the deeper deposits of archaeological interest. These approaches have not been mentioned in the PEIR (compare to Section 7.5.6) but we understand they will be used as part of the geophysical survey work that is proposed and have issued a S42 licence for this work to take place on the scheduled monument at Orsett. In addition, deposit models are not mentioned in the PEIR despite Historic England highlighting the value of this approach in our comments on the Scoping Report document.	For the archaeological trial trenching, Written Schemes of Investigation (WSIs) have been prepared for all land parcels within the Order Limits, which have been approved by the archaeological advisors to the local planning authorities. WSIs have also been agreed for the geophysical surveys.
At the Scoping Stage we asked for greater integration of the information presented in the 'Geology and Soils' chapter with the 'Cultural Heritage' chapter, as the information is highly relevant in terms of assessing the archaeological potential of an area and the vulnerability of archaeological remains to changes. It is stated at the start of these chapters that an inter-relationship is recognised between these chapters/topics, but greater integration of the information is needed at subsequent stages/reports as well as the collaboration and communication between the specialists.	The cultural heritage team worked closely with other environmental specialist areas. ES Chapter 6: Cultural Heritage (Application Document 6.1) has interrelationships with: • ES Chapter 7: Landscape and Visual (Application Document 6.1) • ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1) • ES Chapter 10: Geology and Soils (Application Document 6.1) • ES Chapter 12: Noise and Vibration (Application Document 6.1) • ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1) The above interrelationships have been considered as part of the assessment reported in this chapter.
We strongly recommend that Palaeolithic and Geoarchaeological specialists should be consulted to help determine the potential for archaeological remains to be discovered, utilising existing information and developing an initial deposit model that could be enhanced following the later geoarchaeological/ground investigation works. This information is useful to inform the baseline evidence for the proposed development area and should be included and utilised in the Desk Based Assessment and EIA. Section 7.5.6 states that geoarchaeological assessments will be	The scope of the cultural heritage assessment comprises archaeological remains, built heritage, historic landscapes and the palaeoenvironmental/geoarchaeological resource. National Highways procured specialists in the following: • Military Archaeologists • Palaeolithic Archaeologist • Geoarchaeologist

Historic England comment	National Highways response
carried out and incorporate the results of the geotechnical investigations, which is good, but the value of deposit models should also be discussed. This work should also make reference to the geology and soils chapter (Chapter 11) in terms of what this can add regarding the condition, preservation and archaeological potential of an area. The information obtained from the extensive ground investigation works (Section 11.5.3) could be used to update and enhance the deposit model defined as part of the baseline assessment.	The need for geoarchaeological and palaeoenvironmental investigation was identified from the completion of a deposit model. The deposit model was created by specialist sub-consultants from historical ground investigation data and newly available soil profiles recorded from ongoing Project geotechnical ground investigations. A preliminary Palaeolithic and Quaternary Deposit Model (PQDM) was developed. The PQDM was divided into two phases: a preliminary overview and a more detailed PQDM proposed to be developed following submission of the DCO application. For the initial, preliminary overview model, refer to ES Appendix 6.5: Lower Thames Crossing: Palaeolithic and Quaternary Deposit Model (PQDM) and Desk-based Assessment of Palaeolithic Potential. Please also refer to ES Appendix 6.6: Lower Thames Crossing, Standalone Palaeolithic Archaeological Assessment and Research Framework (SPAA-&-RF).
We would also recommend that the route is divided into zones of differing character and potential, illustrating the depths and deposits of interest on a schematic section. This would utilise existing information in the first instance, such as the type of geology, depth and type of anticipated archaeology. This baseline information should be included in the Desk Based Assessment and at the EIA stage, aid the design of preliminary investigative fieldwork, and can be updated as further geotechnical/geoarchaeological information becomes available.	National Highways shared the initial draft of ES Appendix 6.1: Cultural Heritage Desk-based Assessment to heritage stakeholders in May 2020. Feedback was received from Historic England which has been considered in final application version. A further meeting was held on 15 June 2020 to agree the approach and structure of the final draft of ES Appendix 6.1: Cultural Heritage Desk-based Assessment. A common understanding on the purpose of the DBA was agreed, as well as the broad approach.
At the Scoping Stage we recommended that a number of key Palaeolithic projects/reports be included in the baseline assessment, such as the English Rivers Palaeolithic Survey, the Southern Rivers Palaeolithic Project, as well as relevant Quaternary Research association Field Guides. These have not been mentioned in the PEIR, and we would also recommend that the Palaeolithic sections of the relevant Regional Research Frameworks documents are included in the assessment. We also recommended that a number of key sites be included in the assessment of Palaeolithic & Holocene sequences, such as the nationally significant sites of Purfleet, Aveley, Swanscombe and Tilbury, but these	The following draft reports were shared with Historic England in April 2020 for comment and are subsequently presented in the ES: • Lower Thames Crossing: Palaeolithic and Quaternary Deposit Model (PQDM) and Desk-based Assessment of Palaeolithic Potential (ES Appendix 6.5) • Lower Thames Crossing, Standalone Palaeolithic Archaeological Assessment and Research Framework (SPAA-&-RF) (ES Appendix 6.6).

Historic England comment	National Highways response
have not been discussed as part of the PEIR. The alluvial and peat sequences recorded at Tilbury have been discussed in Section 7.4.24 in terms of the potential for waterlogged archaeological evidence dating from the Mesolithic onwards to be recovered as well as the potential for Palaeolithic remains from the gravel terraces. However, we would expect a more detailed discussion of the archaeological potential of these areas within the Desk Based Assessment and the Environmental Statement.	
Tables 7.6, 7.7. 7.8 summarise the effects and mitigation approaches for key heritage assets affected by the proposed development. It is noted that a Written Schemes of investigation (WSI) will be prepared in advance of works to ensure that remains are investigated and recorded appropriately. It is not clear at this stage what this may entail and more detail is required in terms of the mitigation strategies that will be employed. We would also recommend that any remains are assessed in terms of their condition utilising approaches discussed in the Historic England guidance 'Preserving Archaeological Remains' (2016). This will help clarify what is understood about the preservation of any surviving archaeology on the site and its vulnerability to changes that may occur due to the proposed development.	For the geophysical surveys and archaeological trial trenching, WSIs have been prepared for all land parcels within the Order Limits, which have been approved by the archaeological advisors to the local planning authorities. ES Chapter 6: Cultural Heritage (Application Document 6.1) contains a list of standards and guidance which have been used to devise the methodology for data collection and assessment. Preserving Archaeological Remains: Decision-taking for sites under development (Historic England, 2016) is in the list.
It is stated that bentonite slurry may be used as part of the drilling process needed to excavate the tunnel; we asked that the potential impact that bentonite slurry outbreak could have on any archaeological remains being considered, but this has not been discussed within the PEIR.	The risk of slurry blow out has been subject to full review by industry experts. Based on current ground information a slurry blow out should not occur. The tunnel boring machines would have a suite of technical measures and controls, continually operating, which monitor and limit pressure to below that which would result in slurry loss.
Information presented in the Geology and Soils chapter is of valuable to aid the understanding and assessment of the archaeological potential of an area. This information will aid the assessment of the potential for Palaeolithic archaeology to be present in the areas of the proposed development. The way that the geological data is interpreted for archaeological purposes is different compared to assessments for engineering purposes. We would therefore recommend that a geoarchaeologist is given access to the information presented in this	National Highways procured geoarchaeologist and palaeolithic specialists. The need for geoarchaeological and palaeoenvironmental investigation was identified from the completion of a deposit model. The deposit model was created by specialist sub-consultants from historical ground investigation data and newly available soil profiles recorded from ongoing Project geotechnical ground investigations. A

Historic England comment	National Highways response
chapter and allowed to liaise with geotechnical specialists so that locations can be targeted for site investigations that will be beneficial for both disciplines, and to ensure that the archaeological relevance is not missed.	preliminary Palaeolithic and Quaternary Deposit Model (PQDM) was developed. The PQDM was divided into two phases: a preliminary overview and a more detailed PQDM proposed to be developed following submission of the DCO application. For the initial, preliminary overview model, refer to ES Appendix 6.5: Lower Thames Crossing: Palaeolithic and Quaternary Deposit Model (PQDM) and Desk-based Assessment of Palaeolithic Potential. (Please also refer to ES Appendix 6.6: Lower Thames Crossing, Standalone Palaeolithic Archaeological Assessment and Research Framework (SPAA-&-RF).
A series of ground investigation works need to be carried out as part of the assessment works, which will include a number of intrusive surveys being carried out (Section 11.5.3). The information obtained through this work is likely to be of value to the archaeological assessment and so it would be efficient to include a geoarchaeologist in the planning stages to ensure that opportunities are maximised to understand the archaeological potential of an area, and the risks that may need to be addressed, such as the archaeological preservation and condition of remains, compression of deposits or the presence of archaeologically sterile areas (Section 11.4).	
The potential for contaminated deposits is mentioned in Table 11.11 in terms of how any impacts can be mitigated. We would recommend that the impact that contamination may have on archaeological deposits should also be considered, with reference to the Historic England 'Land Contamination and Archaeology' (2017) good practice guide.	This has been considered in ES Chapter 6: Cultural Heritage (Application Document 6.1). ES Chapter 6: Cultural Heritage (Application Document 6.1) contains a list of standards and guidance which have been used to devise the methodology for data collection and assessment. Land Contamination and Archaeology Good Practice Guidance (Historic England, 2017a) is in the list.
Section 7.5 outlines future baseline information and survey required. The scope of field survey (7.5.7) at this stage should explicitly reflect policy aims over describing significance and establishing harm to that significance. In relation to trial trenching where other methods of prospection might show as false positives or false negatives (7.5.6. d), we recommend that the approach should be set out with over-arching research aims and objectives stated, building on the HLC work which is proposed in (7.5.6 e). We have commented above (5.12) on the work required to assess potential for the Palaeolithic (7.5.6 f).	For the archaeological trial trenching, WSIs have been prepared for all land parcels within the Order Limits, which have been approved by the archaeological advisors to the local planning authorities. WSIs have also been agreed for the geophysical surveys.
We note that Table 7.2 states that the methodology for field evaluation will be agreed with stakeholders and that 'the information regarding heritage assets generated by the evaluation will be assessed in the ES' which will include 'the results of suitable field evaluation'. This is further underlined in 5.142 where it is stated that 'the potential for undiscovered heritage assets	

Historic England comment	National Highways response
will be identified in the Desk based Assessment and through field survey and assessed in the ES.'	
Given that it is stated that access to carry out trial trenching is subject to agreement with landowners (7.5.6.d) and the extent of the scheme, we are concerned that an appropriate level of archaeological evaluation over the areas of proposed land- take might not have been completed before the submission of the ES (or indeed the commencement of enabling works) and that without this information there might be a risk to the programming and resourcing of archaeological mitigation strategies within the construction programme.	National Highways discussed approaches to archaeological trial trenching with Historic England on 5 October 2018 and 14 March 2019. Bilateral meetings with heritage stakeholders, the Project and the Project procured specialists have been occurring monthly since December 2019. For the results of the trial trenching to date please refer to ES Appendix 6.8: Trial Trenching reports and to ES Chapter 6: Cultural Heritage (Application Document 6.1) for the impact assessment of recordings to date. The enabling works would not commence until all trial trenching is completed, assessed and mitigation established in consultation with the archaeological advisor to the local planning authority.
The 7-year construction programme is shown in the form of a Gantt chart in Figure 2.6. The start date is given as the date of the DCO being granted with the enabling works taking place in 2021- 3'd Q of 2022, with tunnelling starting in mid- 2021. We advise, in the light of experience regarding the programming and resourcing of archaeology on the A14 Project in Cambridgeshire, that adequate windows and resources for archaeological field evaluation must be factored into the pre-DCO stages of the project in order to support the ES and the DCO, since without this information, it will not be possible to accurately ascertain the timetable and budget for the completion of archaeological mitigation strategy for the project, and in particular that needed in advance of early enabling works.	Since Statutory Consultation, the construction programme has altered slightly, and the enabling works would commence in 2022. For the archaeological trial trenching, WSIs have been prepared for all land parcels within the Order Limits, which have been approved by the archaeological advisors to the local planning authorities. WSIs have also been agreed for the geophysical surveys. For the results of the trial trenching to date, please refer to ES Appendix 6.8: Trial Trenching Reports for Priority 1 areas. The trial trenching will continue during the pre-examination and examination period following submission of the DCO application, with further results provided when available. The assessment in this chapter has taken a precautionary approach, assuming presence of unknown archaeology in unexcavated areas, but this may be updated as further information becomes available.
Following on from evaluation, the process of decision making on managing significant remains is not spelt out very clearly in 7.6.2, being postponed to ES production itself. It is stated that the tabulated effects and mitigation (Table 7.6) are based on existing information (7.6.1), however there is no	ES Chapter 6: Cultural Heritage (Application Document 6.1) presents the planning policies and guidance at a national level that are relevant to the assessment of cultural heritage. The cultural heritage assessment identifies the level of impact on designated heritage

Historic England comment	National Highways response
reason at this point not to reflect national policy, as set out in the NPSNN, with regard to processes followed and the options available to manage archaeological heritage in major schemes. Local archaeological curators should at the very least be consulted on interim results and offered the opportunity to provide guidance on managing significance in the cases of major finds. If WSIs for archaeological mitigation are to be prepared in advance of enabling works and the construction programme (Table 7.6) then, we reiterate that evaluation must proceed in a timely fashion so that the results can be fed into the WSIs.	assets through assessment of the magnitude of impact, determined based on the degree to which this would adversely affect (harm) the value (significance) of heritage assets, in order to identify any total loss of value. Throughout the development of the Project, National Highways has engaged with Historic England's Greater London Archaeology Advisory Service (GLAAS) for the London Borough of Havering, Kent County Council and Essex Place Services. For the archaeological trial trenching, WSIs have been prepared for all land parcels within the Order Limits, which have been approved by the archaeological advisors to the local planning authorities. WSIs have also been agreed for the geophysical surveys.
The apparent blanket approach of preferring preservation by record (Table 7.6) should be reconsidered. Although the road line itself may prove to be immutable, consideration should be given to design changes for the ancillary works (road re- alignments, services re-alignments, compounds, earthworks, planting etc.) where this could secure preservation in situ (or even public presentation) of any remains that evaluation shows to be of high archaeological importance. There is no reason to exclude these options at this stage, particularly since preservation is proposed for key landscape features in Chapter 8. For example, within Havering certain proposed compounds (Bug Farm, Strawberry Farm) are located close to areas of historic landfill and may be better sited within those areas in order to reduce archaeological impact (Maps appendix). It would be good to have more detail on the individual proposed uses for these compounds and to have a GIS shapefile of them. For example, Strawberry Farm has extant ridge and furrow marked on the GLHER. This is a site where an overhead lines compound is proposed. Yet, a neighbouring field is historic landfill and could be used without damaging the heritage asset.	An iterative process has facilitated design updates and improvements, informed by environmental assessment and input from the Project engineering teams, stakeholders and public consultation. The landscape design for the Project seeks to avoid or reduce adverse impacts on designated and non-designated heritage assets as a result of change within their setting that would negatively affect their significance. This landscape design mitigation would include earthworks and planting as shown on ES Figure 2.4: Environmental Masterplan (Application Document 6.2). The broad types of archaeological mitigation, as detailed in ES Appendix 6.9: Draft Archaeological Mitigation Strategy and Outline Written Scheme of Investigation include the following: • Preservation *in situ* • Recording of above ground heritage assets • Non-intrusive archaeological fieldwork • Intrusive archaeological fieldwork • Monitoring during construction • Outreach and engagement

Historic England comment	National Highways response
	• Post-excavation • Publication
We would also like to see consideration of how public benefit through interpretation and outreach could be applied to better reveal the significance of affected assets and thus improve the mitigation response and result in positive measures which would contribute to the Project Legacy agenda. For example, proposed land acquisition in East Tilbury runs right up to the eastern boundary of the East Tilbury battery (scheduled monument). Additional acquisition of the battery itself would provide an opportunity for this heritage asset to be beneficially managed for its historical interest as a community asset as a northern extension to Coalhouse Park.	Suitable publication and outreach is included in the programme of mitigation, as detailed in ES Appendix 6.9: Draft Archaeological Mitigation Strategy and Outline Written Scheme of Investigation. Following completion of archaeological recording work onsite, a programme of post-excavation assessment, analysis and reporting would be undertaken, including publication of the results and deposition of the archive in an approved local museum.
Minor Points	
Table 8.7 • Coalhouse Fort is owned by Thurrock Borough Council, not a private owner. It is in receipt of monies to help further repair, enhance and sustain it from the Heritage Lottery Fund, Historic England and the Coastal Communities Fund. • Tilbury Fort is in the guardianship of the Secretary of State, managed by the English Heritage Trust. • South Ockendon Hall: reference to scheduled monument missing.	Noted.
Reference to NPPF needs updating to revised 2018 version (p.566)	Noted.
Glossary - add • ***Historic England*** is a non-departmental public body and the government's adviser on the historic environment in England. It helps to protect, enhance and explain England's heritage for people to enjoy. • ***Scheduled monument*** • ***Listed Building*** • ***Designated heritage asset***	Noted.

Historic England comment	National Highways response
• Correct title: ***National Heritage List for England***	
Comments on Cultural Heritage Assessment Methodology (dated October 2018)	
The document sets out how the applicants are going to carry out the DBA and evaluations to inform the application, discussing walk-over surveys, terrestrial and marine archaeology. The overall approaches that will be used are sensible and appropriate, but we would expect to see greater detail in terms of how the assessments will be carried out and the specific approaches that will be used. A number of specification documents have been mentioned in Sections 8.3 and 8.5, but we have not seen these documents (see 5.5. above).	National Highways shared the initial draft of ES Appendix 6.1: Cultural Heritage Desk-based Assessment to heritage stakeholders in May 2020. Feedback was received from Historic England which has been considered in the final application version. A further meeting was held on 15 June 2020 to agree the approach and structure of the final draft of ES Appendix 6.1 Cultural Heritage Desk-based Assessment. The methodologies mentioned were submitted to stakeholders including Historic England between October and December 2018. The comments received were taken on board and resubmitted for re-review. Appropriate (further) geophysical survey techniques have been agreed with stakeholders including Historic England following receipt of magnetometer survey results (south of river) and aerial mapping study (north of river). The geoarchaeological has addressed the deposit model. The methodologies for these surveys/assessments can be found in: • ES Appendix 6.3: Archaeological Desk-Based Assessment of 20th Century Military Archaeological Report • ES Appendix 6.5: Lower Thames Crossing: Palaeolithic and Quaternary Deposit Model (PQDM) and Desk-based Assessment of Palaeolithic Potential • ES Appendix 6.6: Lower Thames Crossing, Standalone Palaeolithic Archaeological Assessment and Research Framework (SPAA-&-RF) • ES Appendix 6.7: Geophysical Survey Report
The document mentions that the Regional Research Frameworks for South East and the Greater Thames Estuary will be addressed, but it does	Regional research frameworks have acquired and considered in the assessment process and include:

Historic England comment	National Highways response
not mention the East of England document (Sections 5.1.8 & 6.11.8) which should be referenced too.	• East of England Regional Historic Environment Research Framework (Association of Local Government Archaeological Officers East of England/Historic England, 2000/2011/2017) • Greater Thames Estuary Historic Environment Research Framework (Greater Thames Estuary Archaeological Steering Committee/Historic England, 2010) • South East research Framework (East Sussex/Kent/Surrey/West Sussex/Historic England, 2007/2019) Refer to ES Chapter 6: Cultural Heritage (Application Document 6.1) for more information.
Section 6.8 discusses the preparation of deposit models, which is good to see but we would expect to see greater detail in the specification document mentioned in Section 6.8.8 in terms of how this will be carried out. In addition, it is stated that an impact assessment will be carried out, but we would recommend that the potential and the limitations of the existing information should be stated. This would highlight where gaps exist in our understanding and therefore what is needed to improve the situation so that the impacts of the proposed development can be fully assessed.	The deposit model was created by specialist sub-consultants from historical ground investigation data and newly available soil profiles recorded from ongoing Project geotechnical ground investigations. A preliminary Palaeolithic and Quaternary Deposit Model (PQDM) was developed. The PQDM was divided into two phases: a preliminary overview and a more detailed PQDM proposed to be developed following submission of the DCO application. For the initial, preliminary overview model, refer to ES Appendix 6.5: Lower Thames Crossing: Palaeolithic and Quaternary Deposit Model (PQDM) and Desk-based Assessment of Palaeolithic Potential. Please also refer to ES Appendix 6.6: Lower Thames Crossing, Standalone Palaeolithic Archaeological Assessment and Research Framework (SPAA-&-RF).
It is stated in Section 6.9 that a marine archaeologist will be employed to undertake an assessment of the resource, but it may be useful to consider including a geoarchaeologist as well. Boreholes have been collected in the foreshore and intertidal areas as part of previous developments and research projects, which may add valuable information about the archaeological potential of the proposed development area, as well as the impacts that the development may pose.	Geotechnical ground investigation covers both terrestrial and marine environments. It was undertaken to develop the Project design and the results used to inform a deposit model to understand the development of the landscape and historic environment. The deposit model was created by specialist sub-consultants from historical ground investigation data and newly available soil profiles recorded from ongoing Project geotechnical ground investigations.

Historic England comment	National Highways response
A number of geophysics techniques will be employed to survey the marine and foreshore areas (Section 6.9.8), including side-scan sonar, multi-beam echo sounder, sub-bottom profiling, magnetic gradiometer and ultra-high-resolution seismic survey. It may be necessary to consider additional techniques that are suitable in the foreshore and intertidal zones, such as electrical resistivity imaging or electromagnetic ground conductivity, and that can investigate deposits to depths over 20m depending of the setup of the equipment. We would recommend that the strategies used to survey the proposed development areas should be carefully considered, such as the line spacings that are used, as this can impact on the ability to identify and resolve archaeological features of interest. We would therefore recommend that the Historic England 'Marine Geophysics' (2013) guidance be consulted: https://historicengland.org.uk/images-books/publications/marine-geophysics-data-acquisition-processing-interpretation	No geophysical surveys of the marine and foreshore areas has been undertaken. Side scanning sonar for the Thames has been considered and discussed with Wessex Archaeology. Side scanning sonar has not been completed for the Project because there are no impacts identified within the river or on the riverbed. Side-scanning sonar would not have recorded any archaeological features with the potential to be impacted by the Project.
Section 6.11 discusses how the historic landscape will be assessed. Section 6.11.4 mentions that aerial photographs will be used as part of this assessment, there is no mention of LIDAR data in the survey.	A specialist aerial mapping study has been undertaken for the section of the route north of the River Thames, presented in ES Appendix 6.2: Aerial Investigation and Mapping Report and results shown on ES Figure 6.4: Geophysical and Aerial Mapping Survey Results (Application Document 6.2). This consists of rectification of historic aerial photographs and an analysis of LiDAR data. This study complements and builds on the existing National Mapping Programme data (a 1980s and 1990s aerial mapping study carried out with more basic techniques). An initial study was undertaken in 2019 for the Statutory Consultation Order Limits and an update to this was undertaken in 2020 to cover gaps in this following release of the Order Limits. The study includes the Order Limits and identifies buried archaeology in detail in areas where non-intrusive geophysical survey has proven unreliable. The LiDAR images also define areas where alluvial soils mask buried historic landscapes. The section of the route to the south of the River Thames was largely covered by an existing recent aerial mapping study as part of the Hoo Peninsula Historic Landscape Project (English Heritage, 2013). The results of that study

Historic England comment	National Highways response
	have been incorporated into the Kent Historic Environment Record (HER).
Table 2 summarises how the impact to heritage will be quantified, but more information should be provided for buried archaeological remains. The majority of the detail in the table relates to standing buildings/monuments and their setting.	ES Chapter 6: Cultural Heritage (Application Document 6.1) assesses the impact to buried archaeological remains where known. Trial trenching for sensitive areas has been completed. The assessment of buried archaeology in ES Chapter 6: Cultural Heritage (Application Document 6.1) has been undertaken on a robust and precautionary basis. Further trial trenching will continue after the submission of the DCO application, for completeness, and enabling works would not take place until that is completed. Please refer to ES Appendix 6.8: Trial Trenching Reports for Priority 1 areas.
Section 8.3 states that specialists will be involved in the assessment of palaeoenvironment and geomorphology of the project area, which is good to see, but additional detail is required to define how this will be achieved. A scope of works for the geoarchaeologist is set out in a document (Section 8.3.2), but Historic England have yet to see this (see 5.5 above). A Palaeolithic specialist will be used to investigate the potential of the development area (Section 8.5), which is good to see.	Geoarchaeologist and Palaeolithic specialists meeting regularly to ensure collaboration and have attended stakeholder monthly progress meetings to communicate their findings.
We would recommend that the geoarchaeological and Palaeolithic specialists collaborate and communicate as their findings will be benefit each research area.	

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Table 10.1 Kent County Council Statutory Consultation

Kent County Council comment	National Highways response
Air Quality and public heath	
Nevertheless, a new road, at the preferred location or elsewhere, will result in a worsening of air quality. Although initial National Highways air quality modelling demonstrated that no properties along the new route are at risk of exceeding legal limits, future modelling needs to consider the effect on background air quality and the cumulative effect of additional traffic in future years. The same applies to noise impacts	The Project is expected to lead to more air quality improvements than worsenings where the annual mean AQS objective for NO_2 is exceeded. The traffic data used in the assessment of air quality already accounts for traffic growth, and for traffic generated by other planned or reasonably foreseeable major developments. Please, refer to ES Chapter 5: Air Quality (Application Document 6.1) for more information. The expected road traffic noise levels within the study area were estimated for the future assessment year of 2042 based on the forecast traffic data. Please, refer to ES Chapter 12: Noise and Vibration (Application Document 6.1) for more information.
For air quality, noise and visual impacts, mitigation measures need serious consideration such as noise-reducing fencing and appropriate landscaping. In developing mitigation measures, National Highways should commit to working with KCC, Gravesham Borough Council, Medway Council, and other relevant organisations.	Acoustic barriers have been incorporated into the design of the Project. Please refer to ES Chapter 12: Noise and Vibration (Application Document 6.1) for more information and ES Figure 2.4: Environmental Masterplan (Application Document 6.2). Environmental workshops on assessments, mitigation and significant residual effects were held with relevant stakeholders in April and June 2020.
It is important that a comprehensive impact study on health is made by National Highways in consultation with Public Health England. In general, any road development should seek to improve air quality and every possible effort should be to secure improvements in local air quality and every possible effort should be to secure improvements in local air quality related to this development, particularly in areas currently exceeding the air quality standards and designated as Air Quality Management Areas (AQMA).	Please refer to the Health and Equalities Impact Assessment (Application Document 7.10). The Project is expected to lead to more air quality improvements than worsenings where the annual mean AQS objective for NO_2 is exceeded.

Kent County Council comment	National Highways response
In-depth information should be used to make an informed decision on route choices. Kent Public Health would urge National Highways to undertake an impact assessment using current data to develop an understanding of the air quality issues for the population in the area. The initial screening assessment (using the Design Manual for Roads and Bridges (DMRB)) considers basic fleet make-up/traffic speeds to predict nitrogen dioxide (NO2) pollution levels. There are currently gaps in the scheme design details that will influence air pollution along parts of the routes, and more detailed information on traffic composition and speed would need to be considered further. Only then can mitigating actions be developed.	A robust air quality baseline has been established using desk-based studies, fieldwork and modelling. Monitoring data was obtained from the 48 local authorities within the assessment study area. Data was also collected from NO_2 diffusion tubes and automatic monitoring sites as presented in ES Chapter 5: Air Quality (Application Document 6.1) and ES Appendix 5.2: Air Quality Baseline Conditions.
From a Public Health perspective, any increase in exposure to NO2 and other air pollutants such as particulate air pollutants (e.g. PM10 and PM2.5) in locations where the standards are currently exceeded, or where a predicted increase in exposure would result in a new exceedance, should be viewed as undesirable and avoided if practicable. Whilst NO2 is a key traffic related pollutant, it is expected that Highway England must consider other pollutants (e.g. PM10/PM2.5) within the assessments completed, given the evidence of long-term impact on health.	Modelled PM_{10} results have been utilised (as they contain the $PM_{2.5}$ fraction) and demonstrate that there will be no risk of $PM_{2.5}$ exceeding statutory thresholds.
In addition to air pollution modelling, it will be expected that monitoring is done before and after development: before to establish background/current concentration and post-development for the assessment of actual air quality impacts arising from the scheme on sensitive receptors, to allow for validation of the modelling methodology and provide valuable baseline data that could be used in the assessment of potential air quality impacts from similar road schemes in the future.	Air quality monitoring is to be undertaken during the construction phase of the Project. The programme of monitoring, including the location of monitors and the type of monitoring, would be submitted in advance to the relevant local authorities. Monitoring would begin at least three months prior to the commencement of that part of the construction works to allow a suitable pre-construction baseline to be established unless otherwise agreed by National Highways in consultation with the relevant local authorities.
Impact on Shorne Woods Country Park	
Movement of the road alignment north towards the existing development line boundary and the Country Park is asked to be avoided if possible. Construction on this land has the potential to impact on dormouse which are immediately adjacent to the existing A2 and an area of Hornbeam Maidens which are veteran trees and rare for the area. Furthermore, it also	At Statutory Consultation the Project required a greater amount of land to be taken on either side of the existing road. At Supplementary Consultation, it was shared that, where possible, the width of land would be reduced on both M2 carriageways, as well as the central reservation, to minimise the footprint of the road through the Kent

Kent County Council comment	National Highways response
risks severing the 10km Darnley Trail, the blue multiuser route within the park. KCC may also have to consider relocating of the outdoor education space that accommodates over 4,000 children per year. The 20th Century clay works history would also be destroyed and also and an old WW2 camp where the shelters are bat roosts and are known to have brown long eared bats roosting in them every year.	Downs Area of Outstanding Natural Beauty (AONB). The hard shoulder was also removed from design on the eastbound link road along the A2 to further minimise the footprint. As a result of the narrowing of the M2/A2 corridor there would be a reduction in the adverse effects caused by the loss of area of designated ancient woodland, including Shorne Woods Country Park and habitats supporting dormouse. Dormouse boxes would be erected in Shorne Wood to increase the availability of nest sites. Extensive woodland planting along the north of the A2 would help to offset the loss of ancient woodland. The Darnley Trail has been assessed as part of ES Chapter 13: Population and Human Health (Application Document 6.1) and is described alongside other routes identified as being indirectly affected by the Project. The Applicant is aware of the role of the WWII camp in supporting roosting bats and is working closely with the utilities team to try to avoid this roost being destroyed or overly disturbed.
However, green bridges can provide dormice corridor links from Shorne Woods into Ashenbank and Jeskyns (Thong Lane) and Cobham Park (Brewers Rd) if they are wide enough and have scrub planted on them as oppose to just a narrow grass verge so there is good scope for habitat corridors if they are done wide enough. Therefore, KCC would ask National Highways to review and consider the feasibility of widening the green bridges included within the latest proposals for the scheme.	The Project design includes seven green bridges. At Supplementary Consultation, it was shared that the green bridge at Thong Lane would be widened to help walkers, cyclists and horse riders to cross the newly constructed Project and access Shorne Woods and Kent Downs AONB. It would also provide more substantial tree planting to benefit wildlife.
The acknowledgement of the England Coast Path within the PEIR document is welcomed as this new National Trail is scheduled for completion by 2020. This would mean that new Coastal Access rights are likely to be in effect during the construction phase of the LTC.	Noted.
The Coast Path should not be directly affected by the LTC, as this section of the trail will pass over the proposed new tunnel. However, impacts on the Coast Path will need to be considered if materials and spoil excavated from the project as to be transferred by the sea. If materials are to be transported	Refer to ES Chapter 2: Project Description (Application Document 6.1) for full details of what has been included in the Project. The Applicant only proposes to potentially utilise the existing East Tilbury jetty at Goshems Farm and does not propose to construct a new jetty.

Kent County Council comment	National Highways response
via the River Thames, there would be a requirement for new marine infrastructure, which may then have a direct impact on coastal access.	
PEIR	
Chapter 9 Terrestrial Biodiversity	
Methodology We note the proposed alternative approach to surveying potential roosting features (PRF) in trees (paragraphs 9.3.5-9.3.6) and have some concerns that this will not provide sufficiently detailed information to adequately appraise the value of the woodlands for bats or to reach informed conclusions regarding likely significant effects. It is also not clear how this approach will ensure compliance with the requirements of the National Planning Statement for National Networks, as outlined in Table 9.2. Given the scale of the project, our expectations are for ecological matters to be dealt with in an exemplary manner. We do not consider the need for "significant survey effort…which would not be delivered in a reasonable timeframe" to present adequate justification for the proposed approach.	Field surveys were undertaken to compile a terrestrial biodiversity baseline for the Project. A summary of the field survey methodologies and study areas is given in Table 8.3 in ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1). For full details of survey methodologies please refer to the terrestrial biodiversity appendices (ES Appendices 8.1 to 8.14).
Desk study data Data from the Kent Habitat Survey 2012 (which includes identification of priority habitats) do not appear to have been requested from the Kent & Medway Biological Records Centre	Terrestrial desk-study data sources are presented in ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1). This data was requested from Kent and Medway Biological Records Centre.
Existing environmental conditions	
To ensure clarity in reporting and aid scrutiny of the work, we would like to encourage a consistent approach to the presentation of results (and conclusions, evaluation etc) across the survey area. We also advise that the reporting commentary should avoid comparison between survey sites within the DCO (e.g. paragraph 9.4.111 "woodland areas in Kent were found to contain a more diverse range of species than Hangman's Wood in Essex") as this is not relevant to the assessment process.	The Applicant has ensured a consistent approach to presentation of results in the ES (Application Documents 6.1 to 6.3). There is no comparison of survey sites.
Table 9.8 Locally important ecological sites and extent (ha) Within the South of the River Thames data, the table does not include all those sites	Non-statutory designated sites and ancient woodland not associated with statutory sites are detailed in tables within ES Chapter 8:

Kent County Council comment	National Highways response
presented in Figure 9.1 – Designated Sites (Application Document 6.2). Ancient woodland sites, although part of local wildlife sites in some instances, have not been listed separately.	Terrestrial Biodiversity (Application Document 6.1). The site name and its interest features such as ancient woodland, grassland, wetland etc, are stated for clarity.
Potential effects and mitigation measures	
Receptor: Thames Estuary and Marshes SPA/Ramsar site etc… We advise that avoidance of works resulting in potential disturbance during key times of year should also be considered as potential mitigation for impacts to birds associated with the SPA/Ramsar sites and SSSIs.	This has been considered in the Habitats Regulations Assessment (HRA) (Application Document 6.5).
Receptor: European designated sites within 20km of the Project It is stated that mitigation for impacts of recreational users as a result of displacement could comprise improving access to the countryside or the provision of alternate green space. We advise that, while this may be appropriate for inland sites, if users are likely to be displaced from coastal areas, it would not be appropriate to provide alternate green space inland as coastal areas have a 'special draw' to users. If the assessment shows that recreational users are displaced into the North Kent SPAs (comprising Thames Estuary and Marshes (Kent side), Medway Estuary and Marshes and The Swale), this may impact on the established North Kent Strategic Access Management and Monitoring Scheme (SAMMS). We advise that Bird Wise (the North Kent SAMMS Board) are contacted in relation to recreational user displacement.	The HRA (Application Document 6.5) considers disturbance to birds but only in relation to the construction of the Project. National Highways is aware that the sites have existing pressures from human disturbance. The Project is not considered to contribute to the redistribution of people into the Special Protection Areas for recreation.
Receptor: Great Crabbles Wood SSSI etc… It is stated that "potential for noise disturbance and air quality effects also – see operational effects", yet in Table 9.29 Potential effects and mitigation measures during operation there is no mention of noise disturbance and no potential mitigation proposed as air quality assessments have not yet been carried out.	Air quality and noise and vibration assessments have since been carried out. The results of these assessment on receptors such as Great Crabbles Wood Site of Special Scientific Interest (SSSI) have been considered in ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1).
We would like to see an overarching consideration of the impacts of habitat fragmentation along the proposed route. While fragmentation impacts should be addressed in the assessments for each of the identified receptors, it would be beneficial for a holistic view to be provided, for	Habitat fragmentation has been fully assessed, please refer to ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1).

Kent County Council comment	National Highways response
example considering whether any areas of semi-natural habitat will become isolated, and when looking at overall net losses/gains in biodiversity along the route.	National Highways has committed to achieving no net loss in biodiversity by the end of RIS 2 and will work towards net biodiversity gain by 2040 across its estate. Although the construction of the Project would have significant adverse effects on statutory designated sites and irreplaceable habitats, such as veteran trees and some sections of ancient woodland, the design has sought to provide biodiversity gains wherever possible and this has resulted in a 15% increase in habitat value. No likely significant effects are predicted on terrestrial biodiversity during operation. An assessment of baseline biodiversity value and that achieved by the Project's design post development is presented within the Sustainability Statement (Application Document 7.11). Please refer to the Need for Project (Application Document 7.1) for more information.
Receptor: Ancient woodland outside of designated sites It is stated that "for potential noise and air quality effects see operational phase" yet there is no 'ancient woodland outside of designated sites' receptor in Table 9.29 Potential effects and mitigation measures during operation (though as stated above, no potential mitigation is proposed as the air quality assessments have not yet been carried out). Consideration must also be given as to whether the construction phase could result in ancient woodland being more accessible to people.	Non-statutory designated sites and ancient woodland not associated with statutory sites are detailed in tables within ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1). Air quality and noise and vibration assessment have been carried out. The results of these assessment on receptors such as designated ancient woodlands have been considered in ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1) and mitigation proposed.
Receptor: Bats We advise that consideration must also be given to construction phase impacts on foraging/commuting bats, for example leading to disturbance as a result of lighting and/or loss of, or impacts to, hedgerows. Table 9.29 Potential effects and mitigation measures during operation	Construction phase impacts on bats has been considered as part of the terrestrial biodiversity assessment, including habitat loss and fragmentation, disturbance and direct mortality. Please refer to ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1). The Project design has minimised light spill and incorporated measures to maintain commuting and foraging corridors. Also refer to measures contained within the REAC, which can be found in the CoCP (ES Appendix 2.2).
PEIR Chapter 10 Marine Biodiversity	
No specific surveys have been carried out in respect of the marine environment, with Chapter 10 relying on desk study information, much of	In addition to desk-based studies, fieldwork was undertaken, which was agreed with the Environment Agency and MMO. Benthic

Kent County Council comment	National Highways response
which appears focussed on the north side of the Thames. KCC awaits the Environmental Statement for further details.	macroinvertebrate samples were collected as part of a marine ground investigation programme in 2019. The results are presented in ES Chapter 9: Marine Biodiversity (Application Document 6.1).
PEIR Volume 2 Appendix F	
It is stated in F.1.79 that surveys for dormice will be carried out in "suitable habitat" but in the descriptions seems to be restricted to hedgerows and woodlands. KCC expects that areas of scrub that are connected to woodlands and hedgerows will also be considered as 'suitable habitat'.	The Project has followed best practice guidance for the scoping of surveys which was also informed by local records. The suitability of habitats for dormice were assessed within the Order Limits of the Project plus a 500m buffer ('survey boundary') during the desk study and Extended Phase 1 habitat and protected species survey. This involved considering the structure, species composition and connectivity of the habitat types present, particularly those known to provide good dormouse habitat.
PEIR Volume 3a: Figures	
KCC has reviewed Figure 9.1 Designated Sites and advise that there is some lack of clarity in the identification of designated areas, particularly around the Shorne and Ashenbank Woods SSSI area. Shorne Wood Country Park and Ashenbank Woodland Trust Reserve are both presented as Local Wildlife Sites, which is incorrect, and the areas marked out for these sites do not accord with those in our files. KCC advise that the site boundaries and details are rechecked.	The Applicant updated the biological records across the Project (including designated sites) in 2020. These mis-representations have been corrected and tables of statutory and non-statutory designated sites are included in ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1).
Other points Given the extent of the project area and the large suite of potential ecological impacts, KCC would suggest that an Ecology Working Group is established, this will ensure that relevant/key consultees are kept abreast of developments as the survey data are collated, can provide local knowledge where appropriate, and have early sight of developing mitigation and compensation strategies.	Although an Ecology Working Group has not been established, there has been ongoing consultation and engagement with all relevant Statutory Environmental Bodies and non-statutory environmental bodies throughout the preapplication phase. This engagement and consultation has been through formal section 42 Statutory Consultation, but also Supplementary and Design Refinement Consultations as well as meetings, bi-lateral meetings, workshops and sharing of technical notes, and of assessment and mitigation progress and information.
Shorne Woods Country Park	

Kent County Council comment	National Highways response
It is understood there is the potential for noise along the Thong Lane side of the Country Park to increase, so any noise buffering to mitigate this impact would be welcomed. There is scope to create a natural sound buffer around Shorne Woods and Brummel hill Woods by planting up to the red line boundary of permanent land required for environmental mitigation shown in Map Book 2, Land Use Sheet 5. Providing an area of woodland planting would increase the woodland coverage along the edge of the SSSI and could be integrated into the existing country park, but trees would need to be native and locally sourced.	The results of the operational noise modelling informed the location of noise barriers. The noise barriers are embedded in the Project's design and their locations are illustrated in ES Figure 2.4: Environmental Masterplan (Application Document 6.2). The suitability of noise barriers and their locations are determined by criteria set out in DMRB LA 111 (Highways England, 2020f) such as cost vs benefit and impact on other environmental factors such as visual impact.
Both during and after construction there is a risk noise pollution at Shorne Woods will be higher, in particular the Thong Lane edge and the boundary of Randall Wood and the knoll. This could affect wildlife in those areas and human enjoyment of the park. Noise mitigation through the use of the environmental bunds will be crucial so this must be fit for purpose. Due to the high number of lorry movements on these roads they will also need to be of an appropriate height to buffer the sound.	The results of the operational noise modelling informed the location of noise barriers. The noise barriers are embedded in the Project's design and their locations are illustrated in ES Figure 2.4: Environmental Masterplan (Application Document 6.2). The suitability of noise barriers and their locations are determined by criteria set out in DMRB LA 111 (Highways England, 2020f) such as cost vs benefit and effect on other environmental factors such as visual impact.
Planting woodland from the LTC past the 4 ponds (on the Southern Valley Golf course land), shown on the General Arrangement Plan Sheet 5, would provide a natural buffer for noise. Additionally, Randall Wood is ancient woodland so this would enhance the habitat by increasing an area of woodland in immediate proximity to the scheme. This area could then be integrated into the existing 4km woodland ride network at Shorne Woods to provide habitat connectivity.	Southern Valley Golf Course would be permanently acquired for the Project. During operation, the site would be replaced with a country park. This would connect the eastern fringes of Gravesend, through the Thong Lane green bridge, with proposed footpaths around the South Portal, connecting to existing footpaths into Shorne Woods Country Park and the wider Kent Downs AONB. The total area of the proposed country park is approximately 84ha. The country park created would have open views to the Kent Downs AONB and the River Thames, with woodland planting to ensure that it complies with landscape and design principles for the Project, which are set out in the Project Design Report (Application Document 7.4).
Creating an area of woodland could also enhance access for bikes, horse, pedestrians from the A226 area which could then be integrated into a cycle path link to Medway along the Lower Higham road improving connectivity for non-car users throughout the area.	For replacement planting and landscaping proposed for the Project, please refer to ES Figure 2.4: Environmental Masterplan (Application Document 6.2).

Kent County Council comment	National Highways response
If during construction Brewers Road bridge is removed for a period of time this will result in a loss of visitors for Shorne Woods as a large majority use the A2 as their access point to the park. The alternative routes bring visitors up narrow lanes like Pear Tree Lane or through the village of Shorne which impacts on local traffic, and poses more of an impact during school holidays and weekends so timings of works will be crucial	There would be a temporary closure of Brewers Road bridge whilst it is replaced. The impact on businesses during this time has been assessed in ES Chapter 13 Population and Human Health (Application Document 6.1).
The increase in emissions will potentially have an impacts on vulnerable species of fungi, lichens and bryophytes as areas of the park that were buffered from the road will now potentially be exposed to higher levels of air pollution. More detailed surveys on lichens and bryophytes and invertebrates associated with the veteran trees should be carried out to better understand what the impact of the new development will be.	Dedicated lichen and bryophyte surveys have been carried out including Shorne Country Park. This is a robust baseline on which to base the assessment. A full description of the terrestrial invertebrate baseline conditions is presented in ES Appendix 8.3: Terrestrial Invertebrates.
Heritage	
Chapter 2 Project Design	
Provision of designed environmental mitigation such as earth bunds, balancing ponds, translocation of soils, landscaping, planting etc. could have impacts on heritage, particularly on buried archaeology. The archaeological consequences of environmental mitigation need to be thoroughly considered at all stages of the scheme.	The cultural heritage assessment is based on the Project in its entirety as detailed in ES Chapter 2: Project Description (Application Document 6.1). The assessment of archaeology has covered areas proposed for environmental mitigation which would require landscaping or ground disturbance as well as temporary land-take for elements such as site compounds, utility diversions and groundworks. Trial trenching has been ongoing; the results of the work carried out prior to the submission of the DCO application are presented in ES Appendix 6.8: Trial Trenching Reports for Priority 1 areas. Archaeological mitigation, at the time of DCO submission, has been informed by results of trial trenching and geophysical surveys.
Temporary land take and measures, such as site compounds, could have impact on heritage, particularly buried archaeology. Mitigation for heritage, particularly buried archaeology, needs to be thoroughly considered for even temporary measures.	
Services and utility diversions could have impact on heritage, particularly buried archaeology. Mitigation for heritage, particularly buried archaeology, needs to be thoroughly considered for all services and utility diversion works.	
Enabling works and variations to scheme groundworks could have impact on heritage, particularly buried archaeology. Mitigation for heritage,	

Kent County Council comment	National Highways response
particularly buried archaeology, needs to be thoroughly considered for all enabling and variation to scheme works	
Archaeological investigations need to take place prior to groundworks in each particular area, including for utility diversions and for enabling works.	
The construction and use of site compounds need to be subject to full archaeological assessment and mitigation. The proposed Highways Construction Compound South of Thames and the South Portal Compound (fig 2.2a) overly many undated cropmarks and part of the Gravesend Airfield. Suitable archaeological mitigation is needed prior to these site compounds being established.	The potential impacts of the southern tunnel entrance compound and related activities on Gravesend Airfield and cropmarks are assessed in ES Chapter 6: Cultural Heritage (Application Document 6.1). More refined design information about these compounds was contained in Supplementary Consultation.
The rural nature of this scheme significantly increases the risk of encountering as yet unknown archaeology which may be of importance. There are a number of cropmarks south of St Mary's Church which indicate the presence of an extensive multi-period occupation site and post-medieval brick kilns are thought to survive in the former Shorne brickfields. We recommend that fieldwork is needed to support any desk-based assessment for the EIA to clarify the potential for significant buried archaeology along the chosen route, especially of all the cropmarks known within the location of the two site compounds south of the Thames.	Fieldwork and trial trenching has been completed in the area of St Mary's Church. Refer to ES Chapter 6: Cultural Heritage (Application Document 6.1) for the assessment and ES Appendix 6.8 for the results of the trial trenching.
In general, there is insufficient consideration of the Thames and Medway Canal, 20th century defensive lines and Gravesend Airfield, or the Milton Rifle Range; their settings, character and wider landscape context. It will be a requirement to clarify the impact of the scheme on the canal and other "larger heritage assets", including the airfield and the full historic Cobham Parkland, not just the current designated area.	These assets are fully assessed within ES Chapter 6: Cultural Heritage (Application Document 6.1) which has interrelationships with the landscape and visual assessment. Please also refer to ES Appendix 6.1: Cultural Heritage Desk-based Assessment.
There is a need for broader and more detailed consideration of impact on historic landscape from lighting. This could be a major harm factor for a variety of receptors, including setting of designated heritage assets, especially listed buildings, and the Grade II* Cobham Park. In addition, as this scheme runs through a rural area, lighting could have a wider impact	Light pollution impacts on landscape and visual has been considered in ES Chapter 7: Landscape and Visual (Application Document 6.1). Night-time lighting would be considered at compounds to avoid light glare, light spill and light pollution.

Kent County Council comment	National Highways response
on the historic character of the landscape, including the historic marshland and open field system south of the Thames.	
Mitigation should not just include adding more trees. There needs to be mitigation considered appropriate for open landscapes as “screening” is not necessarily going to be most appropriate and could be detrimental to the significance of some military heritage assets and historic long views from Cobham and Shorne.	There has been a collaborative approach to the landscape design of the Project which has considered the impact of replacement planting, and structures such as acoustic barriers on views and heritage assets.
Historic landscapes south of the Thames are not fully highlighted as a cultural heritage issue throughout this PEIR. There are considerations of landscape and visual impacts, covering ancient woodland etc, and the setting of Listed Buildings is raised but there is no clarity in how assessment of historic landscapes would be covered. We recommend assessment adheres to the DMRB Volume 11 and associated guidelines and to the 2013 GLVA (although there is a distinct difference between natural landscape assessment and historic landscape assessment.) In addition, the HLC for Kent is not of sufficient detail. We recommend that the assessment for historic landscapes includes a detailed HLC, as recommended by the DMRB. This is particularly needed in view of the green field and rural nature of the scheme.	A Historic Landscape Characterisation (HLC) study has been undertaken and is presented in full in ES Appendix 6.1: Cultural Heritage Desk-based Assessment. As there is no single, fixed methodology for this process the assessment uses the methodologies employed for non-road schemes, such as the Hoo Peninsula Historic Landscape Project (English Heritage, 2013) as recommended by heritage stakeholders.
We welcome the appreciation of the potential impact on marine archaeology from the bridge and immersed tunnel and the acknowledgement that there could be an impact on significant geoarchaeological deposits. We note the proposed programme of geoarchaeological assessment (PEIR chapter 7).	Noted.
There is no mention of options to consider impact on Bluebell Hill from increased traffic to the M2 from the M20. We welcome this in terms of the potential reduction of impact on the historic environment but maintain that any off-line works to the A229 Bluebell Hill could have a major impact on the historic environment, especially the nationally important Medway Megaliths. The impact of increased traffic between the M20 and M2 as a direct result of the Lower Thames Crossing should be part of the assessment.	National Highways acknowledge the concern raised by Kent County Council. Plates 5.7, 5.8 and 5.9 of the Traffic Forecasts Non-Technical Summary (Application Document 7.8) present the forecast percentage change in flow as a result of the Project, and an increase is indicated along the A229. Any future development of the A229 would be subject to the requirements of the National Planning Policy Framework (Ministry of Housing, Communities and Local Government, 2019) if developed by

Kent County Council comment	National Highways response
	Kent County Council, or the National Policy Statement for National Networks (Department for Transport, 2014) if developed by National Highways. Both of these policy frameworks only allow for development in exceptional circumstances and where it can be demonstrated that it is in the public interest.
Requirement (p128) KCC notes that the ES will include the results of suitable field evaluation. I would welcome clarification of what is "suitable" field evaluation. We welcome the proposals to undertake geophysical surveying but I recommend there is a need for targeted trial trenching and/or test pitting. Non-intrusive field techniques cannot always clarify date and nature of heritage assets, especially cropmarks. As such some intrusive archaeological fieldworks may be useful.	The Project has completed targeted trial trenching for sensitive areas, which were completed before DCO application submission. The trial trenching that has taken place to date is adequate to inform a robust assessment of baseline and likely significant effects.
Requirement (p128) states that the DBA and ES will provide an assessment of the value of the heritage assets, including descriptions of the nature of their significance. Assessment of the "value" of the heritage assets needs to be based on Historic England national criteria.	The importance of heritage assets is based on their heritage significance (referred to as 'value' in the cultural heritage assessment to avoid confusion with 'significance of effect') and is determined in line with guidance provided by Historic England in Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment (English Heritage, 2008) and GPA3 (Historic England, 2017b), which also considers the contribution that an asset's setting can make to its importance/value. This methodology is described fully in ES Appendix 6.1: Cultural Heritage Desk-Based Assessment.
The Dairy at Cobham Hall is currently subject to a planning consent for conservation and conversion to residential and works are underway.	The cultural heritage assessment has considered this property.
There is mention of the Roman Watling Street but there is a need to consider earlier and later use of this routeway along the ridge. There are indications from formal investigations at the A2 Cyclopark, that this route may be of prehistoric origins. There are also indications of this route being important, named post medieval routes, e.g. telegraph and poll route. We recommend the need for both assessment of archaeological data and documentary data to clarify the multi-period and diverse use of this ridgeline routeway. It is essential that documentary and cartographic	Kent County Council were issued a draft version of ES Appendix 6.1: Cultural Heritage Desk-based Assessment in early 2020. There is low potential for Romano-British archaeological remains associated with the route of Watling Street Roman road (1680) and associated roadside activity. Previous infrastructure construction associated with the A2 and HS1 are likely to have largely truncated any remains that were present within the area of works adjacent to the A2 and HS2, however, potential for currently unknown remains exists. Any such

Kent County Council comment	National Highways response
assessment is thorough. Early maps from the Cobham Estate must be an essential information source.	remains are likely to be of medium value and experience a moderate impact from works to widen the existing A2, the M2/A2/A122 Lower Thames Crossing junction and utilities diversions. Appropriate mitigation has been considered and is detailed in ES Chapter 6: Cultural Heritage (Application Document 6.1). Cartographic analysis of all available maps has been undertaken and is included in the cultural heritage assessment. The specialist LiDAR assessment utilised all sources of data. Early maps of the Cobham Estate have been used to establish the baseline.
It is essential that the walkover survey includes all the proposed mitigation areas as well as the main scheme. Creation of habitats and receptor site mitigation can have major implications for archaeological mitigation. As such mitigation for natural environment needs to be taken into account throughout the heritage assessment.	An archaeological walkover survey was completed for the cultural heritage assessment which included all of the Project's Order Limits as well as the surrounding 50m survey area.
It is not acceptable for the assessment of setting to simply focus on designated heritage assets. It is essential that the setting of all heritage assets is considered, especially in view of the range of heritage assets, from Gravesend Airfield to Historic England identified historic farmsteads. Assessment of the setting of historic assets may well merge with a suitable historic landscape assessment.	Both designated and non-designated heritage assets, and their settings, within the Order Limits and a 1km study area surrounding it are considered in the cultural heritage assessment.
Non-designated heritage assets within the Development Boundary: Potential mitigation south of the Thames will need to be covered by WSIs agreed with the County Archaeologist.	The Project engaged with the County Archaeologist during the pre-application stage. The emerging mitigation options were discussed with relevant stakeholders prior to the DCO application submission.
Cobham Hall registered park and garden –there needs to be consideration of impact beyond the existing northern edge of asset. It is believed Cobham Park extended north of A2 routeway and remains directly associated with the designated parkland, such as earlier park pales or access points, might require mitigation equivalent to its significance.	Consideration of the impacts beyond the northern edge of Cobham Hall Park were presented in the draft version of ES Appendix 6.1 Cultural Heritage Desk-based Assessment in early 2020.
Cobham Hall including Temple, Engine House, Aviary, The Dairy, The Mausoleum, The Mount Bowl Barrow, Romano-British villa and the 19th Century Reservoir are an extremely varied collection of heritage assets	Mitigation comprises various elements; including the ones suggested here. Mitigation has been designed to be appropriate to the impact and the asset it is potentially impacting. The emerging mitigation

Kent County Council comment	National Highways response
with different attributes and needs. Mitigation for these heritage assets should not be lumped together. Some of the historic buildings are at a distance and may just require mitigation for visual impact but the Romano British villa is very close to the scheme. There is high potential for associated archaeological remains which could be considered to be of equivalent importance. As such KCC recommends that the heritage assets within Cobham Hall are dealt with separately.	options were discussed with relevant stakeholders before DCO submission.
Church of St Mary Chalk –the assessment needs to include impact from increased noise, vibration and lighting during construction and operation. Consideration of visual screening only is not sufficient. This heritage asset is so close to major works including the tunnel entrance, there needs to be a comprehensive assessment of all possible short term and long term impacts.	Negative comments received during Statutory Consultation about the proximity of the South Portal to Chalk were considered and the South Portal location was subsequently adjusted by 350m further south. This was presented to the public and stakeholders during Supplementary Consultation. However, the impact from noise, vibration and lighting during the construction and operation of the Project on Church of St Mary, Chalk, has been assessed, please refer to ES Chapter 6: Cultural Heritage (Application Document 6.1).
Tilbury Fort, Gravesend Blockhouse New Tavern Fort - assessment of these designated assets needs to thoroughly consider their function and especially the need for their visual relationships. Sight lines are a key factor in the significance of these assets and “visual screening” is likely to be more harmful.	More information was provided in Supplementary Consultation and the expected visual effects and mitigation resulting from design changes to the Project. A Historic Landscape Characterisation (HLC) study has been undertaken and is presented in full in ES Appendix 6.1: Cultural Heritage Desk-Based Assessment. The emerging mitigation options were discussed with relevant stakeholders prior to DCO submission. Specialist military archaeology studies have been undertaken and are presented in ES Appendix 6.3: Archaeological Desk-Based Assessment of 20th Century Military Archaeology and ES Appendix 6.4: Coastal Fortifications Statements of Significance. These present an assessment of the value of the military archaeology of the study area and are focused on two key topics. Firstly, the late Medieval – Post-Medieval defences of the Thames Estuary in the study area, between Gravesend, Tilbury, Coalhouse and Cliffe Forts. Secondly, the value of the remains of the 20th century military activity within the study area, including Gravesend Airfield, the scheduled anti-aircraft battery at Bowaters Farm and two First World War landing grounds at
Coalhouse Fort Battery –again assessment needs to thoroughly consider function and especially the need for visual relationships. Sight lines are a key factor in the significance of these military assets and “visual screening” is likely to be more harmful.	
Cliffe Fort: assessment needs to thoroughly consider function and especially the need for visual relationships. Sight lines are a key factor in the significance of these military assets and “visual screening” is likely to be more harmful.	

Kent County Council comment	National Highways response
	Orsett and North Ockendon. The impact of visual screening on these forts has been assessed
St Thomas' Well –Cobham Park –conserved as part of HS1 works but may now be impacted by new scheme. Need appropriate details of mitigation for this heritage asset.	St Thomas' Well is a non-designated heritage asset and is referenced in ES Appendix 6.1: Cultural Heritage Desk-Based Assessment. Details of appropriate mitigation for cultural heritage (including for non-designated heritage assets) is provided in ES Chapter 6: Cultural Heritage (Application Document 6.1).
Chapter 7 baseline heritage assessment does not mention the Thames and Medway Canal, 20th century defensive lines or the Milton Rifle Range in sufficient detail. The immersed tunnel may well have an impact on the Thames and Medway Canal and Milton Rifle Range although the details of the impact are not clear at this stage.	All three of these receptors have been identified and assessed as part of the cultural heritage assessment. Please, refer to ES Chapter 6: Cultural Heritage (Application Document 6.1).
In addition, there is no specific mention of historic landscapes assessment for the land south of the Thames in Kent. As this scheme runs through an open landscape there could be major impacts from built development. The landscape approaching the river is rich and distinctive with multi-period sites visible or close to the surface of green fields. This could potentially be highlighted as being of high sensitivity. We recommend the guidance in DMRB Volume 11 on historic landscapes is adhered to. In particular there should be consideration of cumulative impacts and post-operational or long term impacts on this open space east of Gravesend and west of Rochester.	A Historic Landscape Characterisation (HLC) study has been undertaken and is presented in full in ES Appendix 6.1: Cultural Heritage Desk-based Assessment. As there is no single, fixed methodology for this process the assessment uses the methodologies employed for non-road schemes, such as the Hoo Peninsula Historic Landscape Project (English Heritage, 2013). The study describes: • the 'time-depth' profile of the landscape (i.e. how long it has been subject to human activity) • past landscape change and land use • the chronology and process of land enclosure • the present land use
Kent Downs Area of Outstanding Natural Beauty (AONB)	
KCC notes the concerns of the Kent Downs AONB on the impacts that would arise as a result of the scheme, including those associated with vegetation clearance, landscape severance and loss of ancient woodland. National Highways should consider an arrangement similar to what it has with National Parks England, which has seen the creation of a 'National Agreement Group', which meets every six months to consider RIS	Although an Agreement Group has not been established, the Project has been consulting with the Kent Downs AONB Unit throughout the pre-application phase and has negotiated measures of compensation for the works proposed that directly and indirectly effect the Kent Downs AONB.

Kent County Council comment	National Highways response
schemes and their potential impact on National Parks. This group helps to inform the scheme design as all schemes impacting National Parks go through a design review. This approach is intended to reduce delays and ensure that issues and concerns are considered at the earliest opportunity. A similar approach to the development of the LTC, with its impact on the AONB and other protected landscapes, could help to ensure that the scheme minimises its impact and provides suitable mitigation.	
Drainage	
Page 31 of the submitted Preliminary environmental information summary states that a Flood Risk Assessment (FRA), a hydrogeological risk assessment and water framework directive will be prepared and furthermore page 27 of the Preliminary Environmental Information Report states that an FRA will be submitted as part of the DCO submission.	These assessments have been prepared and submitted as part of the DCO application. Please refer to ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1), ES Appendix 14.5: Hydrogeological Risk Assessment, ES Appendix 14.6: Flood Risk Assessment and ES Appendix 14.7: Water Framework Directive.
KCC would expect these, particularly the FRA, to address the potential effects of the proposed development on the surface water environment (including surface water drainage, pollution prevention and flood risk).	ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1) assesses the potential effects of the proposed development on surface water environment. The strategy for managing operational surface water drainage is summarised in Part 7 of ES Appendix 14.6: Flood Risk Assessment.
Whilst KCC have no preference as to whether these are submitted as a package or are submitted as standalone documents, the County Council would encourage the National Highways to contact us at their earliest convenience to discuss the surface water management at this site and any associated implications for Kent County Council (as Lead Local Flood Authority). It must be ensured the drainage of the site is considered from the outset (at the masterplanning stage), and that sufficient room is allocated for appropriate drainage features: http://www.kent.gov.uk/__data/assets/pdf_file/0007/23578/Masterplanning-for-SuDS.pdf	A strategy for managing operational surface water drainage has been prepared centred on the application of SuDS, appropriate to local conditions. The strategy is summarised in Part 7 of ES Appendix 14.6: Flood Risk Assessment. The drainage principles have been discussed and agreed with relevant Lead Local Flood Authorities, as detailed in ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1).
KCC would also advise that that part of the site falls within the jurisdiction of the North Kent Marshes Internal Drainage Board; any works whatsoever that may have the potential to affect any adjacent watercourse (or the	North Kent Marshes Internal Drainage Board has been consulted on the proposed drainage strategy as well as the Ground Investigation work associated with the Project.

Kent County Council comment	National Highways response
network's ability to convey water) will require their formal prior written permission. They can be contacted at Medway Council 2018, Gun Wharf, Dock Road, Chatham, Kent, ME44TR.	
Design and long-term maintenance of surface and ground water drainage infra-structure should mitigate effects of diffuse pollution run-off and infiltration from hydro-carbons, road salt, heavy metals, shed or leaking hazardous cargos, firefighting foam and water and de-icing chemicals, and utilising technology such as high capacity interceptors and wet vegetated balancing ponds, basins or reed-beds (balancing pond design should be naturalistic to maximise 'edge habitat' thus optimising contact between contaminated contained water and marginal and emergent vegetation to optimise phytoremediation).	A strategy for managing operational surface water drainage has been prepared centred on the application of SuDS, appropriate to local conditions. The strategy is summarised in Part 7 of ES Appendix 14.6: Flood Risk Assessment The drainage principles have been discussed and agreed with relevant Lead Local Flood Authorities, as detailed in ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1). Groundwater modelling studies were undertaken to assess the potential for changes to groundwater levels and flows near the Thames Estuary and Marshes Ramsar and Special Protection Area, south of the River Thames and local to the North Portal, as well as local to the proposed cutting where the Project interfaces with the M25. The results of the assessment of effects on groundwater receptors is provided in ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1) and in ES Appendix 14.5: Hydrogeological Risk Assessment.
A long-term maintenance regime for all interceptors and wet vegetated balancing ponds, basins or reed-beds must be agreed and resourced to ensure optimum efficiency and preclude long-term build-up of contaminants such as hydro-carbons, heavy metals and salts, which will have the potential to pollute adjacent wetlands bearing UK and international environmental protection designations.	
All sustainable urban drainage solutions utilised should employ wet vegetated balancing ponds or swales to optimise responsiveness to intense precipitation events through minimising local surface water flooding risk and mitigate pollution ingress into groundwater (highway run-off presents a significant off-site pollution risk because of incremental loading of hydro-carbons, heavy metals and road salt contamination).	
Technology utilised in mechanical de-watering of the tunnel bores, and potentially the cutting, should be resilient and robust -with the potential for utilising any resultant water resource explored with local water companies (Kent being a water-stressed county), alternatively creation of new compensatory wetland habitat re-creation using non-potable supply should be seriously considered.	Measures to exclude groundwater ingress into excavations and cuttings to reduce dewatering volumes have been incorporated into the design of the Project. Any water resulting from dewatering would be subject to suitable treatment and would be returned to suitable receptor(s) within the local water environment, so as not to disrupt the existing water balance.

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The precise locations for the Kent portals must be sufficiently distant from the tidal flood plain of the River Thames to sustainably accommodate worst-case sea level rise resulting from a combination of glacial isostatic adjustment and the latest climate change impacts projections.	The south portal is located in Flood Zone 1 (low risk), considerably outside of the undefended floodplain. Please refer to ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1) and ES Appendix 14.6: Flood Risk Assessment for further detail.
The extent of planting and natural regeneration (which should be prioritised over planting for biosecurity and biodiversity reasons) of roadside vegetation should be of a scale that will have a meaningful, positive impact upon local air quality, which is already exceeding UK and EU limits across the study area, as well as offsetting future emissions including those caused by the construction process and the operational phase, phytoremediation of run-off, flood attenuation and water infiltration (woodland is the natural historic landcover along the route of the proposed new road and more biodiverse than prevailing more recent agricultural land uses).	Replacement planting and landscaping would comprise native and local species, to benefit biodiversity as far as possible. The extent of replacement planting is shown on ES Figure 2.4: Environmental Masterplan (Application Document 6.2). Roadside vegetation is not considered air quality mitigation. UK and EU limits are based on NO_x and PM_{10} pollutants, which the air quality assessment models, and not CO_2. Pollutants would also be able to disperse in and around vegetation.
Locally appropriate native tree and shrub planting specifications and moulding of the landform (floodplain woodland) in and around the relatively exposed proposed access roads to the tunnels should seek to naturally mitigate against severe weather risks such as high winds, intensive rain or snow fall, and high temperatures.	The extent of replacement planting is shown on ES Figure 2.4: Environmental Masterplan (Application Document 6.2).
All planting and landscaping should utilise a diverse palette of local provenance native shrub and tree species appropriate to this exposed Kent Downs AONB and estuarial location and the underlying substrates to maximise resilience of local biodiversity, and reduce bio-security risk and vulnerability to plant diseases (i.e. the route is within the current range of tree pathogens including Ash Dieback (Hymenoscyphus fraxineus) and Phytophthora ramorum, and is located adjacent to semi-natural ancient woodland), natural regeneration of vegetation, with its lower bio-security risks, is clearly favoured over introduced new planting and seeding.	Replacement planting and landscaping would comprise native and local species, to benefit biodiversity as far as possible. Biosecurity has also been considered.
The extent of woodland recreation illustrated should be significantly expanded to enable more effective mitigation of negative landscape and	The extent of replacement planting is shown on ES Figure 2.4: Environmental Masterplan (Application Document 6.2).

Kent County Council comment	National Highways response
environmental impacts arising from the scheme and to optimise environmental services delivered (n.b. wet woodland types can maximise delivery of environmental services and is appropriate to much of the proposed route).	
Noise and Vibration	
KCC welcomes the monitoring of noise on sensitive receptors during the construction process. These impacts need to be fully monitored and where noise levels exceed the agreed thresholds, suitable mitigation measures will have to be introduced to limit noise and vibration and bring them back to within acceptable levels. The location of noise monitors will be agreed through the planning process and with the Environmental Health Officers for the area.	The baseline noise monitoring locations were shared with the Environmental Health Officers at Brentwood Borough Council, Gravesham Borough Council, London Borough of Havering, Medway Council and Thurrock Council. A summary of the outcome of these communications is presented in ES Chapter 12: Noise and Vibration (Application Document 6.1).
Materials Handling	
KCC would like to see any waste materials from the construction of the Lower Thames Crossing recycled to provide noise bunding for properties close to the proposed route of the crossing or elsewhere on the Strategic Road Network. This excavated spoil can therefore act as noise restraint and reduce the impact on properties in the area.	ES Chapter 11: Material Assets and Waste (Application Document 6.1) considers the consumption of material resources and products from primary and recycled/secondary sources, and the production, treatment and offsite management of waste. The local recycled and primary mineral aggregate reserves were determined in the baseline. Materials required in significant quantities for construction of the Project include metals, aggregate, pavement, concrete and soils, among others. Most of these material resources would originate offsite, purchased as construction products. Others would arise onsite such as excavated soils/minerals (including sand and gravel) or recycled road planings. Wherever practicable and where design specification permits, key construction materials used would include a measurable recycled or secondary content.
Minerals	
There are known mineral deposits (Sub-Alluvial River Terrace Deposits and River Terrace Deposits) that are threatened with sterilisation by the proposed development. These should be identified and, in accordance	A mineral safeguarding assessment has been undertaken to determine if the route alignment would sterilise the mineral resource capacity affected by it and, if so, whether removal prior to

Kent County Council comment	National Highways response
with the NPPF's emphasis on the use of sustainable minerals (paragraph 142), prior extraction should be fully investigated for the chosen route.	development is warranted. Please refer to ES Appendix 11.2: Mineral Safeguarding Assessment.
Surface Water	
The Assessment identifies major strategic issues for surface water in relation to location of the route and potential impacts in relation to construction. The Assessment, however, does not clearly state the impacts in relation to increased surface water flow from construction of the project itself, whether in relation to water quantity or quality. It would be expected that impacts relating to construction and operation will be mitigated through compliance with regulation for surface water management. Wheel washing facilities will have to be provided, with sweepers operating in the area to make sure mud does not cause a risk to motorists.	The road drainage and water environment assessment considers potential impacts on surface water resources. A strategy for managing operational surface water drainage has been prepared centred on the application of SuDS, appropriate to local conditions. The strategy is summarised in Part 7 of ES Appendix 14.6: Flood Risk Assessment. The drainage principles have been discussed and agreed with relevant Lead Local Flood Authorities, as detailed in ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1). Please refer to ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1), ES Appendix 14.3: Operational Surface Water Drainage Pollution Risk Assessment and ES Appendix 14.6: Flood Risk Assessment.

11 Kent Downs AONB Unit

Table 11.1 Kent Downs AONB Unit Statutory Consultation

Kent Downs AONB Unit comment	National Highways response
Introduction	
Areas of Outstanding Natural Beauty are a nationally important and protected landscape that have the same status in planning terms as National Parks and represent just 18 per cent of the land area of England and Wales. National Highways, as a public body, is bound by the Duty of Regard as set out in Section 85 of the Countryside and Rights of Way Act 2000. This requires all public bodies and relevant authorities to have regard to the conservation and enhancement of AONBs in carrying out their duties. This duty of regard needs to be properly considered throughout the decision-making process. It is important to note that the 'Duty of Regard' applies not just in respect of proposals within AONBs but also to relevant authorities in exercising their functions "so as to affect" land in an Area of Outstanding Natural Beauty so is also applicable to the setting of the AONB.	The Planning Statement (Application Document 7.2) identifies how the Project complies with the respective duties in section 85 of the Countryside and Rights of Way Act 2000.
The Countryside and Rights of Way Act 2000 also sets out a requirement for a Management Plan to be prepared and published for AONBs. The Kent Downs AONB Management Plan 2014 -2019 sets out the aims, policies and actions for the conservation, enhancement and management of the AONB. Compliance with policies of the Management Plan assists in helping to demonstrate that public bodies have complied with their duty of regard.	The Kent Downs AONB Management Plan (Kent Downs Joint Advisory Committee & Kent Downs AONB Unit, 2014) has been reviewed as part of the landscape and visual assessment. • The potential effects on landscape character and visual amenity in respect of the Kent Downs AONB are considered in ES Appendix 7.9: Schedule of Landscape Effects and ES Appendix 7.10: Schedule of Visual Effects. • Potential indirect effects in the Kent Downs AONB are set out in ES Appendix 7.11: Traffic and Noise Effects on the Kent Downs AONB. • Detrimental effects on the environment, the landscape and recreational opportunities are identified in the Planning Statement (Application Document 7.2).

Kent Downs AONB Unit comment	National Highways response
	• ES Chapter 7: Landscape and Visual (Application Document 6.1) sets out the mitigation measures to minimise the landscape and visual impacts of the Project. • ES Figure 2.4: Environmental Masterplan (Application Document 6.2) identifies the embedded environmental mitigation measures for the Project. • A full extract of the published guidance is included in ES Appendix 7.6: Kent Downs AONB Relevant Guidance.
The Kent Downs AONB Unit strongly opposes the preferred route for the Lower Thames Crossing (LTC). This is because of impacts arising as a result of the new link road required to connect the crossing with the existing highways infrastructure, the requirement for works to the existing A2/M2 as it passes through the AONB and because of potential downstream impacts arising as a result of the location to the east of the existing crossing.	The justification of the preferred route is included within the Planning Statement (Application Document 7.2). The impact on the Kent Downs AONB is assessed in ES Chapter 7: Landscape and Visual (Application Document 6.1).
The proposed link road required to connect the new LTC with the existing A2/M2 would involve the construction of a dual 3 lane wide highway and a major new junction, both in the immediate setting of the Kent Downs AONB, creating a significant visual impact resulting in substantial harm to Kent Downs AONB that could not be satisfactory mitigated.	The visual impact of the Project has been assessed in ES Chapter 7: Landscape and Visual (Application Document 6.1). The design has wherever possible avoided impacts, and further reduced residual effects through the embedded mitigation measures as identified on ES Figure 2.4: Environmental Masterplan (Application Document 6.2).
It is also advised that the proposed location necessitates major widening of a 2km section of the existing A2/M2 corridor as it passes through the AONB between the new link junction and Junction 1of the M2 which would have major significant impacts on the AONB; see our detailed comments on the potential impacts of this provided in our response to Q2c.	The impacts of the Project on the Kent Downs AONB have been assessed in ES Chapter 7: Landscape and Visual (Application Document 6.1).
It is considered inevitable that the provision of a route further east that the existing one, connecting directly to the A2/M2 will result in a significant shift in traffic heading southwards into Kent, including Dover Port and Channel Tunnel traffic. This is likely to result in a significant increase in traffic using the A229 (Bluebell Hill) and choosing the M2/A2 over the M20. The A229 Bluebell Hill cuts directly through the North Downs escarpment	National Highways acknowledge the concern raised by Kent Downs AONB Unit. Plates 5.7, 5.8 and 5.9 of the Traffic Forecasts Non-Technical Summary (Application Document 7.8) present the forecast percentage change in flow as a result of the Project, and an increase is indicated along the A229.

Kent Downs AONB Unit comment	National Highways response
and with the exception of a small section at the southern end, lies within the Kent Downs AONB. The route is predominantly a dual carriageway although a proportion of the northern bound carriageway comprises three lanes. The road is already often congested and it is considered inevitable that there will be future pressure for this route to be widened in response to increased traffic flows as a result of a new crossing in this location. Upgrading of this route would have significant adverse impact on the Kent Downs AONB.	Any future development of the A229 would be subject to the requirements of the National Planning Policy Framework (Ministry of Housing, Communities and Local Government, 2019) if developed by Kent County Council, or the National Policy Statement for National Networks (Department for Transport, 2014) if developed by National Highways. Both of these policy frameworks only allow for development in exceptional circumstances and where it can be demonstrated that it is in the public interest.
The absence of improvements to the A229 Bluebell Hill is also likely to have impacts on the road links between Dover and Folkestone. There is significant risk that links either through or around Dover will be needed for vehicles for the Channel Tunnel that have taken the M2 route (and vice versa). These roads are in the AONB and are already congested.	
We are also concerned that the location of the new crossing will result in implications for the M2/A2 which forms the northern boundary of the AONB for much of its length between Rochester and Faversham and passes through a significant length of the AONB south of Canterbury. From Junction 4 of the M2 the carriageway reduces to two lanes and sections further south on the approach to Dover are only single carriageway. As such, increased use of the M2/A2 is likely to result in capacity issues, also leading to potential future pressure for works to this route as well as potential pressure for services, lorry parks etc. which could all impact on the Kent Downs AONB. A significant increase in traffic could also impact on tranquillity as this road passes through/adjacent to the AONB.	Measures have been taken to minimise damage to Kent Downs AONB where possible. Discussions with Statutory Undertakers are underway to reduce the impact wherever possible. The impact of the Project on tranquillity are assessed in ES Chapter 7: Landscape and Visual (Application Document 6.1).
The AONB Unit maintains it view that Location A would have a lesser impact on the landscape, culture, heritage, tranquillity and air quality assets of the AONB. It would also diminish potential knock on impacts elsewhere in the AONB (in particular the A229 at Bluebell Hill and at the Dover/Folkestone end) and therefore have less environmental impact.	The justification of the preferred route is included within the Planning Statement (Application Document 7.2). The impacts of the Project on landscape, culture, heritage, tranquillity and air quality assets of the Kent Downs AONB are addressed in ES Chapter 5: Air Quality, Chapter 6: Cultural Heritage and Chapter 7: Landscape and Visual (Application Document 6.1).
The Kent Downs AONB considers that too much emphasis has been placed on economic factors without due consideration of the impact on the	All decisions about the Project, such as whether it should proceed, the selection of a preferred route and design considerations, have

Kent Downs AONB Unit comment	National Highways response
environment. The economic benefits must be weighed against the loss of quality of life and wellbeing that would be caused by damage to protected landscapes, biodiversity, the historic environment, light pollution and loss of tranquillity in a landscape of national significance. It is considered that the weighting put on economic growth potential above the environment is misguided. Kent is a transport corridor into and out of the UK. It is vitally important that a high quality environment is conserved and enhanced here in order to attract and maintain economic activity and a high quality of life. The provision of a new crossing at Location C would challenge this in the long term.	taken, and will continue to take, account of a wide range of economic, social and environmental impacts. While some impacts are monetised and others are appraised qualitatively, all impacts, including environmental, inform assessments about the Project's value for money.
Accordingly, the Kent Downs AONB Unit opposes the proposal to construct a new crossing at Location C	Noted.
The Kent Downs AONB Unit strongly opposes the route changes that have been made since the preferred route announcement in 2017. The scheme has been amended substantially since the previous consultation in 2016 in respect of the proposed route south of the LTC to include a major widening of the M2/A2 corridor resulting in a 14 lane wide highway through the Kent Downs AONB along with major changes to the new junction design connecting the link road to the A2.	Noted.
The proposed changes have significant adverse implications for the Kent Downs AONB including: • The proposed widening of the A2 corridor from 8 to 14 lanes for a length of approximately 2 km as it passes through the AONB. This would result in the erosion of the landscape and visual quality of the AONB, replacing an existing 8 lane motorway whose impact is significantly moderated as a result of vegetative screening on either side and a significant tree belt between the east and west bound carriageways with a 14 lane wide highway, complete with retaining walls and embankments that would be out of scale with the existing landscape and stripped of its existing screening vegetation. • The removal of existing vegetation along the A2,including the belt of mature trees from the existing wide central reservation separating the	The Project including the broadened A2 corridor resulting in the loss of defining woodland, the new M2/A2/A122 Lower Thames Crossing junction with elevated slip roads, and additional prominent lighting, and restricted woodland replanting due to utility easements result in a series of residual significant effects to the south of the River Thames. Landscape and visual impacts of the route, including the removal of the central reservation and established mitigation for HS1 are assessed in ES Chapter 7: Landscape and Visual (Application Document 6.1). Although the Project is increasing the width of the transport corridor, in the longer-term green bridges would reduce the severance of the Kent Downs AONB by providing dedicated walker, cyclist and horse rider routes and soft landscape features providing visual screening of

Kent Downs AONB Unit comment	National Highways response
two carriageways which currently screens the east and west bound carriageways of traffic from each other, as well as loss of mature trees from both sides of the highway and removal of established vegetative mitigation for HS1, opening up views of the transport corridor and reducing the current wooded context within which it sits. • Physical and visual severance of the AONB to the north of the A2, further isolating Shorne Woods from Cobham Parklands and Ashenbank Wood to the south. • Significant detrimental impacts for recreational users of the AONB, including walkers, riders and cyclists crossing the newly widened transport corridor. • Potential direct loss of ancient woodland, along with loss of habitat from the woodland within Shorne and Ashenbank Woods SSSIs. • Reduction in tranquillity during construction and following completion of the scheme from both noise and increased lighting. • Increased visual intrusion on the setting of the AONB as a result of the increase in width of the link route between the A2 and southern portal to dual 3 lanes. • Increased visual intrusion on the setting of the AONB as a result of the changes to the design of the new junction with the A2 (see our more detailed comments in response to Question 4).	the corridor with improved ecological connectivity. The Design Principles (Application Document 7.5) provide that all severed walker, cyclist and horse rider routes would be relinked across the Project unless better quality routes can be provided nearby, the route can be rationalised to better link communities with the places they want to go, or realigned routes provide better connectivity into the existing walker, cyclist and horse rider network. The Project is working with Statutory Undertakers to reduce encroachment into ancient woodland wherever possible. Significant improvements have been made since the Statutory Consultation in 2018. Ancient woodland compensation planting has been proposed as part of the mitigation strategy and support improved habitat connectivity within the wider landscape.
It is advised in Chapter 3 of the PEIR that the impact of the amended Western Southern Link has been assessed against the previously proposed Eastern Southern Link and it is concluded that the proposed route would still have less impact, despite increasing intrusion into the AONB and its the setting and now resulting in increased impacts on both Ancient Woodland and SSSIs, to a similar level as predicted for the Eastern Southern Link. This is justified on the basis that the Project would be widening an existing corridor, whereas the Eastern Southern Link would require the creation of a new corridor and would extend the impacts to encroach on a wider area of the AONB and its setting.	Noted.

Kent Downs AONB Unit comment	National Highways response
The AONB Unit nevertheless has concerns that the comparison of the environmental impacts of the amended route design against the Eastern Southern Link. The Post Consultation Scheme Assessment Report (Highways England 2017) does not appear to consider the proposed amendment comprising the widening of the existing A2 corridor. We also consider the justification that the impacts of the ESL would be greater due to encroachment on a wider area of the AONB and its setting to be questionable given the significant harm resulting from the proposed route change arising in the AONB due to the substantial widening of the transport corridor, associated vegetation loss and limited opportunities for mitigation. We are also concerned that the selection of the Western Southern Link as the preferred route followed a consultation exercise (in 2016) that was not based on the current, more impactful proposal.	This is assessed within the Planning Statement (Application Document 7.2) as it is a National Policy Statement for National Networks (NSPNN) test (Department for Transport, 2014).
The AONB Unit considers the proposed changes to be wholly in conflict with the NPSNN which states at paragraphs 5.151 to 5.155 that there is a strong presumption against any significant road widening or building of new roads in an AONB, unless it can be shown that there are compelling reasons for the new or enhanced capacity and any benefits must significantly outweigh the costs. We do not consider that such a case has been made, with the project response to this as set out at Table 8.2 in Chapter 8 of the PEIR to be wholly inadequate. This will need to be adequately addressed in any DCO application.	The justification of the preferred route is included within the Planning Statement (Application Document 7.2). There are compelling reasons for the Project, which are set out in the Need for the Project (Application Document 7.1). ES Appendix 7.14: Landscape and Visual Legislation and Policy sets out NPSNN paragraphs 5.151 to 5.155 (Department for Transport, 2014) with the Applicant's response.
The impacts of the route south of the Thames on the AONB are recognised in Chapter 8 of the PEIR with a predicted impact of Major negative change on the Kent Downs AONB landscape both during construction and subsequent operation and Major to Moderate negative operational visual impacts. The AONB Unit agrees that the route south of the river would have significant adverse impacts on the AONB as a result of development both in the designated landscape and within its setting.	Following statutory consultation, the M2/A2/A122 Lower Thames Crossing junction was redesigned, resulting in an improved layout and reduced footprint, and a reduced impact on the Kent Downs AONB. The section of the A2/M2 that would be enhanced as part of the Project proposals has been narrowed to reduce the impact on the Kent Downs AONB. The additional lanes required on the A2 would be provided within the existing highway boundary where possible.
Our comments on potential impacts of the route south of the Thames on the AONB in respect of the design changes to the existing A2 and revised	Impacts on the setting of the Kent Downs AONB are detailed in ES Chapter 7: Landscape and Visual (Application Document 6.1).

Kent Downs AONB Unit comment	National Highways response
junction design are provided in our response to Questions 2 and 4. We are also concerned about the following impacts on the setting of the AONB.	
The local character of the area is one of small ancient settlements in a wooded landscape, including the villages of Thong, Shorne and Cobham. There are a number of ancient woodlands within the locality as well as the Cobham Hall Registered Park and Garden comprising 18th Century parkland, estate woodlands and a golf course. Despite the presence of the A2/M2and HS1, the transport corridor is not readily visible in the wider landscape because of topography, the wooded nature of the area and established mitigation planting associated with the HS1 railway, although its presence is known by its noise and the A2/M2/A289 junction with its associated flyovers is more prominent.	Noted.
The new link road and junction would be apparent from the AONB, including from viewpoints in Shorne Woods and Ashenbank Woods as well as from Thong Lane which forms the eastern boundary of the AONB and Shorne Ifield Road which forms the northern most boundary of the AONB. This road follows high ground for much of its length, providing panoramic views of the lowlands towards the Medway which would enable extensive views of the link road towards the southern portal. The highway infrastructure required for the link connecting the A2 with the LTC involving a new six lane carriage way and the major new multi-level junction would fundamentally change the landscape resulting in a loss of existing rural character to the detriment of the local environment and setting of the AONB.	Impacts on the landscape character of the Kent Downs AONB are detailed in ES Chapter 7: Landscape and Visual (Application Document 6.1). Viewpoints and photomontage locations have been agreed with Kent Downs AONB Unit and Natural England.
The proposal would also be detrimental as a result of increased traffic movements, lighting, noise, further removal of vegetation between HS1 and the A2 and a block of woodland to the immediate west of the AONB, severance of habitat and loss of biodiversity; the surrounding woodland that is such a feature of the local landscape, is particularly susceptible to and could be affected by changes in the nitrogen deposition as a result of changing traffic flows. It would be difficult to satisfactorily mitigate the impact of the new highway infrastructure given that the land affected	Impacts on the landscape character and setting of the Kent Downs AONB are detailed in ES Chapter 7: Landscape and Visual (Application Document 6.1). The effect of nitrogen deposition changes from the Project on woodlands has been fully assessed, using DMRB standards' methodologies, in ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1) and the Habitats Regulations Assessment (HRA) (Application Document 6.5). It is concluded there would be no

Kent Downs AONB Unit comment	National Highways response
comprises mainly large open arable fields and a golf course that is of a relatively flat profile. The proposed construction compound to the immediate west of the AONB boundary would also have detrimental impacts.	residual significant effects on European designated sites with woodland qualifying features in the HRA.
The AONB Unit is concerned that the redesigned junction with the A2 will have a more harmful impact on the landscape than the previously proposed scheme. The new design has come about as a result of a desire to enable a continuous motorway to motorway connection with the associated maintenance of a 70-mph speed limit. In doing so, the design of the junction has been amended from a compact junction to now incorporating some 7 new bridges to facilitate access and egress to either the new LTC or access to local roads. This will result in a highly complicated, multi-level junction immediately adjacent to the boundary of the AONB. The landscape here is currently open and flat and we are concerned	The proposed M2/A2/A122 Lower Thames Crossing junction would result in a series of residual significant effects to the south of the River Thames. The justification of the preferred route is included within the Planning Statement (Application Document 7.2).
The AONB Unit supports the proposals to reinstate any Public Rights of Way affected by the proposal. It will be important to ensure that any diversions of routes does not degrade the experience of users and that connectivity of the PRoW network is not compromised. The proposal offers a unique opportunity to provide improvement to the existing Rights of Way network and reduce the need to travel by car in the locality through the provision of a multi-user route that links the existing Green Infrastructure in the locality (Jeskyns Country Park, Cobham Park, Ashenbank Wood and Shorne Woods Country Park) and provides an off road route to these facilities from Gravesend town centre.	All severed walker, cyclists and horse rider routes would be relinked across the Project unless better quality routes can be provided nearby, the route can be rationalised to better link communities with the places they want to go, or realigned routes provide better connectivity into the existing walker, cyclists and horse rider network. Consideration has been given to the experience of users and maintaining connectivity with the creation of pleasant routes between Shorne Country Park, Ashenbank Wood and Jeskyns Community Woodland linked with existing routes from Gravesend. Public Rights of Way NS167 and NS169 would be integrated into a new circular walker, cyclists and horse rider route connecting around the M2/A2/A122 Lower Thames Crossing junction. Between Claylane Wood and Shorne Woods Country Park, this would be via the new green bridge at Thong Lane.
Paragraph 14.4.90 of the PEIR makes reference to National Trails, however the North Downs Way national trail is not mentioned. While this route is not directly affected by the LTC proposals, this route passes close	The functionality and connectivity of Green Infrastructure is set out within the Project Design Report (Application Document 7.4), and Design Principles (Application Document 7.5).

Kent Downs AONB Unit comment	National Highways response
to and over the M2 and A2 at various points downstream of the project, including immediately south of Junction 2 of the M2 where the Trail crosses the Medway Bridge immediately adjacent to the motorway. The LTC will result in a modal shift in transport choices with additional traffic using the M2/A2 rather than the M20, resulting in an increased use of the M2/A2 which will impact on the experience of users of the North Downs Way. One way of helping compensate for this would be an enhancement to the North Downs Way further downstream on the A2 near Guston. The situation here is such that walkers need to make a 1.4km diversion beside the A2 to cross it due to previous highway works. In order to improve this situation, we consider a footbridge or underpass should be provided.	ES Figure 2.4: Environmental Masterplan (Application Document 6.2) identifies the embedded environmental mitigation measures for the Project including walker, cyclists and horse rider routes and areas of open space.
While we note that The Countryside & Rights of Way Act 2000 is referred to in Table 8.2 –'NPSNN requirements and Project response', the AONB Unit considers that the Countryside & Rights of Way Act 2000 should be included in Table 8.1 –Summary of Legislative requirements, as this Act is the primary legislation relating to AONBs. This is particularly important in view of the Duty of Regard set out at Section 85 of the Act, which requires that in exercising any functions in relation to land in an AONB, or so as to affect land in an AONB, relevant authorities, which includes National Highways, shall have regard to the purpose of conserving and enhancing the natural beauty of the AONB. This is known as the 'Duty of Regard'. The Duty of Regard can be demonstrated by testing proposals against the policies set out in the Kent Downs AONB Management Plan and its supporting guidance.	The Planning Statement (Application Document 7.2) identifies how the Project complies with the respective duties in section 85 of the Countryside and Rights of Way Act 2000. This act is also referenced in ES Appendix 7.14: Landscape and Visual Legislation and Policy. The policies of the Kent Downs AONB Unit have been reviewed as part of ES Chapter 7: Landscape and Visual (Application Document 6.1).
Table 8.2 sets out the NPSNN requirements and Project response. In respect of the project response to paragraphs 5.151 to 5.155 of the NPSNN, which advises that "there is a strong presumption against any significant road widening or building of new roads in an AONB unless it can be shown that there are compelling reasons for the new or enhanced capacity and with any benefits significantly outweighing the costs" the Project response is considered wholly inadequate.	The Planning Statement (Application Document 7.2) identifies how the Project complies with section 85 of the Countryside and Rights of Way Act 2000 and paragraphs 5.151 to 5.155 of the NPSNN (Department for Transport, 2014).

Kent Downs AONB Unit comment	National Highways response
Reference to the 2012 NPPF requirements, asset out at Table 8.3, needs to be updated to the revised 2018 NPPF. This should include reference to the newly inserted and twice repeated instruction for AONBs to be enhanced as well as conserved, bringing the policy requirement in line with the legislative requirement set out in the Countryside & Rights of Way Act 2000 and the new requirement for any development within AONBs to be "limited in scale and extent".	Noted.
The AONB Unit welcomes the inclusion of reference to the Kent Downs AONB Management Plan in Table 8.3. We consider however that reference to specific policies should be included here. The Setting Position Statement is no longer in draft form, having been adopted earlier this year.	Noted. The policies of the Kent Downs AONB Unit have been reviewed as part of ES Chapter 7: Landscape and Visual (Application Document 6.1). Reference to the Setting Position Statement is also made in ES Chapter 7: Landscape and Visual (Application Document 6.1).
No reference is made to ash dieback in Chapter 8 of the PEIR. As part of the 'Further baseline information' set out at 8.5, we consider that work should be carried out to assess the likely implications of ash dieback, which it is predicted will affect over 90% ash trees in Kent. This is considered particularly important in view of the strong prevalence of ash trees in the vicinity of the site and the potential opening up of views.	Following the submission of the PEIR and recommendation by the Kent Downs AONB Unit, further analysis has been undertaken with regard to the prevalence of Ash trees within the AONB near the Project to inform the likely implications of Ash dieback. This analysis has had regard to the findings of the National NVC Study and Arboricultural Survey. The NVC Study is presented in ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1), and the Arboricultural Impact Assessment in ES Appendix 7.12. The effects of ash dieback in the landscape and the scale of loss are unknown and unquantifiable, however the National Vegetation Classification (NVC) surveys undertaken as part of the Project conclude that Ash is common, but not prevalent within the immediate vicinity of the Project. Therefore, whilst likely to be perceptible overall and more noticeable within certain locations it is not considered that this would affect the overall wooded nature and characteristics of the Kent Downs AONB in the immediate vicinity of the Project and the overall composition of the woodland groups and its screening/containing benefit would be retained.
The AONB Unit welcomes the commitment to continue engagement with the local authorities and AONB Unit in respect of agreeing key receptor	The representative viewpoints and photomontage locations have been agreed with Kent Downs AONB Unit and Natural England.

Kent Downs AONB Unit comment	National Highways response
viewpoints as set out at paragraph 8.5. Engagement should include Natural England as the Government's adviser on the natural environment, including landscape. We are concerned that the number of viewpoints included in the PEIR is insufficient to fully assess visual impacts on the AONB, for example none of the viewpoints extend further east than Park Pale and there should be an additional View Point at location 5 facing east as well as west.	Please refer to ES Appendix 7.7: Representative Viewpoint and Visual Receptor Baseline Descriptions & Visual Sensitivity.
It will also be essential that the cumulative visual impacts of the widened A2 corridor are considered in combination with HS1, particularly in view of the proposed removal of vegetation adjacent to the HS1 route.	HS1 is considered as part of the baseline, and the visual assessment within ES Chapter 7: Landscape and Visual (Application Document 6.1) which considers the increased visibility of this asset.
The proposed inclusion of night-time effects and tranquillity studies is welcomed. While we note that noise impacts are dealt with separately in the PEIR, it will be important that the effects of noise on the area are considered alongside visual and landscape impacts. It is very disappointing that it appears that no noise receptors are proposed within the AONB given the potential impacts on tranquillity on locations such as Shorne Woods Country Park and Ashenbank Woods.	The landscape and visual assessment considered impacts on perceived tranquillity and a series of baseline landscape noise surveys have been undertaken at key locations where the defining characteristics include a perceived level of tranquillity. These locations and survey durations were discussed with stakeholders and include locations within the Kent Downs AONB and within its setting. Locations are identified on ES Figure 7.6: Landscape Tranquillity Baseline Noise Survey Locations (Application Document 6.2) and baseline noise survey results summarised in ES Appendix 7.5. There would be localised impacts on tranquillity during construction and following completion. An acoustic barrier would be installed along Park Pale and adjacent to Shorne Woods to minimise impacts.
To enable the visual impacts of the scheme to be properly understood, the AONB Unit considers the inclusion of photomontages in the LVIA to be essential.	Photomontages have been included in the landscape and visual assessment, please refer to ES Figure 7.19: Photomontages – Winter Year 1 and Summer Year 15 (Application Document 6.2). Locations of photomontages have been consulted on with Kent Downs AONB Unit and Natural England.
Mitigation	
Tables 8.14 and 8.15 describe the landscape and visual operational effects for land south of the Thames and both acknowledge that the scheme has the potential for Significant adverse effects on the AONB. We note that the	Measures have been taken to minimise damage to Kent Downs AONB where possible. Mitigation and residual significant effects are

Kent Downs AONB Unit comment	National Highways response
scope for mitigation in the A2/HS1 corridor through the AONB is constrained because of the limited width of the highway boundary and constraints of the HS1 line to the south and woodland to the north, some of which is designated Ancient Woodland and SSSI. However, we consider the proposed mitigation south of the Thames to be wholly inadequate in view of the scale of impact and significant residual harm that would result to the AONB.	reported within ES Chapter 7: Landscape and Visual (Application Document 6.1).
It will be essential for significant investment to be put into exceptional mitigation to minimise impacts as far as possible. This is in accordance with policy SD12 of the AONB Management Plan which requires that essential transport schemes are to be mitigated by sympathetic landscape and design measures. This would also respond with paragraph 6.2.4 of the 'Approach to Design, Construction and Operation' Report where it states that that the design of the Project will be influenced by five overarching considerations, including environmental constraints such as the AONB designation and that impacts will be minimised and/or mitigated wherever practicable and that the scheme seeks to deliver a positive legacy for local communities and the environment.	Measures have been taken to minimise damage to Kent Downs AONB where possible. Mitigation measures and residual significant effects are reported within ES Chapter 7: Landscape and Visual (Application Document 6.1).
We consider it essential that a strategic landscape scale approach to mitigation is adopted, which addresses all matters affecting the special qualities and characteristics of the AONB and its setting, not just the immediate landscape and visual impacts, such as the severance of the AONB and Public Rights of Way north and south of the widened transport corridor, the setting of cultural heritage assets, new green infrastructure provision, improving access routes for non-motorised users including connecting existing green infrastructure assets and improving biodiversity connectivity.	ES Chapter 7: Landscape and Visual (Application Document 6.1) considers well designed, practical and achievable mitigation measures to minimise the impacts of the Project on the character, visual amenity and tranquillity of the Kent Downs AONB. ES Figure 2.4: Environmental Masterplan (Application Document 6.2) has been prepared to identify the environmental mitigation measures.
In respect of the mitigation measures proposed, we have the following comments:	Noted.

Kent Downs AONB Unit comment	National Highways response
Green Bridges	
The AONB Unit welcomes the incorporation of green bridges into the scheme. It will be essential however that they are designed and of a scale to have a landscape benefit in providing a continuation of the landscape on either side of the transport corridor as well as functioning as a wildlife corridor and crossing point.	Discussions underway on green bridge designs including at a meeting held on 17 June 2020 with Kent Downs AONB Unit and Natural England. Green bridge designs are detailed in the Design Principles (Assessment Document 7.5).
Best practice on Green Bridge Design has been published by both Natural England and the Landscape Institute: https://www.landscapeinstitute.org/wp-content/uploads/2018/01/tgn-09-2015-green-bridges.pdf http://publications.naturalengland.org.uk/publication/6312886965108736	Noted.
Environmental barriers	
Very limited details are provided at this stage on the proposed environmental barrier; however, it is described as a 'combination of free standing wall, retaining wall, geotechnical wall or earth bund depending on the available land within the existing highway estate.'	Discussions on environmental barrier design have taken place including at a meeting held on 17 June 2020 with Kent Downs AONB Unit and Natural England. The locations of barriers were also shared during the Design Refinement consultation in July 2020.
Until further details of the design are provided we reserve comment on this aspect of proposed mitigation, a response to the restricted land availability through the A2 corridor. We have some reservations that this may not be an appropriate response to the sensitive setting, being wholly contrary to paragraph 6.2.2 of the Approach to Design, Construction and Operation Report which states "Enabling road users to experience this range of landscapes will enhance their journey. Our design response to these landscapes will seek to enhance the different landscape character of these areas and enable users of the Project to experience them."	Engagement with Kent Downs AONB Unit has been ongoing since Statutory Consultation and further information on the design has been shared.
Landscape led approach to design of highway infiltration ponds	
At present, the waterbodies at either end of the A2 appear very regular in form; we support a more landscape led approach to their design so they appear more naturalistic features.	The attenuation ponds at either end of the A2 would be woodland planted and would be appropriately designed within islands to allow planting and landscape integration. Ancillary elements such as fencing and hard surfaced access roads shall be minimised to avoid

Kent Downs AONB Unit comment	National Highways response
	urbanisation. Balancing ponds shall be designed to appear as naturalistic elements within the wider setting that respond to existing topography. Please refer to the Design Principles (Application Document 7.5).
Landscape Planting Strategy:	
We welcome proposals to design the landscaping strategy to reflect the characteristics of the local area. It should, where possible, link with existing vegetation and reflect local subtleties. Indigenous stock as well as species should be used. Landscaping should also incorporate appropriate planting of verges according to location, for example chalk grassland verges and woodland verges.	Replacement planting and landscaping would comprise native and local species, to benefit biodiversity as far as possible. The extent of replacement planting is shown on ES Figure 2.4: Environmental Masterplan (Application Document 6.2).
We note that small section of the central reservation between the east and west bound carriageways of the A2 is proposed to be retained. It would be beneficial for this to retain a treed character.	The existing central reservation between the east and west bound carriageways of the A2 has been removed to prevent encroachment of the carriageway into ancient woodland.
In addition to the mitigation measures currently proposed in the PEIR and Environmental Master Plan, consideration should be given to:	Advanced woodland planting would be undertaken wherever practicable – this would largely be restricted to areas that are set back from the main route alignment and which are not affected by any enabling or main works construction areas, haul routes, utilities diversions or permanent works (examples of this would be some of the areas of proposed woodland planting between Brewers and Great Crabbles Wood, woodland planting adjacent to Jeskyns Wood and new areas of woodland associated with the M25 J29 ancient woodlands).
• assessing scope for mitigation further afield including exploring what off site works can be provided to help mitigate visual effects.	
• establishing opportunities for advance planting.	
• Opportunities for community mitigation should also be explored. As well as impacting on the landscape and environment, the widened transport corridor would break up the cohesion of communities on either side of the road.	Design principles include that all severed walker, cyclists and horse rider routes would be relinked across the Project unless better quality routes can be provided nearby, the route can be rationalised to better link communities with the places they want to go, or realigned routes provide better connectivity into the existing walker, cyclists and horse rider network. Consideration has been given to the experience of
• Enhancement to the Public Rights of Way network –see our comments in response to Question 5.	

Kent Downs AONB Unit comment	National Highways response
• Investment in the existing recreational sites in the vicinity of the site – Shorne Woods Country Park, Ashenbanks Wood, Cobham Park and Jeskyns.	users and maintaining connectivity with the creation of pleasant routes between Shorne Country Park, Ashenbank Wood and Jeskyns Community Woodland linked with existing routes from Gravesend. PRoWs NS167 and NS169 would be integrated into a new circular walker, cyclist and horse rider route connecting around the M2/A2/A122 Lower Thames Crossing junction. Between Claylane Wood and Shorne Woods Country Park, this would be via the new green bridge at Thong Lane.
• An amended design and reduction in scale of proposal, in particular in respect of the new A2 link junction and the widening of the A2 transport corridor with parallel link roads. This would be in accordance with guidance in the NPSNN (Sections 5.159-5.161) which advises that a reduction in scale of the proposals or otherwise amending the design may help to mitigate the visual and landscape effects of the proposal.	At the point of statutory consultation, the Project required a greater amount of land to be taken on either side of the existing road. Where possible, the width of lane four on both M2 carriageways was reduced, as well as the central reservation, to minimise the footprint of the road through the Kent Downs AONB. The hard shoulder was also removed from design at the eastbound link road along the A2.
• Flexibility in the highway design; full trunk road standards guidance should be relaxed to allow for a more sensitive design to respond to the protected landscape. We would wish to see the following incorporated: – Where fencing is required, use of traditional cleft post and rail fencing – Minimise the amount of signage and road markings on any routes. – Minimise metal crash barriers and look at alternative designs where required –tensioned steel cables/ natural stone products such as flint and ragstone. – Kerbs to be kept to a minimum, rumble strips or cats eyes to be used instead. Where kerbs considered essential these should be used flush to the ground. – Verges to be integrated with agricultural land and variations in widths of verges used. – The use of gantries and lighting to be limited and located to minimise visual impact and be of a design that minimises light pollution. We	The Project has been designed in accordance with a set of design principles which are described in Design Principles (Application Document 7.5).

Kent Downs AONB Unit comment	National Highways response
are concerned at the indicated number of lights proposed in the A2 corridor.	
Compensation	
In addition to mitigation, and in view of the substantial harm arising from the proposal, compensation should be provided. Compensation would not offset harm to the AONB; damage to the AONB and its setting cannot be substituted by other means. However, if the decision is taken to proceed with the LTC in this location, such an approach would be consistent with the Kent Downs AONB Management Plan Policy SD12. This requires essential transport and infrastructure schemes to, amongst other things, provide environmental compensation by benefits to natural beauty elsewhere in the AONB. The level of compensation should be commensurate with the significant level of harm. Compensation provided by National Grid in respect of the installation of a gas pipe through a 41 km length in the Cotswold AONB exceeded £1m, which represented approximately 1% of the cost of construction. This contributed towards wider mitigation measures in the AONB including dry stone walling grants and funding for community and climate change projects. The impact of this scheme was a temporary one due to the undergrounding of the pipe. Given the permanent harm that would result in the Kent Downs AONB as a result of the proposed highways infrastructure, a commensurate amount of compensation.	The potential for a Kent Downs AONB compensation fund was discussed at a meeting with Kent Downs AONB Unit and Natural England on 17 June 2020 and a follow-up meeting will be arranged.
A good example of a similar local initiative is the Cobham Ashenbank Management Scheme. This was established as part of a compensation package following the HS1 scheme due to the impact on the historic park. An initial monetary injection of £750,000 created a series of projects which delivered over £7m worth of work in the local and wider area.	Noted.
It is advised at 2.16.1 of the PEIR that the permanent land take will be 'for the road and tunnel along with other operational infrastructure, land for utility diversions and land for environmental mitigation and flood compensation'. As explained in our response to Question 6, the AONB Unit is of the view that the mitigation proposals put forward are wholly	Environmental impacts and mitigation have been discussed with Kent Downs AONB Unit at meetings and workshops.

Kent Downs AONB Unit comment	National Highways response
inadequate and that further opportunities for mitigating the scheme, including at a landscape scale, need to be put forward. If mitigation proposals need to be included within the red line application site area, this will clearly have implications for the land take area.	Measures have been taken to minimise damage to Kent Downs AONB where possible. Mitigation measures and residual significant effects are reported within the landscape and visual assessment.
Figure 16.1 of the Approach to Design, Construction and Operation seems to indicate that there will be a construction compound on land immediately west of Thong Lane, north of the A2. The plan however is diagrammatic and it is not possible to tell the exact location; we are concerned that further details of this are not provided within the more detailed information regarding the location of compounds at Figures 2.2a, b and c in Volume 3 of the PEIR. This area lies immediately adjacent to the boundary of the AONB and therefore has the potential to have significant detrimental impacts; we query whether this could be located elsewhere so as to reduce the additional impacts that would occur as a result of locating the construction compound so close to the AONB boundary.	This comment refers to the A2 compound. Engagement with Kent Downs AONB Unit has been ongoing and further consultation on construction compounds has taken place since Statutory Consultation. Construction compounds would be located to reflect the construction requirements of the Project, with the aim to avoid environmental constraints where possible and provide access for personnel and material deliveries in relation to major structures/worksites. The construction compound locations are shown on ES Figure 2.5: Construction Information (Application Document 6.2) and described in ES Appendix 2.1: Construction Supporting Information. The A2 compound has been located to support the A2/M2 connection area. Construction compounds have been assessed and a series of good practice and essential mitigation on the design of the construction compounds has been included in ES Chapter 7: Landscape and Visual (Application Document 6.1) and in the REAC, which can be found in the CoCP (ES Appendix 2.2). The A2 compound has been carefully sited, requiring a balance between proximity to and clearance of the main works and utility diversions, as well as minimising environmental impact on the Kent Downs AONB as far as reasonably practicable.
In addition, we note that the South Portal compound and another Highways compound are located close to the AONB boundary and as a result of the higher topography associated with the AONB will be particularly prominent in the landscape. Every effort to reduce the visual and noise impacts of the compound, including the effects of any lighting, on the AONB need to made, notwithstanding the temporary nature of the facilities.	

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Table 12.1 London Borough of Havering Statutory Consultation

London Borough of Havering comment	National Highways response
Noise	
The Council supports the methodology proposed for the noise and vibration assessments as detailed in the Preliminary Environmental Information Report ("PEIR").	Noted.
The Council considers it appropriate to work closely with HE and their agents/consultants with any further baseline monitoring proposed for the Scheme both in terms of the existing monitoring sites and additional monitoring sites.	National Highways shared the proposed locations of the baseline noise surveys with London Borough of Havering in February 2018. London Borough of Havering responded in April 2018 confirming the monitoring locations and methodology were reasonable. More information on baseline, scope and assessment methodology were included in the Technical Note for Statement of Common Ground, a document prepared by the Application and sent to host local authorities in January 2020.
The PEIR identifies options for the mitigation of noise for both the construction and operational phases of the Scheme. The Council will look to work closely with HE to ensure that the options incorporated into the Scheme fully protect the residents/sensitive receptors in the borough for both the construction and operational phases of LTC and the wider Scheme.	Both construction and operational noise mitigation were shared with stakeholders during workshops in June 2020.
Appendix 3: Noise & Vibration	
The Council has concerns that the 3dB criteria used as the threshold for the impact being perceptible for long term scenario, is too high. This conflicts with the criteria for the Noise Insulation Regulations which are aligned with the short-term criteria being used for this scheme.	The assessment methodology is prescribed in DMRB LA 111 (Highways England, 2020f) the 3dB criteria has been used for the 'do minimum' and 'do something' scenarios in the long term. The Environmental Noise (England) Regulations 2006 (as amended 2008, 2009) have been referred to in the noise and vibration assessment and a Noise Insulation Regulations (NIR) assessment has been undertaken using the predicted noise levels obtained from the operational noise

London Borough of Havering comment	National Highways response
	assessment which is presented in ES Appendix 12.7: Noise Insulation Regulations Assessment.
Lighting	
It is noted within the PEIR that the lighting design is at an early stage of development and that the extent of new lighting is yet to be confirmed. It is welcomed that all highway lighting will be in accordance with the appropriate lighting standards and guidance and that the intention is for energy efficient lighting to be used throughout the Scheme.	The lighting design has been assessed as part of ES Chapter 7: Landscape and Visual (Application Document 6.1). The landscape and visual assessment considers the Institution of Lighting Professionals' (2020) Guidance Note 01/20 – The Reduction of Obtrusive Light with respect to light pollution effects and impacts on landscape character and visual amenity. To inform the night-time environments baseline condition, the current environmental lighting zones covering the Lower Thames Crossing route, the order limits and the full study area have been identified (ES Appendix 7.5: Local Landscape Character Baseline). This has been prepared with reference to the Institution of Lighting Professionals' (2020) Guidance Note 01/20 – The Reduction of Obtrusive Light and used as the basis to inform qualitative judgements on the changes in the night-time environment, both on landscape character and visual amenity. Embedded mitigation has been included in the design, to minimise light spill. Please refer to ES Chapter 7: Landscape and Visual (Application Document 6.1), the REAC which can be found in the CoCP (ES Appendix 2.2), and the Design Principles (Application Document 7.5).
The Council must have sufficient time to review the final design for the proposed new footbridge between Dennises Road in Thurrock and Public Footbath 252 in Havering with appropriate illumination/ lighting prior to submission of the DCO.	
It is considered essential that the layout and appearance of night time lighting at the construction compound in North Ockendon is agreed with the Council prior to installation. The construction compound is in close proximity to the North Ockendon Conservation Area and to residential properties in North Ockendon such as Church Lane and the B186 North Road. The Council considers it important that light pollution is minimised and HE implements any necessary mitigation measures.	
The Council welcome discussion at a future technical meeting with HE once lighting plans for the construction period and lighting plans for the completed Scheme have been further developed.	
Air Quality	
The Council has an adopted Air Quality Acton Plan ("AQAP"). The AQAP identifies the key transport routes of the M25, A13, and A127 as major sources of motor vehicle tailpipe emissions which are the main source of pollution in the borough.	Noted.
The AQAP identifies major trunk roads in the borough as having some of the highest annual mean levels for nitrogen dioxide and particulate matter in the borough. The major trunk roads in the borough are the	Noted.

London Borough of Havering comment	National Highways response
responsibility of TfL. If additional traffic is forecast to use the boroughs strategic roads, in particular the A127 and Gallows Corner junction, the average annual mean levels for NO2 and PM10 are considered highly likely to deteriorate.	
The Council expects HE to engage with TfL and the Council to agree suitable mitigation measures to reduce the impact of the Scheme on local air quality.	Engagement with London Borough of Havering and Transport for London has been ongoing throughout the pre-application phase. Each ES topic chapter contains a summary of stakeholder consultation and engagement relevant to that chapter.
The Council agrees in principle with the methodology set out in Section 6.3 of the PEIR.	Noted.
The Council notes that the air quality impacts of the pre-construction and construction phase of the Scheme have not been assessed in the PEIR.	The construction phase (including the pre-construction and enabling works phase) has been fully assessed in ES Chapter 5: Air Quality (Application Document 6.1).
The Council must have sufficient time to input into a full detailed assessment that will be undertaken before submission of the DCO application. It is noted that the results, mitigation measures, including the mechanism to secure mitigation, will be fully detailed in HE's Environmental Statement.	London Borough of Havering has been consulted throughout the pre-application phase. There have been environmental impacts, mitigation and significant effects workshops in April and June 2020 which covered the outcomes of the assessments to date and emerging air quality mitigation. In September 2020, a meeting was held with all the Environmental Health Officers of the host local authorities to discuss the air quality assessment outcome in more technical detail.
The Council considers it appropriate to locate sensitive receptors within 200m of the development boundary, A127 and Front Lane, to the south west of junction 29 of the M25 motorway.	The affected road network (ARN) is the air quality construction assessment study area which is based on roads that met the criteria within DMRB LA 105 (Highways England, 2019a). The ARN includes a section of the A127, Front Lane and B187 St Marys Lane. Waycross Road and Roseberry Gardens are not included in the ARN and have therefore not been considered in the assessment since impacts there would be negligible. Impacts have been predicted at worst-case receptors along the ARN, and neither Engayne Primary School nor James Oglethorpe School are considered to be worst-case
The Council considers it appropriate that HE should consider including sensitive receptors along the following roads: • Front Lane • Roseberry Gardens • Waycross Road	

London Borough of Havering comment	National Highways response
The Council considers it appropriate for Engayne Primary School and James Oglethorpe school, to be added to the location of sensitive receptors within the impact assessment.	receptors, since there are receptors far closer to ARN roads which would experience greater impacts. These receptors have therefore not been included in the assessment.
HE must engage with the Councils Public Protection Department regarding the selection of sensitive receptors and model verification prior to submission of the DCO application.	National Highways engaged with London Borough of Havering about the air quality assessment methodology in July 2017 and November 2017. More information on baseline, scope and assessment methodology were included in the Technical Note for Statement of Common Ground which was sent to all host local authorities in January 2020. Assessment outcomes and emerging mitigation were presented to local authorities in workshops in April and June 2020. In September 2020, a meeting was held with all the Environmental Health Officers of the host local authorities to discuss the air quality assessment outcome in more technical detail.
Geology and Soils	
The development area for the Scheme is in the proximity to three historical landfill sites in Havering: • Groves Farm • Hall Farm and • Land adjoining Chapmans Farm	These historical landfills have been taken into account in ES Chapter 10: Geology and Soils (Application Document 6.1).
The Council agrees, in principle, with the mitigation measures outlined in Section 11.6 of the PEIR to minimise the risks to human health and the environment posed by land contamination, during the construction and operation phases of the Scheme.	Noted.
The Council look forward to early engagement by HE with the Councils Public Protection Department prior to the commencement of the investigation works, in particular in regard to the design of the ground investigation (e.g. soil sampling strategy, gas monitoring strategy etc.).	Consultation and engagement with London Borough of Havering has been ongoing throughout the pre-application phase. Information on additional/local knowledge environmental information, such as landfill sites, pollution incidents and records of Part 2A sites was received from London Borough of Havering to enhance the baseline information of ES Chapter 10: Geology and Soils (Application Document 6.1).

London Borough of Havering comment	National Highways response
Appendix 4: Geology and soils (contaminated land)	
Apart from the intrusive ground investigation, detailed human health and controlled waters risk assessments should be carried out.	Effects on human health receptors from exposure to contaminated soils and fugitive dust and contamination have been assessed in ES Chapter 10: Geology and Soils (Application Document 6.1).
If piling techniques are used to construct structures within the project, a suitable Piling Risk Assessment should be carried out, to ensure that there will be no unacceptable risks to groundwater.	Potential risks to groundwater have been assessed as part of ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1).
Any reuse of soil and excavated materials on site should be carried out following advice from the Environment Agency. The CL:AIRE Definition of Waste: Code of Practice should also be used as a guide.	The Definition of Waste: Development Industry Code of Practice (Contaminated Land: Applications in Real Environments (CL:AIRE), 2011) has been used in devising the methodology for data collection and waste impacts in ES Chapter 11: Material Assets and Waste (Application Document 6.1). Clean, naturally occurring soils would be reused onsite in line with WaFD Article 2. Contractors would implement the necessary environmental permits, exemptions and complete Materials Management Plan (as per the Definition of Waste: Development Industry Code of Practice (CL:AIRE, 2011) for the reuse of made ground and contaminated soils.
Heritage and Archaeology	
The Council has concerns over the impact of the construction site on heritage assets. These include the North Ockendon Conservation Area and nearby listed buildings in the North Ockendon area (including Grade I and II listed buildings).	The potential effects of the Project on North Ockendon Conservation Area and nearby listed buildings have been fully assessed, please refer to ES Chapter 6: Cultural Heritage (Application Document 6.1).
The Council and HE must continue to engage on matters of Heritage and these discussions must include Historic England, and other stakeholders (as considered necessary).	Engagement and consultation with stakeholders including the Council and Historic England has been ongoing throughout the pre-application phase. A summary of consultation with heritage stakeholders is provided in ES Chapter 6: Cultural Heritage (Application Document 6.1).
The Council notes in the PEIR HE's proposed 1km study area, which is not considered sufficiently wide. The Council recommends a 2km wide study area.	An outer study area 1km from the Order Limits was used to create the baseline. This was refined through consultation, the Zone of Visual Influence (ZVI), noise assessment and professional judgement, which

London Borough of Havering comment	National Highways response
	extended the study area in some places and reduced it in others. Additional consultation with stakeholders along with professional judgement added heritage assets that are located outside the ZVI or 1km that are considered to potentially experience an impact and therefore required assessment, for example where groups of heritage assets with group value extend beyond the ZVI. This study area has been used to assess the impact on any designated assets and the setting of any heritage asset. Any assets scoped out of assessment in the ES are listed in ES Appendix 6.1: Cultural Heritage Desk-based Assessment.
The Council considers it essential that HE must undertake interior inspections of all heritage assets at an early stage to better understand the direct and indirect impacts of the Scheme upon these.	Building condition surveys have been undertaken as part of the fieldwork for cultural heritage and these have included detailed internal and external inspections of buildings identified as being at risk of significant physical effects from the Project. The full methodology is provided in ES Chapter 6: Cultural Heritage (Application Document 6.1).
The Council also considers it necessary for HE to assess impacts (such as views and noise) from interior spaces with appropriate mitigation measures put forward as necessary.	There are no historic buildings in the London Borough of Havering that would warrant this assessment.
A notable indirect impact of the Scheme will be the requirement for secondary glazing to historic properties, to mitigate noise implications upon residents, and the impact this will have upon the significance of these assets. The Council expects HE to identify and assess indirect impacts within future reports.	A Noise Insulation Regulations Assessment (ES Appendix 12.7) for all dwellings within 300m of the Order Limits has been undertaken. The results of this have been reviewed to identify if any historic buildings are affected which has been incorporated as appropriate in the cultural heritage assessment.
Appendix 5: Heritage and Archaeology	
Heritage	
Within the introduction, the report correctly explains that there are expected to be interrelationships between the potential effects on cultural heritage and other disciplines reported on in the PEIR. Whilst this is accurate, it is important that aspects such as the analysis and interpretation of historic landscapes is considered within both the	ES Chapter 6: Cultural Heritage (Application Document 6.1) has interrelationships with ES Chapter 7: Landscape and Visual (Application Document 6.1).

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Cultural Heritage and Landscape chapters to better inform the conclusions of each discipline.	A Historic Landscape Characterisation (HLC) study has also been undertaken and is presented in ES Appendix 6.1: Cultural Heritage Desk-based Assessment.
Similarly, potential impacts of noise and vibrations must also be analysed and interpreted within the heritage section given these have the potential to alter how we experienced and interpret heritage assets - as well as potentially cause damage to their fabric in the case of vibration. This approach is supported by Historic England's GPA3 –Note 3 (Second Edition) The Setting of Heritage Assets.	Noise and vibration impacts on heritage assets has been considered as part of the assessment, please refer to ES Chapter 6: Cultural Heritage (Application Document 6.1).
With regards to methodology, the PEIR does not appear to reference nationally recognised guidance relating to heritage such as Conservation Principles, GPA 2 –Managing Significance in Decision-Taking in the Historic Environment or GPA 3 –The Setting of Heritage Assets.	Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment (English Heritage, 2008) and The Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning Note 3 (Second Edition) (GPA3) (Historic England, 2017b) are two of the guidance documents used in devising the methodology for data collection and assessment of cultural heritage impacts. Please refer to Section 6.3 of ES Chapter 6: Cultural Heritage (Application Document 6.1) for the full list of standards and guidance used.
Archaeology	
The document under section 7.5.6 identifies the need for trial trenching to allow the EIA to provide a sufficient assessment of the significance of the historic environment assets along the route and as a method to check apparently blank areas. This is to be welcomed, as previously discussions had indicated that this would be left to a later date following the DCO process.	Trial trenching for sensitive areas has been completed. The assessment of buried archaeology in ES Chapter 6: Cultural Heritage (Application Document 6.1) has been undertaken on a robust and precautionary basis. Trial trenching for sensitive areas has been completed. The assessment of buried archaeology in ES Chapter 6: Cultural Heritage (Application Document 6.1) has been undertaken on a robust and precautionary basis. Further trial trenching will continue after the submission of the DCO application, for completeness, and enabling works would not take place until that is completed. Please refer to ES Appendix 6.8: Trial Trenching Reports for Priority 1 areas. Finds to date are being shared with stakeholders and will be catalogued.

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The document states that only the setting of designated assets such as listed buildings and Scheduled Monuments will be assessed, however, it is recommended that consideration should be given to assessing the setting of significant non-designated assets such as the moated complex at North Ockendon Hall.	The setting of all heritage assets, designated and non-designated, has been assessed. Please refer to ES Chapter 6: Cultural Heritage (Application Document 6.1).
Landscape and Green Belt Implications	
The London Borough of Havering is one of London's greenest boroughs with extensive open spaces and more than half of the borough designated as Metropolitan Green Belt. Elements of the Scheme (specifically the new junction of the link road for LTC and M25 motorway) will impact the boroughs Green Belt. It is a key objective of the Councils Local Plan to "protect and enhance Havering's Green Belt"	ES Chapter 7: Landscape and Visual (Application Document 6.1) considers well designed, practical and achievable mitigation measures to minimise the impacts of the Project on the character, visual amenity and tranquillity of the Kent Downs AONB and London's Green Belt within Gravesham, Thurrock and London Borough of Havering as well as other areas of landscape. ES Figure 2.4: Environmental Masterplan (Application Document 6.2) has been prepared to identify the environmental mitigation measures. The Applicant is committed to the protection and retention of vegetation as identified as 'retained' in the Environmental Masterplan. Post-construction, there will be reinstatement of land back to agriculture and woodland, and hedgerow replanting to replace those features removed. An assessment on the impact on Green Belt is set out in the Planning Statement (Application Document 7.2) which specifically considers the protection of the permanent openness off the green belt.
The Council considers it appropriate for HE to provide further detail about the consideration given to the visibility of storage of spoil, excavation areas for balancing points and material storage areas which have the potential to adversely impact the boroughs Green Belt.	The landscape and visual assessment considered the storage of spoil/materials. Good practice mitigation is proposed, please refer to ES Chapter 7: Landscape and Visual (Application Document 6.1).
The Council is a partner in the Thames Chase Community Forest (including the Land of the Fanns Landscape Partnership). Elements of the Scheme (specifically the new junction of the link road for LTC and M25 motorway) will be within the Thames Chase Community Forest. The Council has concerns over the visual impact of the Scheme on the Thames Chase Forest Centre and the impact both visually and in terms	Engagement with Thames Chase Community Forest has been ongoing throughout the pre-application phase. The potential visual impacts of the Project have been fully assessed as part of ES Chapter 7: Landscape and Visual (Application Document 6.1).

London Borough of Havering comment	National Highways response
of noise and lighting during the construction phase. The PEIR further states that land take and vegetation removal within the Thames Chase Forest would also be required.	The Project would improve access to Thames Chase Forest Centre through improvements to the Public Right of Way network and through a new bridge.
The Councils Local Plan sets out clearly that developers must work with existing partnerships to support and enhance green infrastructure provision. The Thames Chase Community Forest (being a partnership) should expect support from HE as a developer putting forward a DCO.	
The Councils Local Plan also designates Thames Chase as "open space" and policy 18 commits the Council to protecting the borough's designated open spaces from development unless it can be demonstrated that "replacement provision of equivalent or better quantity and quality will be made in a suitable location.	For all the open space land-take proposed for the Project, replacement land would be provided.
HE must engage with Thames Chase and the Council to agree appropriate mitigation for the impact on the Thames Chase Community Forest.	Regular meetings have taken place with Thames Chase and Forestry England have taken place to discuss appropriate mitigation for the land proposed to be taken.
Appendix 6: Landscape Implications	
The PEIR refers to appropriate Havering Local Landscape Policies; Policy 27: Landscaping and Policy 29: Green Infrastructure. As the project develops, it is important to understand how green infrastructure will play a role in the scheme's landscape and ecological mitigation design and this should be reviewed throughout the course of the development.	Consideration has been given to local planning policies and guidance/strategy documents relating to landscape, and visual matters published by local authorities. These are detailed in ES Chapter 7: Landscape and Visual (Application Document 6.1). For information landscape and ecological mitigation design, please refer to the following: • ES Chapter 7: Landscape and Visual (Application Document 6.1) • ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1) • ES Figure 2.4: Environmental Masterplan (Application Document 6.2) • Design Principles (Application Document 7.5)
Visual and landscape effects during construction and operation of the identified receptors have been suitably outlined and mitigation measures provided. However, it is unclear whether the ZTV has taken into consideration the visibility of storage land for spoil, excavation areas for	The landscape and visual assessment considered the storage of spoil/materials. Good practice mitigation is proposed, please refer to ES Chapter 7: Landscape and Visual (Application Document 6.1).

London Borough of Havering comment	National Highways response
balancing ponds and material storage areas, or whether it is solely based on the ZTV of the proposed crossing route. Unless clarified, it is recommended that further assessments are made for the areas that will be affected during the construction phase of the project	
A detailed study area extending up to 2km on either side of the proposed project route centre-line has been used to select 54 key visual receptors. These have been identified as part of the desk based and field survey work within the 2km ZVI.	In accordance with DMRB LA 107 (Highways England, 2020e), the study area for the landscape and visual assessment was identified specifically for the purposes of the assessment of the Project presented in this ES. The rationale for the identification of the ZVI which informs the study area is set out in detail in ES Appendix 7.3: Area of Search and Zone of Theoretical Visibility Analysis.
However, due to the extent of the site and its intrusion in the landscape, it's crucial that locations at all distances of potential visibility are assessed, even if only minimal viewpoints at the 5km extent are discovered, these views may critical in defining the overall landscape and visual impact of the proposal. It is therefore necessary that additional viewpoint locations are proposed based on the 5km ZTV and are assessed and verified as part of the winter field survey work during 2018/2019.	In January 2019, following Statutory Consultation, the landscape and visual assessment representative viewpoints were shared with all of the host local authorities, including a refined Project ZVI and analysis and justification for the rationale on the selection of the study area. The feedback received in April 2019 was incorporated into the selection of 88 representative viewpoint locations to be used for the assessment of impacts on visual amenity and inform the landscape character assessment. In May 2019, a site walkover was undertaken with London Borough of Havering, Essex County Council and Thurrock Council to view the viewpoints and discuss methodologies further.
Scheduled Ancient Monument designations have not been identified on the plans included in Volume 3a. Figure 8.5. The inclusion of this designation is necessary as it will be informative in understanding some of the identified receptors and viewpoints.	Scheduled monuments are identified on ES Figure 6.1: Archaeological Assets Assessed as Likely to Experience an Effect (Application Document 6.2). These have been assessed in terms of landscape and visual impact. Refer to ES Chapter 6: Cultural Heritage and ES Chapter 7: Landscape and Visual (Application Document 6.1).
Biodiversity	
Policy 30 of the Local Plan Nature Conservation states that the Council will protect and enhance the rich biodiversity and geodiversity in Havering by protecting Sites of Special Scientific Interest, Local Nature Reserves and Sites of Importance for Nature Conservation. The Havering Nature Conservation and Biodiversity Strategy (2014) sets out	Noted.

London Borough of Havering comment	National Highways response
how the Council and its partners will promote, protect and enhance biodiversity in the borough. The Council considers it inappropriate for such areas to be adversely affected.	
The PEIR indicates predicted loss of habitat, and fragmentation of remaining habitat likely to affect several ancient wooded areas including Franks Wood, and Clay Tye Wood in Havering. Ancient woodlands such as Clay Tye Wood and Franks Wood require appropriate surveys and assessment to ensure that development is in line with the Councils Local Plan Policy 30 on Nature Conservation.	The Project does not involve any loss of Franks Wood or Clay Tye Wood. The Project design and mitigation measures would safeguard these woods from potential indirect effects during construction.
The Council requires engagement with HE on the potential locations and methodologies for any translocation of ancient woodland soils and new woodland planting in the borough.	New and replacement planting is shown geographically on ES Figure 2.4: Environmental Masterplan (Application Document 6.2), drafts of which were shared with London Borough of Havering during environmental workshops in April and June 2020. The landscape strategy for new areas of woodland planting aims to link areas of retained ancient woodland to improve connectivity and reduce fragmentation effects, which would provide wider biodiversity benefits.
The Council requires engagement with HE on the avoidance of any adverse effects on Ancient Woodland or if the Council considers this not to be an option then on compensation packages for any loss of Ancient Woodland in Havering. To include the management of nearby Ancient Woodland and restoration of plantations on Ancient Woodland sites. The Council expects HE to provide a suitable planning obligation, pursuant to Section 106 Town and Country Planning Act 1990 to deliver these objectives.	Ancient woodland compensation planting has been proposed. Please refer to ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1) and ES Figure 2.4: Environmental Masterplan (Application Document 6.2).
The Council notes the reference in the PEIR to an outline Environmental Management Plan (EMP). The Council expects HE to prepare both a Construction Environment Management Plan (CEMP) and Landscape and Ecological Management Plan (LEMP) linked to the DCO.	Please refer to the Code of Construction Practice (CoCP) (ES Appendix 2.2) which sets out the measures and procedures National Highways would require its Contractors to adopt and implement for their works associated with the Project. Environmental Management Plans would be required to be prepared in accordance with the CoCP.

London Borough of Havering comment	National Highways response
Appendix 7: Biodiversity	
The potential impact on all the relevant species and habitats must be effectively assessed and appropriate mitigation and compensation measures developed to minimise adverse impacts on health and the environment as agreed with DfT. In delivering new schemes, the Government expects applicants to avoid and mitigate environmental impacts in line with the principles set out in the NPPF and the Government's planning guidance.	The National Planning Policy Framework confirms in paragraph 5 (Ministry of Housing, Communities and Local Government, 2019) that it does not set policy for Nationally Significant Infrastructure Projects (NSIPs), and that relevant policy is to be found within the National Policy Statements. Potential impacts on relevant species and habitats are considered in ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1) together with appropriate mitigation measures. Refer to Section 8.3 of ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1).
There will be opportunities to enhance parts of the site, by creating Priority Habitats such as hedgerows, to improve connectivity across the landscape to mitigate for disconnections caused by the new road. The Ecology chapter of the Environmental Information Report should thoroughly explore all reasonable options to enhance the development for biodiversity including Protected and Priority Species to support the National Highways Biodiversity Action Plan and in response to local conservation priorities.	The Project has explored opportunities to enhance and improve connectivity. There are seven green bridges proposed as part of the Project to deliver these objectives. The green bridges would be connected to areas with proposed replacement tree planting.
It is welcomed the statement in 9.1.7 that the survey data contained within the Terrestrial Biodiversity chapter will be used to inform the separate Habitats Regulations Assessment (HRA) which is being prepared to support the project's Development Consent Order application.	Noted.
Table 9.1 of the PEIR also includes the statement that "The project must also ensure legislative compliance to legally protected species." However, there is no mention of Wildlife & Countryside Act 1981 Schedule 9 species (invasive) which require the applicant to avoid releasing or allowing to escape into the wild, any animal which is not ordinarily resident in Great Britain and is not a regular visitor to Great Britain in a wild state or is listed in Schedule 9 to the Act. It is also illegal	The Wildlife and Countryside Act 1981 is referenced as well as species-specific legislation. Please refer to ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1).

London Borough of Havering comment	National Highways response
to plant or otherwise cause to grow in the wild any plant listed in Schedule 9 to the Act.	
Although the EIA Scoping report (Section 9.4) identified the desktop assessment request would include both the Essex Recorders Partnership (ERP) co-ordinated by Essex Field Club (EFC) and Essex Wildlife Trust (EWT), we are concerned that only terrestrial data held by EWT Biological Records Centre (BRC), ecological data is included in the PEIR.	Information on nationally and locally important designated sites, habitats and species was obtained from the sources set out in ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1) and includes Essex Recorders Partnership (ERP) co-ordinated by Essex Field Club and Essex Wildlife Trust
There is also no reference to Greenspace Information for Greater London (GiGL) https://www.gigl.org.uk/ for records within Havering for biodiversity and geodiversity (in conjunction with London Geodiversity Partnership). There is reference to Hall Lane Road Cutting (A127) in Table 11.7 of the PEIR and para 11.4.24 refers to local geological sites in Essex and Kent, but not Greater London. If EFC and GiGL have provided this data, it is recommended that these sources are added to the PEIR and added to the Environmental Constraints map (or if not, Table 9.27 for the updated desk study) to ensure additional records are available to inform the assessment of likely impacts for the ES.	The Applicant requested biological records from Essex Field Club and Greenspace Information for Greater London (GiGL). Geological records were obtained from EFC. This data is presented in the ES and used to inform the EIAs.
Whilst potential impacts on notable species are being noted, it is recommended that throughout the ES, the text adequately identifies all the relevant Priority (s41) habitats and species to ensure these are being effectively assessed. For example, Open Mosaic Habitat (on previously developed land), is a Priority s41 Habitat that needs to be accurately reflected in the ES, particularly as the Development Boundary includes large areas of this habitat. References to arable field margins and heath/acid grassland as habitats of principal importance (Priority Habitat) in para 9.4.23 and Slender Hare's-ear and Sea Barley as species of principal importance (Priority Species) in para 9.4.30, 9.4.34, 9.4.88, 9.4.113 and 9.4.151, are however noted. As records from the EFC data search have not been provided, the records obtained from EWT BRC may underestimate the impact of the project on Protected and Priority species.	Open Mosaic Habitats are considered in ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1). Since Statutory Consultation, data was requested from Essex Field Club and has been used to establish a robust baseline for the assessment.

London Borough of Havering comment	National Highways response
Havering welcomes the statement that the Northern Thames Basin National Character Area (NCA) is important for a farmland bird assemblage and farmland birds listed in Schedule 1 of Wildlife & Countryside Act 1981 -Barn Owl, Brambling, Fieldfare, Quail and Redwing -have the potential to be present within the Development Boundary, specifically to the north of the project within the Northern Thames Basin NCA, although Fieldfare is listed as a breeding species in Scotland. However, of these species, Barn Owl is resident year-round, Quail is a scarce summer visitor and the remainder are only winter visitors.	Noted.
Regarding species listed in Birds of Conservation Concern (Eaton et al., 2015) as 'red' or 'amber', it is important to note that the majority of red listed species are also listed on Section 41 of the NERC Act(2006). Please note that farmland birds listed in Table 9.22, should be identified as Priority Species where appropriate, to allow impacts to be assessed and measures identified to allow the Sec of State to demonstrate compliance with NERC duty to conserve biodiversity and deliver net gain	Noted.
The PEIR (para 9.4.116) suggests that Northern Thames Basin NCA is suboptimal for bats although it is a generalisation with respect to roosting and foraging and does not consider important migration routes for Nathusius' Pipistrelle known to use river valleys at particular times of year (see Table 9.24).	Noted.
Stands of invasive non-native plant species have been identified including Japanese Knotweed in discrete locations within the proposed Development Boundary. Appropriate procedures will need to be incorporated into the Construction Environmental Management Plan (CEMP) and Landscape & Ecology Management Plan (LEMP) for the Development.	Please refer to the Code of Construction Practice (CoCP) (ES Appendix 2.2) which sets out the measures and procedures National Highways would require its Contractors to adopt and implement for their works associated with the Project. Environmental Management Plans would be required to be prepared in accordance with the CoCP (ES Appendix 2.2).
Opportunities to deliver enhancements need to be explored in consultation with appropriate stakeholders as a mechanism to deliver net gain for biodiversity. This is in line with The NPSNN Paragraph 5.33 and reasonable opportunities to deliver environmental benefits as part of	The Applicant has explored opportunities to enhance and improve connectivity. There are seven green bridges proposed as part of the

London Borough of Havering comment	National Highways response
schemes are required under Schedule 4 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009.	Project to deliver these objectives. The green bridges would be connected to areas with proposed replacement tree planting.
There will be opportunities to enhance parts of the site, by creating Priority Habitats such as hedgerows, to improve connectivity across the landscape particularly to mitigate for disconnections caused by the new road. The Ecology chapter of the ES should thoroughly explore all reasonable options to enhance the development for biodiversity including Protected and Priority species to support the National Highways Biodiversity Action Plan.	National Highways has committed to achieving no net loss in biodiversity by the end of RIS 2 and will work towards net biodiversity gain by 2040 across its estate. Although the construction of the Project would have significant adverse effects on statutory designated sites and irreplaceable habitats, such as veteran trees and some sections of ancient woodland, the design has sought to provide biodiversity gains wherever possible and this has resulted in a 15% increase in habitat value. No likely significant effects are predicted on terrestrial biodiversity during operation. An assessment of baseline biodiversity value and that achieved by the Project's design post development is presented within the Sustainability Statement (Application Document 7.11). Please refer to the Need for Project (Application Document 7.1) for more information.
It is considered this project will incorporate a sustainable drainage system (SuDS) to reduce hydraulic loading on sewers etc. There will therefore be scope for ecological improvements through SuDS and improved water quality where possible.	There is an interrelationship between ES Chapter 8: Terrestrial Biodiversity and ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1).
Cumulative Impacts	
In addition to the Scheme for the LTC, a further DCO scheme is being prepared by HE for capacity improvements to the junction of the M25 motorway with the A12 trunk road in Havering at Junction 28 of the M25.	The M25 Junction 28 scheme's interrelationships with the Project have been considered as part of ES Chapter 16: Cumulative Effects Assessment (Application Document 6.1).
The Council is extremely concerned about the potential cumulative impact arising from two substantial infrastructure projects being built concurrently in close proximity to the borough's strategic highway network.	
It is likely that there will be a considerable adverse impact on the local highway network in the borough and its wider environment if traffic is displaced from the motorway pre and during construction of these projects.	

London Borough of Havering comment	National Highways response
It should be further noted that within the east sub region TfL are planning improvements to parts of their own network over the next few years including the Lodge Avenue Flyover (A13) in the borough of Barking and Dagenham and a safety improvement scheme at Gallows Corner. This again highlights the need for a working group between the Council, TfL and HE so that these works can be discussed in greater detail to ensure a co-ordinated approach.	Transport for London's road safety improvements at Gallows Corner on the A12 was considered within ES Chapter 16: Cumulative Effects Assessment (Application Document 6.1). A consultation was held in 2016, but no further information is available regarding the time period for planning application submission or construction periods, so it was not included in the short list. National Highways is in contact with Transport for London and maintains an open dialogue on relevant matters, including Gallows Corner. Lodge Avenue Flyover (A13) is outside the zone of influence of the EIA.

13 Marine Management Organisation

Table 13.1 Marine Management Organisation (MMO) Statutory Consultation

Marine Management Organisation comment	National Highways response
Designated site	
The MMO agree you have correctly identified designated sites with marine components that have the potential to be affected by the Project.	Noted.
The status of the two recommended MCZs should be reviewed before the Environmental Statement (ES) is finalised to ensure the presented information and any associated assessment is up to date	It was agreed with the Environment Agency and MMO that an Marine Conservation Zone (MCZ) assessment was not required. The status of the two sites were reviewed prior to finalising the ES. Candidate MCZ in Upper Thames was not considered due to it being withdrawn from Tranche 3 review. The status of Swanscombe MCZ is included in ES Chapter 9: Marine Biodiversity (Application Document 6.1).
Fisheries	
It is acknowledged that the data sources are to be investigated further and may be supplemented by other, as yet to be determined, data sources. Furthermore, for information about the ecology of fish species, it would be beneficial to consult the Fish Atlas by Heesen et al. (2015).	Additional data sources were used to update the marine environment baseline. A full list of references can be found in ES Chapter 9: Marine Biodiversity (Application Document 6.1).
Direct/indirect effects to both fisheries and shellfisheries as result of all phases of the project must be considered throughout the Environmental Impact Assessment (EIA) process and presented in the ES, for example sessile shellfish stocks (such as cockles) can be smothered by suspended silt particles from works further upstream.	Direct and indirect effects on fisheries and shellfisheries have been assessed. Please refer to ES Chapter 9: Marine Biodiversity (Application Document 6.1).
Given the importance of The Thames for the passage of European eel (Anguilla anguilla), effects from the proposal to this and other migratory species must be considered and assessed.	The passage of eel and other migratory species was assessed and is reported in ES Chapter 9: Marine Biodiversity (Application Document 6.1).
There are multiple proposed and current developments along the Thames and given the importance of the Thames as fish foraging, nursery, spawning habitat and for the passage of migratory species, a thorough	Intra-project cumulative effects are reported in ES Chapter 9: Marine Biodiversity (Application Document 6.1). Inter-project effects are reported within ES Chapter 16: Cumulative Effects Assessment

Marine Management Organisation comment	National Highways response
assessment of cumulative and in combination underwater noise and vibration effects on fish must be completed.	(Application Document 6.1). An underwater noise assessment has been completed, please refer to ES Appendix 9.1: Underwater noise modelling of ground-borne noise and vibration from the tunnel boring machine.
Scour protection is proposed during the operational phase. The associated habitat loss and change in habitat type must be assessed and presented in the ES.	Scour protection has been removed from the Project design. The vertical tunnel alignment was re-evaluated to avoid the need for scour protection.
Underwater noise	
The Preliminary Environmental Information Report (PEIR) provides a very high-level overview of the potential impacts during the jetty construction and decommissioning process on marine receptors. Further to the temporary adverse effects identified in table 10.8, there are other specific noise sources, for example from impact piling, which can cause marine receptors temporary and permanent injury or hearing loss. These impacts should be considered throughout the EIA process and presented in the ES.	The Applicant only proposes to utilise the existing East Tilbury jetty at Goshems Farm and does not propose to construct a new jetty.
The MMO agree that soft-starts and vibropiling will introduce less impact noise into the underwater environment	Where piling activities would take place, best practice relating to soft start and vibropiling would be applied. Please refer to ES Chapter 9: Marine Biodiversity (Application Document 6.1) and the REAC, which can be found in the CoCP (ES Appendix 2.2).
It is unclear what is meant by the following sentence in table 10.8 ‘use of soft start and vibropiling techniques to limit extent and duration of noise emissions.’ This should be clarified within the ES.	It was agreed that, where piling activities take place, best practice relating to soft start and vibropiling would be applied. Please refer to the REAC, which can be found in the CoCP (ES Appendix 2.2).
It is stated in table 10.7 of the PEIR that there is potential for an underwater noise survey to be undertaken. The MMO acknowledge that it is stated in the Draft Proposed Marine Monitoring and Modelling Programme ‘no background [underwater noise] survey or modelling [is] proposed.’ If underwater noise surveys are undertaken the MMO would require details of the survey methodology to be presented in the ES.	Modelling has been used to predict underwater noise levels associated with construction (arising from use of the tunnel boring machines) and operation (tunnel road noise) of the Project. The resulting underwater noise levels have been compared against known injury and disturbance thresholds for fish, marine mammals and invertebrates to assess the potential for significant effects. These results are presented in ES Chapter 9: Marine Biodiversity (Application Document 6.1).

Marine Management Organisation comment	National Highways response
The MMO appreciate that detailed assessments using significance criteria have not been undertaken at this stage and believes the approach detailed in paragraph 10.6.2 to be sufficient.	Noted.
Benthic ecology	
The desk-based review has revealed a number of historic studies that offer benthic ecology data relevant to the Project. While a number of these sources are somewhat old (>10 years old), there is no evidence regarding the precise nature of the more recent surveys. While it is indicated that the survey conducted under the Thames Tideway Tunnel project (i.e. Physalia, 2017) provides data apposite to the current Project, the details of the actual survey (timing, where samples were taken, etc.) are not provided. This information is required to evidence the suitability of this source. This also pertains to data referred to in section 10.4.35, which refers to the Clean Safe Seas Environmental Monitoring Programme (CSEMP). The MMO considers it unlikely that sampling conducted under that programme will provide relevant data specific to the Project.	A reference list of the third-party data sources used to determine existing baseline conditions is contained in ES Chapter 9: Marine Biodiversity (Application Document 6.1). The extent of the monitoring programme was agreed with the MMO. Subsequent to monitoring programme agreement, the Project conducted in-river benthic surveys which informed the marine biodiversity assessment. Please refer to ES Chapter 9: Marine Biodiversity (Application Document 6.1).
Paragraph 10.4.10 states that impacts on intertidal benthic ecology, specifically with respect to indirect impacts on bird feeding via alterations in benthic assemblages, will be addressed in Chapter 9. Information specifying how this is to be conducted must be provided in the ES.	This is fully explained in ES Chapter 9: Marine Biodiversity (Application Document 6.1). Benthic macroinvertebrate samples were collected as part of a marine ground investigation programme in 2019. The data were used to supplement recent studies completed in this area to help improve understanding of the quality of the benthic habitats and communities in and adjacent to the Order Limits. The field data were also used to improve the understanding of the presence of the protected tentacled lagoon worm *Alkmaria romijni* near the Order Limits. The scope and extent of marine survey were agreed with the MMO.
It was stated in section 4.2 of the MMO's scoping response, dated 1 December 2017, that 'consideration should be given to allocating sampling stations according to visual changes in sediment type or obvious habitat differences as opposed to following a strategic grid of stations'. Information on the design of any benthic ecology sampling should be presented in the ES.	
Coastal Processes	
The MMO is satisfied that the potential impacts to physical and coastal processes associated with the works have been identified and that the scope of the ES described will allow the potential impacts of the proposed	Scour protection has been removed from the Project design. It was subsequently agreed with the MMO that hydrodynamic and sediment modelling was no longer required.

Marine Management Organisation comment	National Highways response
jetty operation and potential scour protection works to be adequately assessed.	
With regards to the proposed scour protection, the MMO welcomes ongoing consultation and the use of trigger levels as a monitoring and implementation strategy.	Scour protection has been removed from the Project design. The vertical tunnel alignment was re-evaluated to avoid the need for scour protection.
Dredging	
There is reference in the PEIR to potential dredging activities during construction and operation of the marine jetty. The MMO acknowledge that it is stated in the Draft Proposed Marine Monitoring and Modelling Programme 'no dredging is proposed.' If this activity will be undertaken, specific details must be presented in the ES, for example the volumes, materials, locations, and the proposed dredge and disposal methods.	The Applicant only proposes to utilise the existing East Tilbury jetty at Goshems Farm and does not propose to construct a new jetty. No dredging is proposed.
As detailed in the Draft Proposed Marine Monitoring and Modelling Programme, if the results in the referenced RWE 2017 document are reported as suggested then the MMO agree that this would provide a robust baseline and no further sediment sampling would be required.	
The MMO requires any sediment analysis information to be reliable and relevant to within 3 years of the required dredging activities. If dredging is required, the sediment analysis data should be reviewed to ensure that it is still suitable. If it is deemed unsuitable then the MMO may request that new sample analysis be undertaken. The Applicant is encouraged to continue to engage with the MMO on this subject.	
The mitigation measures regarding the design of the proposed jetty and volumes of material to be dredged appear suitable. It may be necessary to include other measures, as the design evolves, to facilitate a reduction in environmental impacts.	
Potential impacts on marine receptors of dredging and other sediment remobilisation mechanisms should be assessed and presented in the ES.	
General Comments	

Marine Management Organisation comment	National Highways response
The MMO consider all construction (including alternative and improvement of works), removals, dredging and maintenance activities associated with the proposed scheme that are in or above the jurisdiction of the MMO area to be licensable	The Applicant only proposes to utilise the existing East Tilbury jetty at Goshems Farm and does not propose to construct a new jetty. No dredging is proposed. Scour protection no longer included in Project design.
The MMO require precise details of the proposed jetty and any scour protection works to confirm whether the approach fully identifies, and assesses, the potential impacts.	
The MMO acknowledges that the scope of the monitoring / modelling programme is in the process of being revised following submission of our comments to the Applicant on 22 November 2018. It was concluded in the response that the MMO supported the proposals in the reviewed document, subject to the changes identified.	The monitoring and modelling proposal has been agreed with the MMO. The vertical tunnel alignment was re-evaluated to avoid the need for scour protection.
Conclusion	
The MMO reserves the right to make further comments on the Proposed Scheme throughout the pre-application process and may modify its present advice or opinion in view of any additional information that may come to our attention.	Noted. Consultation and engagement with the MMO has been ongoing throughout the pre-application phase.
The MMO requests that prior to the submission of the application to the Planning Inspectorate (PINS), the Applicant enter into discussions with the MMO to discuss the content of the draft DCO and DML to ensure that, where possible, issues are resolved prior to submission.	Engagement with the MMO has been ongoing throughout the pre-application phase. A draft Deemed Marine Licence (DML) was issued to the MMO for review and comment received. This is included in the draft DCO (Application Document 3.1). Revisions will take place prior to the examination phase of the DCO, and this version will address the MMO's comments.
Furthermore, the MMO recommends that the Applicant continues to engage with other stakeholders regarding any other requirements for inclusion within the DCO.	Engagement has taken place with a range of other statutory and non-statutory stakeholders.

14 Medway Council

Table 14.1 Medway Council Statutory Consultation

Medway Council comment	National Highways response
As a matter of broad principle, the LTC should enhance accessibility in the areas affected by the new crossing for walkers, cyclists and horse riders. This is important to encourage non-car modes, particularly for leisure purposes, wishing to travel along established corridors and public rights of way.	Information on the initial proposals was shared on the 05 September 2019 for walker, cyclist and horse rider routes and further information supplied during Supplementary Consultation. There are a number of Project-wide design principles, including *'People are at the heart of our design work, making good roads safe and useful, inclusive and understandable. Good road design reflects users' needs, engages with communities and works intuitively for all*'. This is expanded upon with 10 specific principles relating to walkers, cyclists and horse riders, which serve to enhance accessibility. For example, in order to enhance and improve off-road provision for all walkers, cyclists and horse riders, Public Rights of Ways impacted by the Project shall be upgraded to within the Order Limits (as per the Rights of Way and Access Plans (Application Document 2.7)), and redesignated as a bridleway unless stated otherwise. These specific design principles can be found in the Design Principles (Application Document 7.5).
Medway Council welcomes the proposal for 'Green Bridges' to replace and upgrade local road and PROW crossings affected by the LTC slip roads.	Noted.
Medway Council would like to highlight the impact of this design on the setting of the Kent Downs AONB and nearby ancient woodlands and urge National Highways to satisfy itself that the visual impact of the scheme is minimised by limiting the removal of vegetation and enhancing planting wherever possible.	Consultation with Kent Downs Area of Outstanding Natural Beauty (AONB) Unit and Natural England has been ongoing throughout the pre-application stage. The visual impact of the Project on Kent Downs AONB has been minimised as far as reasonably practicable through the reduction in removal of vegetation as far as possible and incorporating enhancement planting in as many areas as possible. Please refer to ES Figure 2.4: Environmental Masterplan (Application Document 6.2) for location of replacement planting.

Medway Council comment	National Highways response
	The visual impact of the Project on Kent Downs AONB has been assessed, please refer to ES Chapter 7: Landscape and Visual (Application Document 6.1).
Overall, Medway Council considers it important for the impact of the proposed junction to be offset by mitigation in the form of local community, economic or environmental benefits.	Environmental considerations have influenced the Project throughout the design development process, from early route options assessment through to refinement of the Project design. An iterative process has facilitated design updates and improvements, informed by environmental assessment and input from the Project engineering teams, stakeholders and public consultation. The community and economic impact of the Project has been assessed in ES Chapter 13: Population and Human Health (Application Document 6.1).
We would also encourage National Highways to clarify the mitigation proposed by the incursion into the Green Belt required by the construction of the new junction, including the associated slip roads.	ES Chapter 7: Landscape and Visual (Application Document 6.1) considers well designed, practical and achievable mitigation measures to minimise the impacts of the Project on the character, visual amenity and tranquillity of the Kent Downs AONB and the Metropolitan Green Belt (around London) as well as other areas of landscape. ES Figure 2.4: Environmental Masterplan (Application Document 6.2) has been prepared to identify the environmental mitigation measures. The Applicant is committed to the protection and retention of vegetation as identified as 'retained' in the Environmental Masterplan. Post-construction there will be reinstatement of land back to agriculture and woodland and hedgerow replanting to replace those features removed. An assessment on the impact on Green Belt is set out in the Planning Statement (Application Document 7.2) which specifically considers the protection of permanent openness off the Green Belt.
The assessments for air quality, noise and vibration are provisional and subject to any revisions prior to the submission of the DCO. As such, final comments will be provided following the submission of the Environmental Statement.	The air quality and noise and vibration assessment outcomes and mitigation proposals were discussed during bilateral workshops with other stakeholders and at a meeting with Medway Council on 3 July and 15 September 2020.
The Council has some concerns that the noise and air quality impacts of the LTC within Medway will be greater than currently presented, on	Please refer to ES Chapter 5: Air Quality and ES Chapter 12: Noise and Vibration (Application Document 6.1).

Medway Council comment	National Highways response
the basis that the traffic modelling does not take account of growth set out in our emerging Local Plan.	
The Council also has concerns around the robustness of the air quality impact assessment. This relates to the number of receptors modelled in Medway and the absence of any analysis in respect of PM2.5, the pollutant of greatest concern for impacts on public health. We also believe that the scope and scale of the project warrants consideration of air quality impacts during the construction phases	$PM_{2.5}$ is considered through the results of the PM_{10} modelling, as $PM_{2.5}$ is a component of PM_{10}. There would be no exceedances of the $PM_{2.5}$ EU Limit Value, even if it was assumed that all of the modelled PM_{10} existed in the $PM_{2.5}$ size fraction. The air quality assessment includes an assessment of construction dust, road traffic and traffic management. Please refer to ES Chapter 5: Air Quality (Application Document 6.1).
Notwithstanding this, Medway Council looks forward to further discussions with a view to ensuring that the air quality assessment has accurately modelled baseline and the opening year concentrations. A joint working party of Directors of Public Health from the local authorities across the Thames Gateway will consider the impact of the LTC on the health of Medway's population.	Consultation on the traffic model and air quality assessment has been ongoing. A cordon traffic model was shared with all local authorities after Statutory Consultation and an updated version after Supplementary Consultation.
Medway Council recognises that the red-line development boundary extends wider than the actual land-take that will ultimately be required for the crossing and its connections. We recommend that further consultation with local stakeholders on the implications for the Green Belt be undertaken as the proposals are finalised, given its proximity to the development boundary.	The Order Limits have been reduced since Statutory Consultation through further consultation with stakeholders and further refinements to the design. ES Chapter 7: Landscape and Visual (Application Document 6.1) considers well designed, practical and achievable mitigation measures to minimise the impacts of the Project on the character, visual amenity and tranquillity of the Kent Downs AONB and the Metropolitan Green Belt (around London) as well as other areas of landscape. ES Figure 2.4: Environmental Masterplan (Application Document 6.2) has been prepared to identify the environmental mitigation measures. The Applicant is committed to the protection and retention of vegetation as identified as 'retained' in the Environmental Masterplan. Post-construction there will be reinstatement of land back to agriculture and woodland and hedgerow replanting to replace those features removed.

Medway Council comment	National Highways response
	An assessment on the impact on Green Belt is set out in the Planning Statement (Application Document 7.2) which specifically considers the protection of permanent openness off the Green Belt.
Medway Council notes the distances between existing service stations on the M25, M2 and M20 and the fact that traffic using the LTC would not pass the existing M25 services at Thurrock. On this basis, we have no objection to the proposals for a rest and service area.	The rest and service area has since been removed from the Project design.
Medway Council has some concern that the traffic modelling does not take into account background growth between now and the design date (2041) that is either already provided for in local plans or will be required to satisfy the Government's standardised methodology for assessing housing need. We note that 2,085 new homes and 7,245 square metres of commercial floor space in Medway have been incorporated within the future year scenarios for the Lower Thames Crossing. However, the introduction by Central Government of a Standard Method for calculating Local Housing Need has generated the need to provide 28,441 new homes in Medway for the period 2018 to 2035. We are concerned that National Highways' modelling does not adequately reflect this future growth and the transport impacts this is likely to have.	The updated Lower Thames Area Model includes all committed developments, as required by DMRB standards.
At this stage, therefore, it is not possible to say that the analysis presented accurately predicts the combined impact of background growth and changed journey patterns on the surrounding road network.	Consultation on the traffic model has been ongoing. A cordon traffic model was shared with all local authorities after Statutory Consultation and an updated version after Supplementary Consultation.
As part of Medway Council's emerging development strategy, the Hoo Peninsula is identified as a location for new housing and commercial development. This location is also subject to the Council's Housing Infrastructure Fund (HIF) proposal. The bid identified the need for new transport infrastructure to 'unlock' new homes on the Hoo Peninsula, comprising highway improvements to the existing A228 and A289 junctions, a new/formalised Four Elms Roundabout bypass and the	The Lower Thames Area Model includes committed development as advised by the local authorities and in line with TAG. Engagement with Medway Council has been ongoing throughout the pre-application phase.

Medway Council comment	National Highways response
reinstatement of rail passenger services. The Council is currently refining the preferred highway and rail infrastructure requirements and preparing a business case for submission to government in March 2019. Growth in this particular location will bring about a significant increase in traffic demand for the A289 and M2 Junction 1. The LTC will involve rebuilding M2 Junction 1 and, in doing so, provides the only opportunity in the short to medium term to align growth in Medway with improvements to the Strategic Road Network. It is therefore critical that the alternative scenarios take account of growth in Medway.	
Medway Council requests that National Highways review its modelling of future traffic flows to take full account of both adopted and emerging housing numbers in local plans. The Council would be happy to work with National Highways to prepare alternative scenarios that take account of up-to-date development needs in Medway.	The Lower Thames Area Model includes committed development as advised by the local authorities and in line with TAG. Engagement with Medway Council has been ongoing throughout the pre-application phase. Consultation on the traffic model has been ongoing throughout the pre application phase. A cordon model was shared with all local authorities after Statutory Consultation and an updated version after Supplementary Consultation.
Medway Council recommends that National Highways undertake further consultation as proposals to build the Lower Thames Crossing are finalised, in order to manage and mitigate the likely highways impacts of construction traffic.	Consultation on the traffic model has been ongoing throughout the pre application phase. A cordon traffic model was shared with all local authorities after Statutory Consultation and an updated version after Supplementary Consultation.
The Council would also encourage National Highways to develop proposals for transportation of spoil and of more construction materials by river, and to explore avenues for the use of Medway-based companies.	The existing jetty located with the northern tunnel entrance compound at the North Portal is currently used by at Ingrebourne Valley Limited (IVL) for material import operations. The traffic and environmental assessments have assumed that road transport would be used as a worst-case for import of plant and materials. However, the Contractor may wish to consider use of the existing East Tilbury jetty at Goshems Farm to facilitate river transport as an option for import of materials and so the refurbishment, use and subsequent decommissioning of the jetty is also proposed. This has been assessed in the ES (Application Documents 6.1 to 6.3).
It is essential that the local and regional economic benefits of the scheme on both sides of the Thames are maximised and the	The local and wider economy has been considered, please refer to the Need for the Project (Application Document 7.1) and the Economic

Medway Council comment	National Highways response
environmental impacts are minimised and mitigated as far as possible.	Appraisal Package, which is Appendix D of the Combined Modelling and Appraisal Report (Application Document 7.7)
The Council would welcome measures to safeguard and improve existing environmental assets in the vicinity as part of the wider consultation process. These measures should consider the wider landscape and habitats likely affected by the construction, and we the Council advocates a strategic approach to addressing environmental issues resulting from the LTC.	Environmental considerations have influenced the Project throughout the design development process, from early route options assessment through to refinement of the Project design. An iterative process has facilitated design updates and improvements, informed by environmental assessment and input from the Project engineering teams, stakeholders and public consultation.

15 National Grid (NGET/NGG)

Table 15.1 National Grid Statutory Consultation

National Grid comment	National Highways response
If a landscaping scheme is proposed as part of the proposal, we request that only slow and low growing species of trees and shrubs are planted beneath and adjacent to the existing overhead line to reduce the risk of growth to a height which compromises statutory safety clearances.	Consultation with National Grid has been ongoing throughout the pre-application phase. Landscaping under overhead lines has been proposed as part of the Project, please refer to Design Principles (Application Document 7.5). Where woodland planting around the junction conflicts with overhead utilities (both existing and diverted), scrub planting of suitable species shall be planted to connect area of woodland and provide a diversity of planting typologies. Planting would include suitable species and heights in consultation with utilities operators who maintain an easement to their assets but shall provide some cover for small mammals.

16 Natural England

Table 16.1 Natural England Statutory Consultation

Natural England comment	National Highways response
General Comments	
Based upon the information provided and the guidance above Natural England does not consider that the PEIR contains sufficient information for us to provide detailed advice on the nature, scale and significance of the impacts to designated sites, protected landscapes, protected species and wider biodiversity at present. Similarly, we do not feel there is sufficient information for us to be able to provide in depth advice on the appropriateness or otherwise of the indicative mitigation and compensation measures.	There has been a programme of engagement with Natural England which has been ongoing since Statutory Consultation. As more information and assessment work has been undertaken this has been presented to Natural England accordingly. Detailed environmental assessment is being undertaken of part of the EIA which is reported in the ES (Application Documents 6.1 to 6.3).
We acknowledge that the route design has yet to be finalised but in the absence of more detailed information, supported by the results of the detailed studies Natural England's advice provided at this stage is necessarily limited in scope and detail. That said, Natural England remains committed to build upon the excellent partnership working approach with the project and colleagues from the Defra Family to ensure that, where possible, our continued working with the Project Team over the next few months ensures that the biodiversity and landscape impacts can be fully addressed ahead of the Development Consent Order submission. This is likely to require much greater levels of engagement over the coming months and we will of course be pleased to provide this on a cost recovery basis through the Discretionary Advice Service contract.	
We would recommend that the results of the ecological, landscape and access/recreational studies are fully embedded into the ongoing work to finalise the scheme design to ensure that the finalised route and detailed design is the least environmentally damaging, building upon the positive work undertaken at the	The iterative design process has provided the opportunity to avoid or reduce potential environmental impacts through changes to aspects such as road alignment, land requirements, and the type and form of major structures. Changes incorporated into the Project design during

Natural England comment	National Highways response
preferred route selection stage. Such an approach is in accordance with the 'avoid, mitigate, compensate' hierarchy within the National Planning Policy Framework.	the design process that have, by their inclusion, avoided or reduced potential environmental impacts are referred to as embedded mitigation. Each ES chapter includes a list of standards, guidance and studies that have been referred to in the assessment. The Project, as submitted at DCO application, includes a range of environmental commitments, please refer to the REAC, which can be found in the CoCP (ES Appendix 2.2). This includes embedded mitigation which are measures that form part of the engineering design, developed through the iterative design process which has facilitated design updates and improvements, informed by environmental assessment and input from the Project engineering teams, stakeholders and public consultation. Embedded mitigation is included within the Design Principles (Application Document 7.5).
Given the scale of the development, it being one of the biggest transport infrastructure projects in the country, Natural England would expect the project to be an exemplar in sustainable development demonstrating how it is helping to achieve the outcomes within the Government's 25 Year Environment Plan. Natural England would be pleased to work with the Project Team and National Highways over the coming months to realise the ambition for this to be an exemplar project for delivering environmental net gain. The PEIR makes reference to enhancements but we do not consider they realise the ambitions of the Environment Plan for a scheme of this size.	National Highways has committed to achieving no net loss in biodiversity by the end of RIS 2 and will work towards net biodiversity gain by 2040 across its estate. Although the construction of the Project would have significant adverse effects on statutory designated sites and irreplaceable habitats, such as veteran trees and some sections of ancient woodland, the design has sought to provide biodiversity gains wherever possible and this has resulted in a 15% increase in habitat value. No likely significant effects are predicted on terrestrial biodiversity during operation. An assessment of baseline biodiversity value and that achieved by the Project's design post development is presented within the Sustainability Statement (Application Document 7.11). Please refer to the Need for Project (Application Document 7.1) for more information.
We welcome the intention on page 6 to 'carry out environmental mitigation such as relocating protected species' as part of the enabling phase before main construction work begins. We would highlight the need for any associated habitat creation works (whether for species or habitats) to be timetabled such as to allow sufficient maturation time in order for the habitats created to function effectively for target species, and/or to display sufficient	

Natural England comment	National Highways response
functionality. The aim where possible should be to avoid the net loss of habitat availability at any given point in the project construction, moving to a position of long-term net gain, consistent with the direction of environmental policy. Any likely temporal shortfall in habitat availability may need to be taken into account through upscaling to offset that deficit.	
The PEIR confirms the estimated construction time frame of around six years. Whilst we recognise the necessity of a lengthy construction period for a major infrastructure project of this scale, it is noted that typically construction phase effects are shorter in duration, and for many species a six-year period may represent several life cycles. We suggest that the associated impact assessments should consider whether the duration of the construction phase may translate into longer-term effects to some species, and whether any changes in distribution or behaviours may take longer to reverse than would typically be the case for otherwise temporary impacts. For example, it is possible that changes in over wintering bird distribution by the avoidance of foraging areas may become learned behaviours, beyond the completion of the construction phase.	ES Chapter 7: Landscape and Visual (Application Document 6.1) has assumed a construction period of up to 7 years, with certain activity extending beyond this period for a further 3 years. The Habitats Regulations Assessment (HRA) (Application Document 6.5) has considered effects that act on qualifying species and habitats for above 5 years duration as permanent effects, in part for the reasons mentioned.
The clear positioning of construction compound areas is welcomed, and we agree that these should be scoped into impact assessments for the project as a whole. We welcome the proposed 'Code of Construction Practise' (CoCP) and its intention to include environmental best practice, which should include specific measures as required and informed by detailed surveys.	The Code of Construction Practice (CoCP) (ES Appendix 2.2) has been shared with Natural England at each stage of drafting, starting with a skeleton version, and presented at a workshop in December 2019 and April 2020. Further drafts were shared throughout 2020 prior to DCO submission.
We note that a number of services and utilities are likely to need diversion or alteration as part of the project –it is not clear to us at this stage whether such actions are to be included within the scope of the project, or whether they will be separately assessed and consulted upon and it would be appreciated if clarity were provided.	After Statutory Consultation, engagement with Natural England continued. Construction impact workshops were held to explain the utility works and demonstrate the impact. Further information was also shared during Supplementary and Design Consultation. The scope of the utility works is included as part of the Project and has been assessed in the ES (Application Documents 6.1 to 6.3).

Natural England comment	National Highways response
Similarly, given the likely change in traffic flow through Kent with an increase in vehicle movements along the A2/M2 corridor once the Lower Thames Crossing is operational, any highway upgrade or junction improvements that will be required to facilitate the safe and effective operation of the A2/M2 between the Crossing and the channel ports should be considered within the Environmental Statement; at present no such assessment seems to be proposed or included within the PEIR.	ES Chapter 16: Cumulative Effects Assessment (Application Document 6.1) has considered the potential for cumulative impacts between reasonably foreseeable developments and the Project, including highways improvements. These have been summarised in the ES Chapter 16: Cumulative Effects Assessment (Application Document 6.1).
It may be appropriate to note for the avoidance of doubt, that the reference to 'priority habitat or species' at Table 9.2 (NPSNN paragraph number 4.25) should be distinguished from the Section 41 (of the Natural Environment and Rural Communities Act,2006) habitats and species, although they are known by the same name.	This has been noted. These distinctions have been made and have been referenced throughout ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1).
At paragraph 9.4.1, it is proposed to 'describe the current ecological baseline and capture a moment in time against which the potential effects of the proposed development will be assessed'. It should be noted that several areas likely to be affected by the proposal benefit from permissions requiring nature conservation-led restoration and aftercare plans, which may either not have commenced, or which may partially or substantially complete during the construction period of the scheme. With this in mind, the Environmental Statement should consider the latent biodiversity potential such areas hold for enhanced biodiversity that the baseline studies might not otherwise detect. We will be pleased to expand on this point as required in our pre-application discussions. Similar comments apply to paragraphs 9.5.2 –9.5.4 headed 'Future baseline conditions', where the ecological baseline may well change if this project were not undertaken.	The terrestrial biodiversity assessment within the ES considers effects from the Project on a baseline compiled from information and field data captured between 2017 and 2020. Future baseline conditions have also been considered, taking into account current uses and management of land affected by the Project and likely changes to this going forward in the absence of the Project. Where third party development is currently being carried out under existing planning consents, the Project baseline takes this into consideration, including any associated restoration plans.
Protected Landscapes	
Natural England notes that the development boundary encompasses areas of the Kent Downs Area of Outstanding Natural Beauty (AONB). The proposal is that the A2, post-	The impacts on the Kent Downs Area of Outstanding Natural Beauty (AONB) and its setting are fully assessed in ES Chapter 7: Landscape

Natural England comment	National Highways response
construction will be fourteen lanes wide (Table 8.10) with the highway estate further widened with realigned adjacent local roads, which will remove the existing tree planting within the central reserve and road embankment. Given the above, Natural England is concerned that there will be a significant negative impact on the special qualities of the AONB in this area, both through direct impacts and impacts to the setting of the AONB.	and Visual (Application Document 6.1). Measures have been taken to minimise damage to Kent Downs AONB where possible.
We also note that the application boundary now also appears to include areas of land where landscape mitigation measures for the Channel Tunnel Rail Link/High Speed 1 rail line were implemented. From the information provided, the alignment of the A2 and local roads appears to remove these previous mitigation measures which were implemented to mitigate the landscape and visual impacts of the rail line. Given the route alignment for the A2, there does not appear to be any additional land to reinstate this landscape mitigation and as such, the impacts of removing these previous mitigation measures need to be fully considered and mitigated/compensated for in addition to the further impacts that will arise from the Lower Thames Crossing project.	Landscape and visual impacts of the route, including the removal of the central reservation and established mitigation for HS1 have been assessed in ES Chapter 7: Landscape and Visual (Application Document 6.1).
Natural England acknowledge that the landscape and visual impact assessment (LVIA) has yet to be finalised for the project and are keen to work with the Project Team, the AONB Unit and other interested parties to ensure that the viewpoints for the LVIA are appropriate and the impact assessment robust. We welcome the additional visual surveys to be undertaken in winter 2018/19 and look forward to providing input during the site visit and workshop in January once these are confirmed.	After Statutory Consultation, consultation with Natural England continued on the selection of viewpoints for the landscape and visual impact assessment. The number of representative viewpoint locations increased, and agreement of these locations was sought with Natural England and Kent Downs AONB Unit. Please refer to ES Chapter 7: Landscape and Visual (Application Document 6.1).
We note that the noise impact assessment detailed within Section 13 of the PEIR does not appear to include monitoring or an impact assessment of the noise that may result from the scheme on receptors, including people recreating within the Kent Downs AONB. However, we note that Section 8.5.3 of the PEIR mentions	The landscape and visual assessment considers impacts on perceived tranquillity and a series of baseline landscape noise surveys have been undertaken at key locations where the defining characteristics include a perceived level of tranquillity. These locations and survey durations were discussed with stakeholders and include locations within the Kent

Natural England comment	National Highways response
that noise surveys were due to be carried out in the summer of 2018 for receptors within the AONB. Natural England would expect the Environmental Statement to include a full assessment of noise in relation to the AONB along with details of the mitigation measures proposed.	Downs AONB and within its setting. Locations are identified on ES Figure 7.6: Landscape Tranquillity Baseline Noise Survey Locations (Application Document 6.2) and noise results summarised in ES Appendix 7.5: Local Landscape Character Baseline. There would be localised impacts on tranquillity during construction and following completion. An acoustic barrier would be installed along Park Pale and adjacent to Shorne Woods to minimise impacts.
Given the scale of the impacts to the Kent Downs AONB (with major negative impacts predicted both during the construction and operational phases), Natural England would expect the scheme to deliver a visionary mitigation and compensation package. This may need to encompass measures both in the immediate locality of the scheme and further afield within the AONB. Natural England will of course be pleased to work with the Project Team, the Kent Downs AONB Unit and other relevant organisations to help inform the detailed mitigation strategy.	Measures have been taken to minimise damage to Kent Downs AONB where possible. Mitigation measures and residual significant effects have been reported within the ES Chapter 7: Landscape and Visual (Application Document 6.1).
Given the potential change in vehicle movement patterns in Kent upon opening, with a likely increase in traffic along the A2/M2 corridor, Natural England recommends that the Environmental Statement includes a comprehensive consideration of the potential impacts to the Kent Downs along the transport corridor to the channel ports. This should include the consideration of impacts from increased vehicle movements and any highway and junction upgrade works or utility diversions that may be required along the A2/M2 and M20 corridors. Such an assessment does not appear to have been included within the PEIR.	The EIA assesses the impact of the Project at the A2/M2 as well as the required utility diversions in this area. The scope of the utility works is included as part of the Project and has been assessed in the ES (Application Documents 6.1 to 6.3). No works are proposed along the M20 as part of the Project.
On a more general note, Natural England would recommend that the Kent Downs AONB Management Plan is referenced within the 'Planning Policy' tables in the relevant sections of the PEIR and carried forward into the Environmental Statement.	The Kent Downs AONB Management Plan (Kent Downs Joint Advisory Committee & Kent Downs AONB Unit, 2014) has been reviewed as part of the EIA. • The potential effects on landscape character and visual amenity in respect of the Kent Downs AONB are considered in ES Appendix

Natural England comment	National Highways response
	7.9: Schedule of Landscape Effects and ES Appendix 7.10: Schedule of Visual Effects. • Potential indirect effects on the Kent Downs AONB are set out in ES Appendix 7.11: Traffic and Noise Effects on the Kent Downs AONB. • Detrimental effects on the environment, the landscape and recreational opportunities are identified in the Planning Statement (Application Document 7.2). • ES Chapter 7: Landscape and Visual (Application Document 6.1) sets out the mitigation measures to minimise the landscape and visual impacts of the Project. • ES Figure 2.4: Environmental Masterplan (Application Document 6.2) identifies the embedded environmental mitigation measures for the Project. • A full extract of the published guidance is included in ES Appendix 7.6: Kent Downs AONB Relevant Guidance.
Nationally and internationally important nature conservation sites	
We welcome the ecological studies that have been undertaken or are ongoing. However in the absence of the detailed survey results Natural England is not able to provide advice on the likely direct and indirect impacts to designated sites, including Sites of Special Scientific Interest (SSSIs), Special Protection Areas (SPAs), Special Areas of Conservation (SACs),Wetlands of International Importance under the Ramsar Convention (Ramsar Sites)and Marine Conservation Zones (MCZs). We would refer you to our response to the EIA Scoping Report dated 1 December 2017 (our reference 230863) for further clarity on the information that should be provided within the Environmental Statement. Natural England will of course be pleased to provide detailed advice in relation to the likely impacts and mitigation measures in the near future once you are able to share the survey results and draft impact assessment with us.	Draft ES chapters have been shared with Natural England, along with a series of meetings and workshops to present impacts, compensation and mitigation. Detailed ecological surveys results have been provided in the technical appendices for ES Chapter 8: Terrestrial Biodiversity where they are also summarised. along with an assessment of impacts and proposed mitigation measures.

Natural England comment	National Highways response
Since our response to the EIA Scoping response, where all direct impacts to designated sites and ancient woodland (including Claylane Wood) were to be avoided, the application boundary has now been amended to encompass areas of Shorne and Ashenbank Woods SSSI either side of the A2 corridor. It is unclear, in the absence of the finalised design, whether there will be direct land take from the SSSI or areas of ancient woodland. Natural England strongly recommends that the scheme is designed to avoid all direct and indirect impacts to designated sites. Where this is not possible, a robust mitigation strategy will need to be implemented.	The Applicant has worked with Statutory Undertakers to reduce encroachment into ancient woodland wherever possible. Significant improvements have been made since the Statutory Consultation in 2018. Information on the proposed extent of ancient woodland and Site of Special Scientific Interest (SSSI) loss is detailed in ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1). Ancient woodland compensation planting has been proposed as part of the mitigation strategy and support improved habitat connectivity within the wider landscape. Measures have been taken to minimise damage to Kent Downs AONB where possible. Residual significant effects are reported within ES Chapter 7: Landscape and Visual (Application Document 6.1).
Natural England notified the Langdon Ridge SSSI on 29 June 2018. This notification has been consulted upon in recent months, and we are now assessing the responses to the consultation, with a decision on whether to confirm or withdraw this notification expected by 28 March 2019. This SSSI may not have been picked up in the baseline data collection, depending upon when certain searches were undertaken. Further information can be found on our website. It would appear appropriate for the impact assessment to consider whether there may be implications for this site as a result of the proposal.	Langdon Ridge SSSI has been included in the assessment of impacts to statutory designated sites that fall within the Zone of Influence for the Project. Full details are provided in ES Appendix 8.1: Designated Sites.
The indicative 'potential nature of effects' and 'potential mitigation measures' detailed within Table 9.28 (construction phase) and Table 9.29 (operation phase) in general, appear appropriate at this high level in the absence of detailed survey information. One additional mitigation measure that doesn't appear to be considered is the use of timing restrictions to undertake the most disturbing activities outside of the sensitive periods of the year and we would suggest this should be included as part of the overall mitigation measures. We will of course be pleased to provide input and	The measures and procedures National Highways would require its Contractors to adopt and implement are detailed in the CoCP (ES Appendix 2.2). Mitigation measures for terrestrial biodiversity are outlined in ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1). These include fencing, appropriate timing of works, phased vegetation clearance, and ECoW supervision, working according to the relevant method statements within the approved protected species licences.

Natural England comment	National Highways response
guidance over the coming months once you are able to share the detailed survey results with Natural England.	
It is not immediately clear from the PEI what the rationale for the use of a 20km zone of influence for displaced recreational users is. We may be able to assist with this impact pathway as there are strategic solutions operating in Kent to manage recreational pressure to coastal sites and similar work is at an advanced stage in Essex.	The study area for walkers, cyclists and horse riders (WCH) encompasses footpaths, bridleways and cycle routes potentially affected by the Project. Routes potentially affected by the Project were identified (including Public Rights of Way (PRoW), cycle routes and minor roads used by WCH) and current usage levels ascertained, as outlined in ES Chapter 13: Population and Human Health (Application Document 6.1). The assessment identified the sensitivity of individual routes, taking into account usage levels (including by vulnerable travellers), opportunities for substitution, and level of vehicular traffic (relevant to rights of way for WCH crossing roads at grade). Temporary and permanent closures of PRoWs, associated diversions and changes in journey length (increase or decrease) for WCH as a result of the Project were identified. Please refer to ES Chapter 13: Population and Human Health (Application Document 6.1).
As mentioned in our response to the EIA Scoping Response, Natural England consider that the Environmental Statement should consider the impacts to designated sites that may result from this scheme within the area of influence, not just the application boundary. Such impacts could result from the measures to dispose of the tunnel arisings or from increased traffic flow (and resultant air quality impacts) as a result in the change in vehicle movements along the A2/M2 and M20 corridors accessing the channel ports. We therefore recommend that the impact assessment fully considers such impacts, out with the Development Consent Order boundary.	The study area for terrestrial and marine biodiversity encompasses the Project's Zones of Influence. Statutory designated sites including Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Ramsar, SSSIs and National Nature Reserves (NNRs) were assessed up to 2km from the Order Limits, with an expanded study area for European Sites designated for bats within a 30km radius.
Air Quality	
Within Natural England's advice to the Planning Inspectorate at the Environmental Impact Assessment scoping stage and during our recent meetings with the Project Team, Natural England requested that the air quality assessment considered the potential impacts to designated sites from the likely increases in traffic flow along the	Air quality impacts have been assessed in statutory ecological sites that are within 200m of the affected road network (ARN) defined in DMRB LA 105 (Highways England, 2019a) . Such sites have been assessed for changes in nitrogen deposition (associated with the Project), taking into account critical levels and

Natural England comment	National Highways response
entire A2/M2 corridor and link roads to the M20 corridor. There are a number of chalk grassland SSSIs and SACs which are sensitive to air quality impacts including nitrogen deposition along these corridors which may be adversely impacted during the operation of the scheme. The PEIR does not include such an assessment, confining the assessment to the application boundary.	critical loads. This includes the A2/M2 corridor and M20 link roads would fall within the ARN, but this would need to be determined at ES stage.
The air quality assessment will also need to consider the in-combination impacts that may occur from other plans and projects, including allocations within Local Plans within the area of influence of the scheme. As mentioned above, we consider the area of potential influence for the scheme should encompass the A2/M2 corridor along with the roads linking the A2/M2 to the M20 for vehicles travelling to the channel ports for the impact assessment.	The Do-Minimum and Do-Something traffic data used in the assessment of air quality already accounts for traffic growth, and for traffic generated by developments either under construction, that have planning permission, or a planning application submitted, as advised by the local authorities in early 2019 and in line with TAG. The air quality assessment has considered impacts at receptors near the Application Site, and across the ARN which covers an extensive area. This is described in ES Chapter 5: Air Quality (Application Document 6.1) and shown in ES Figure 5.3: Operational Study Area (Application Document 6.2). The ARN includes the A2/M2 corridor and the A228 and A229 to the extents shown in ES Figure 5.3: Operational Study Area.
Habitats Regulations Assessment	
The Habitats Regulations Assessment should fully detail the potential direct and indirect impacts that may result from the scheme, including impacts for functionally linked land and designated sites out with the Development Consent Order boundary where impacts may result, for example from the disposal of tunnel arisings and air quality impacts to designated sites adjacent to the wider strategic road network.	This has been noted. The Habitats Regulations Assessment (HRA) (Application Document 6.5) includes these aspects.
We note that table 9.6 (European designated sites and their extent) refers to Holehaven Creek as a proposed Special Protection Area (pSPA). For clarity, Holehaven Creek is not a pSPA but we advise that it holds a strong functional linkage to the Thames Estuary and Marshes SPA, and therefore we consider it is appropriate to include this site within the Habitats Regulations Assessment.	The Holehaven Creek SSSI is included in the HRA (Application Document 6.5) as part of the functionally linked land and is represented as such on any associated figures. However, this hasn't been included in other aspects of the HRA (Application Document 6.5) as it is not a European designated site.

Natural England comment	National Highways response
In addition, Paragraph 9.4.99 mentions the jetty location and we are pleased that this area has apparently been surveyed for its functional linkage to the Thames Estuary and Marshes SPA and Ramsar Site. Please note that Natural England has recently provided a fuller commentary on our concerns linked to activities in this area, in our Discretionary Advice Service letter dated 4 December 2018. We refer you to that letter and will not repeat our comments here.	A technical note on jetty proposals was issued to Natural England on 4 June 2020. A meeting on Water Framework Directive marine compensation was held on 1 June 2020.
Best and most versatile agricultural soil	
Table 11.2 of the PEIR does not appear to reference the potential direct and indirect impacts to best and most versatile (BMV) agricultural land and soil that may result from this proposal. Natural England recommends that a full assessment of the potential impacts to BMV land and details of the avoidance and mitigation measures that are to be implemented is included within the finalised environmental statement.	An assessment of impacts on BMV has been carried out. A meeting about Agricultural Land Classification was held with Natural England on 13 May 2020. Natural England agreed to the Project's desk-based approach where required due to COVID-19 restrictions. This is fully explained within ES Chapter 10: Geology and Soils (Application Document 6.1).
Habitats of conservation importance	
Natural England is concerned that the revised Development Consent Order boundary now encompasses areas of ancient woodland, some of which are also within the Shorne and Ashenbank Woods Site of Special Scientific Interest. We strongly recommend that the detailed design of the scheme ensures that impacts to all areas of ancient woodland and SSSIs are avoided and where this is not possible impacts are minimised, fully mitigated and compensated for.	The Project has worked with utility providers to reduce the impact on SSSIs wherever possible. Utility diversion workshops were held on 3 and 4 December 2019 to discuss this further. The Project design has taken account of the mitigation hierarchy of avoid, reduce, restore, and offset. Where impacts to ancient woodland have been unavoidable, compensatory habitat has been included within the design to offset this loss.
Natural England would welcome clarity on what is meant by "new mosaic habitat" (Page 18) and whether this is intended to refer to the Section 41 priority habitat "open mosaic habitat on previous developed land" or a more generic description of habitat mosaics. We also note that the study area includes the proposed development boundary and a 500m buffer, 'but also includes	Noted. Consultation with Natural England has been ongoing throughout the application phase and clarity on these points has been provided.

Natural England comment	National Highways response
locations further away where indirect effects from the Project could occur'. It will be helpful to agree through the consultation process what the zones of influence are for various species groups. Please note that information may exist which suggests that a larger buffer may be appropriate for certain impact pathways.	
Once the results of the detailed ecological studies are available to share with Natural England, we will be pleased to provide further advice in relation to habitats of conservation importance within our remit through our ongoing partnership approach. Given the length of the route, Natural England would expect significant mitigation measures to be implement along the whole route to maintain habitat connectivity for species and recreational routes for people.	The Project shared draft ES chapters with Natural England in June 2020. At a meeting on 13 May 2020, the purpose of the landscape strategy was discussed which is to provide robust connection between habitats along the route.
Protected species and species of principal importance	
When the Project Team are able to share the results of the protected species surveys with Natural England and the more detailed impact assessment, we will be pleased to provide advice on the nature and scale of the mitigation and compensation measures that are likely to be required. We will of course be pleased to work with the Team to ensure that, wherever possible, Natural England are able to provide the Letters of No Impediment (LONIs) for protected species ahead of the Development Consent Order submission. Similarly, we would be pleased to provide advice on species of principal importance within our remit once the detailed information is available.	Specific protected species meetings have been undertaken with Natural England in 2019 to discuss the findings of both south and north of the river and the Project's approach to species licensing.
Natural England notes that the Desk Study sources listed within table 9.4 do not include the Essex Field Club, which should be used in addition to the Biological Records Centre data. The Field Club hold substantial records in particular for invertebrates and should be consulted for appropriate records for the Essex area.	Essex field club records were received in April 2020 and have been included in the baseline of the terrestrial biodiversity assessment.
We also welcome National Highways' current view of the value of Lytag brownfield local wildlife site as being of national importance.	Lytag Brownfield Local Wildlife Site is included in the baseline of ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1). This

Natural England comment	National Highways response
It should be noted that the national invertebrate interest centres on the Lytag site, but is not confined to it, and may include other areas in that vicinity. We will be pleased to comment further on this in due course.	area has been previously subject to extensive invertebrate surveys (as part of the Tilbury2 assessment). The results of survey in this area consider it to be of national importance for invertebrates. The planning proposal for Tilbury2 has since been granted and the proposals are for the removal of Lytag Brownfield LWS with offsite mitigation at Mucking Flats and Marshes, and the retention of 0.7ha of habitat. As such no impacts are predicted from the Project.
At paragraph 9.4.24 (Table 9.9), notable records of plant species from Kent are listed. Please note that at least broad-leaved cudweed, stinking goosefoot and least lettuce are also known from appropriate habitats in Essex as well, however it does not appear that these have been noted in the desk study for Essex.	The Project has included broad-leaved cudweed and stinking goosefoot within the plant species for Kent and Essex. Least lettuce, however, has not been included as no record of it was received from the local records centres in Essex. Additionally, this species was not recorded during the baseline field surveys.
Environmental Legacy	
One of the key aspirations of the Defra Family is to ensure that the landscape, for people and wildlife, is not severed as result of the Lower Thames Crossing and associated link roads. Linear infrastructure projects like this have the potential to sever the landscape preventing movement of wildlife and making recreational access more difficult. To help maintain habitat connectivity and linkages for recreational users, Natural England considers that the scheme should ensure that a network or green/living bridges is provided along the length of the route facilitating movement and helping to future proof the scheme allowing species to move as their ranges change. We would also consider that the soft estate should be managed to maximise its biodiversity and landscape value with species-rich corridors for pollinators and habitats for widespread species created and maintained.	A meeting on green bridges was held with Natural England in November 2019 and further discussed at a DCO workshop held on 21 May 2020. Designs were presented to Natural England and Kent Downs AONB Unit on 17 May 2020. Green bridge designs are detailed in the Project's Design Principles (Application Document 7.5).
East Tilbury Area	
The area is broadly within the Essex Living Landscape areas of Tilbury and Mucking Grassland and Marshes and is situated within the Natural England Thames Estuary and Marshes Focus Area	Noted.

Natural England comment	National Highways response
(such areas are where we are seeking to contribute towards landscape scale conservation). The area also adjoins the estuary with associated inter-tidal habitats and is set between areas of industrial use containing a hub for brownfield invertebrate conservation (to the west), and active landfill and quarry sites (much of which benefits from approved nature conservation led restoration schemes) to the east and north-east.	
Opportunities exist in this area to ensure connectivity is both conserved and enhanced for invertebrate assemblages, in particular, along with other species groups since the presence of a new major road is likely to significantly hinder this. The integrity of the coastal margin should also be maintained as a functional corridor, not only for the intertidal avian assemblage but also for notable botanical and other species.	A full description of the terrestrial invertebrate baseline conditions is presented in ES Appendix 8.3: Terrestrial Invertebrates. Essential mitigation has been proposed that would support the Project becoming a wildlife corridor, linking the area around the Thames Estuary to the A13, Mardyke and M25 corridors. For example, where grassland is proposed to be created, the species mix would be herb-rich and focused on local prevalent species that would benefit local invertebrate populations.
Thames Chase Area	
This area aligns with the broad areas of the Ingrebourne Valley and quarry landscapes and Mardyke and Aveley Forest and includes part of the Essex Living Landscape areas of Ingrebourne Valley and Belhus Woods. There are many conservation projects set out in the Thames Chase Plan focussed on increasing habitat connectivity and enhancing for biodiversity that requires a mosaic of woodland, grassland and wetlands. The partnership would need to include Thames Chase Trust (with numerous partners including Forestry Commission, Essex County Council, Thurrock Council and the London Borough of Havering, amongst others).	Noted.
A2 Corridor	
This area has a rich environmental heritage with the Kent Downs AONB, Shorne and Ashenbank Woods SSSI, the South Thames Estuary and Marshes SSSI and areas of ancient woodland, species rich grassland and historic parkland. Given the significant additional	South of the River Thames, the habitat creation would largely be woodland planting to reduce the impact for the loss of ancient and SSSI woodland during construction of the Project. This woodland planting has

Natural England comment	National Highways response
severance effect the fourteen-lane dual carriageway will have for people and wildlife a visionary strategy to maintain and create new connections for people and wildlife presents the opportunity to deliver a significant environmental legacy. There are significant opportunities to link with developments at Ebbsfleet, the Swanscombe Peninsula and residential developments in Medway and Gravesham.	been designed to link existing areas of woodland including Great Crabbles Wood, Shorne Woods and Claylane Wood. For further details on essential biodiversity mitigation proposed for the Project, please refer to ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1) and ES Figure 2.4: Environmental Masterplan (Application Document 6.2).
For all of the environmental legacy opportunities that National Highways progresses, it would be appropriate to select key species for each geographical area and/or habitat as indicators to aid the monitoring and success of the conservation outcomes. We would of course be pleased to work with the Project Team to develop such indicators of success if this would be helpful.	Following construction, monitoring of newly created habitats would be undertaken in accordance with a habitat management and monitoring plan that would be established in consultation with the relevant local authorities and statutory consultees. The habitat management and monitoring plan would outline the required maintenance operations, control measures and frequency of monitoring surveys to ensure the successful establishment of habitats.
As will be expected of a scheme of this scale, post-construction monitoring, with reporting and defined performance against targets linked to baseline studies will be essential. This will need to be complemented by detailed management arrangements for any landscape and biodiversity mitigation features to secure their success in the long-term.	

17 Port of London Authority

Table 17.1 Port of London Authority Statutory Consultation

Port of London Authority comment	National Highways response
Use of the River	
Whilst transport of materials and waste by river is still under consideration by the Applicant, it is understood that the options being investigated include the use of existing or the provision of new infrastructure in the River such as a jetty. The Applicant proposes to complete a feasibility assessment "to inform the ES to determine the appropriateness and viability of using river transport. This will support the import and export of materials (including waste) and the findings used to outline the proposed materials movements strategy in the ES" The PLA supports use of the River for the construction of developments of all scales and use of the River would assist in meeting the Thames Vision's target of increasing the amount of freight transported by water. The Development Consent Order (DCO) application needs to be clear what commitment is being made to river use –what materials will be transported and what has been discounted and why. It is understood that a draft Code of Construction Practice (CoCP) will accompany the DCO application and the Applicant is encouraged to review the CoCP's and River Transport Strategies submitted in support of the Silvertown Tunnel and the Thames Tideway Tunnel DCO's.	There is no proposed jetty, but the existing East Tilbury jetty at Goshems Farm is the most likely facility to be used during the construction phase, should this be deemed necessary, and has been assessed as worst case in the EIA as whole. For the purposes of assessment it was assumed that barge movements would be limited to two a day (one movement per tide cycle), which is lower than that currently taking place at the East Tilbury jetty in relation to the works associated with Thames Tideway (currently three barge movements per day). Impacts to marine environment as a result of using this jetty have been assessed, please refer to ES Chapter 9: Marine Biodiversity (Application Document 6.1).
Marine Biodiversity	
The plans show a relatively large red line area within which any new jetty would be located and as the details provided in Chapter 10 are limited, it is not possible at this stage to scope in or out the jetty or its associated dredging due to some fundamental factors being unknown e.g. size of jetty, number of piles, depth of dredge. It is also of note that the PEIR dos not even mention a possible jetty in Chapter 2. It will be important for the	

Port of London Authority comment	National Highways response
jetty and any associated dredging to be fully assessed and included in the Water Framework Directive assessment.	
The text and tables within chapter 10 that deal with Marine Conservation Zones (MCZ's) needs updating and discussions are recommended with Natural England. For example, Swanscombe is a proposed MCZ under Tranche 3.	No specific marine biodiversity receptors have been scoped out of the assessment. An MCZ assessment was scoped out through consultation with the MMO, however potential effects were still considered in the marine biodiversity assessment. Please refer to ES Chapter 9: Marine Biodiversity (Application Document 6.1) for details on the scope of the marine biodiversity assessment.
At paragraph 10.4.49 the list of invasive species should also include Asian clams and both zebra and quagga mussels.	Noted.
Air Quality	
The PEIR recognises at paragraph 6.3.1 that the construction phase of the development has the potential to affect air quality because of emissions from vessels. Whilst the PEIR does not consider these construction effects it does advise at paragraph 6.6.3 that they will be considered as part of the ES submitted with the DCO application. The PLA agrees that such an assessment should be undertaken and presented in the ES.	Construction air quality effects associated with river transport have been scoped out of the assessment. Local Air Quality Management Technical Guidance (TG16) (LAQM.TG16) (Defra, 2016)[1] provides guidance on the risk of shipping emissions leading to exceedances of air quality objectives and therefore requiring consideration through monitoring and modelling. The guidance indicates that this would be required where either of the following criteria are met: • If there are there more than 5,000 large ship movements per year, with relevant exposure within 250m of the berths and main areas of manoeuvring. • If there are more than 15,000 large ship movements per year, with relevant exposure within 1km of these areas. The number of barge movements during construction of the Project is expected to be below 5,000 movements per year, therefore the air quality effects of river transport have not been considered further.

[1] https://laqm.defra.gov.uk/documents/LAQM-TG16-February-18-v1.pdf

Port of London Authority comment	National Highways response
People and Communities	
Chapter 14 of the PEIR considers how the project potentially affects people. It includes information about marine assets and infrastructure but the list is not representative of what occurs in the study area for example: • it includes activities that take place a significant distance away from the study area (for example the Great River Race which starts in Greenwich and finishes in Ham) and the Barge Race (which takes place in Central London) • it omits activities such as the Shorne Mead Chase (a rowing race from Gravesend to Shorne Mead light and back) • it omits river infrastructure for example it references the PLA's Denton Wharf but does not reference Port Health's pier, Clubb's jetty, the National Sea Training Centre Pier or any of the mid-stream moorings • the first reference to the Gravesend to Tilbury Ferry is at paragraph 14.4.89 in relation to cross river cycle provision All the relevant infrastructure, assets and activities need to be listed and assessed in the ES.	These omissions have since been added into the baseline for ES Chapter 13: Population and Human Health (Application Document 6.1).
Whilst the PEIR identifies marine users and infrastructure as a receptor and advises there may be potential effects on river usage and navigation because of construction activities and use of a jetty for the transportation of construction materials and waste, the potential mitigation 'is careful design of structures and careful consideration of mooring, berthing and manoeuvring arrangements'. The PLA would advise that a draft Navigational Risk Assessment (NRA) must be produced and submitted in support of the DCO application. The Applicant is urged to engage with the PLA on the production of the draft NRA as a matter or urgency to ensure that the scope and subsequent carrying out of the assessment meets the PLA's requirements. The NRA will need to take into consideration the full range of activities that take place in this part of the river and during the construction phase it will be necessary to ensure that there is minimum	Impacts on marine and riparian assets have been considered. To the north of the River Thames, these impacts are restricted to potential jetty use during Project construction. The existing East Tilbury jetty at Goshems Farm is the most likely facility to be used during the construction phase, should this be deemed necessary. It is assumed that barge movements would be limited to two a day (one movement per tide cycle), which is lower than that currently taking place at the East Tilbury jetty in relation to the works associated with Thames Tideway (currently three barge movements per day). As such, no navigational risk assessment has been undertaken.

Port of London Authority comment	National Highways response
disruption to normal port operations and continuous engagement with the PLA.	
Road Drainage and Water Environment	
Whilst paragraph 2.9.2 of the PEIR refers to drainage systems south of the River Thames being to outfall to soakaways and the River Thames and paragraph 2.94 states “outfalls to watercourses will include attenuation basins to reduce outflows to green-field runoff rates” this does not appear to be reflected in chapter 15 of the PEIR which advises that a surface water drainage strategy is being developed. There is no reference to discharge to the River Thames. A clear strategy for water discharge needs to be set out and assessed in the ES.	The Project has been assessed as per the detail provided in ES Chapter 2: Project Description (Application Document 6.1). This contains information on the proposals for the management of highway drainage. During construction, drainage and process water from the northern tunnel entrance compound is proposed to outfall from the north side of the River Thames. The discharge infrastructure would be designed in accordance with measures agreed with the MMO as detailed in the Deemed Marine Licence (Schedule 14 of the draft DCO (Application Document 3.1)). Further details are provided in ES Chapter 9: Marine Biodiversity and ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1).
Depending on the design or temporary works to be progressed, consideration will need to be given to regime impacts of any structures or dredging by numerical modelling.	Noted.

18 Public Health England

Table 18.1 Public Health England Statutory Consultation

Public Health England comment	National Highways response
Environmental Public Health	
We are generally satisfied with the proposed methodology. We would expect to see that the detailed quantitative and cumulative assessments proposed are undertaken and provided in the final Environmental Statement (ES).	Noted.
The PEIR focuses on compliance with air quality standards. There are benefits to public health in improving air quality beyond standards and limits. We recommend that the promoter considers the potential benefits to air quality and health associated with road and traffic management design and mitigation options and seeks to maximise benefits. This could include evaluation of potential population-level exposure reduction in the local urban area, as well as impacts and benefits associated with changes in emissions on a regional basis.	An air quality assessment has been undertaken and the benefits have been considered in the Health and Equalities Impact Assessment (Application Document 7.10).
The PEIR has provided limited information on the tunnel ventilation system and associated emissions to air for the operational phase of the project. We recommend that the final ES considers any risks or impacts that might arise from the proposed system and confirm that any impacts have been evaluated and will not be significant.	This has been undertaken, please refer to ES Chapter 5: Air Quality (Application Document 6.1).
The PEIR states that the construction of the tunnel and highway below the existing ground level will produce a significant quantity of material arisings. The River Thames may be used to transport excavated waste materials from the site which includes plans to potentially build a jetty to facilitate this within the scheme. It is recognised that this could have beneficial effects on air quality from reduced road journeys required to move the very large quantities of excavated waste. We expect that these plans will be developed	The Project does not include a new jetty option, but the environmental assessment has taken into account river transport using the existing East Tilbury jetty at Goshems Farm, and the refurbishment/maintenance, operation and decommissioning of this jetty. It was assumed that the operation of the jetty would be used for the import of concrete segments to the supply the tunnelling only. The barge movements would be constrained by the tide and would

Public Health England comment	National Highways response
further and details will be provided for comment at the application stage.	coincide with high tide, limited to two a day (one movement per tide cycle). Construction air quality effects associated with river transport have been scoped out of the assessment. As it is anticipated that there would only be two barges per day, the annual barge movements would be well below the thresholds detailed by guidance that would lead to exceedances of air quality objectives. More information can be found in ES Chapter 5: Air Quality (Application Document 6.1).
We note the current PEIR has not considered possible health impacts of Electric and Magnetic Fields (EMF). We recommend that the final ES confirms either that the proposed development does not include or impact upon any potential sources of EMF; or ensure that an adequate assessment of the possible impacts is undertaken and included in the ES.	Electromagnetic fields (EMF) from National Grid owned overhead lines that are required to be repositioned as part of the Project have been assessed by a specialist at National Grid. The assessment can be found in Appendix D of the Health and Equalities Impact Assessment (Application Document 7.10).
The PEIR states that the promoter has no plans to decommission the proposed scheme and does not consider further consideration of decommissioning appropriate. We recommend that provision for minimising any impacts to air, ground or water quality associated with future decommissioning are still accounted for as part of the scheme design.	It is highly unlikely that the Project would be decommissioned before the end of its 120-year design life as the road would have become an integral part of the strategic road network. However, if it were required that the Project needed to be decommissioned, this would conform to the statutory process at that time, and an EIA or similar assessment would be undertaken in line with regulatory requirements at that future point in time.
We welcome the initial assessment of noise generated during the construction and operational phases of the Project, and the identification of noise sensitive receptors which may be impacted as a result.	Noted.
We are unable to find any discussion or quantification of specific health impacts due to environmental noise exposure in either Chapter 13 or 14. We would expect to see consideration of the effect on human health of changes in environmental noise levels due to construction and operational phases of the Project, including health	Please refer to the Health and Equalities Impact Assessment (Application Document 7.10), which has drawn on the conclusions of ES Chapter 12: Noise and Vibration (Application Document 6.1).

Public Health England comment	National Highways response
outcomes such as annoyance, sleep disturbance and cardiovascular effects, in line with the Noise Policy Statement for England's	
(NPSE's) aims to "avoid significant adverse impacts on health and quality of life; mitigate and minimise adverse impacts on health and quality of life; where possible, contribute to improvement of health and quality of life". We recommend that the latest evidence published in the WHO Environmental Noise Guidelines [1] is used to quantify effects arising from operational road traffic noise exposure.	The operational road traffic noise assessment has been undertaken using DMRB LA 111 (Highways England, 2020f). Please refer to ES Chapter 12: Noise and Vibration (Application Document 6.1).
We have set out specific recommendations with regards to the additional assessments which will be undertaken as part of the full Environmental Statement, in particular in relation to the following: the potential for adverse health outcomes due to changes in environmental noise exposure; the significance of noise impacts in view of the potential impact on health and quality of life; the efficacy and/or monitoring of proposed noise mitigation strategies; and the dissemination of relevant information to local communities. The recommendations are discussed in further detail Appendix 1.	Noted.
Health and Wellbeing	
It is noted from the PEIR that: • A wider community impact approach is being followed by National Highways (HE) as part of the project's assessment. This approach includes the preparation of Equality Impact Assessment (EqIA) and Health Impact Assessment (HIA), which will assist with determining the effects of the project on communities and vulnerable populations. • Section 42 and Section 47 consultations are being run concurrently; and • Further detailed assessments are to be completed to support the HIA and other public health impacts are to be incorporated in the final ES.	Noted.

Public Health England comment	National Highways response
The final HIA should reflect and address information from the wider stakeholder engagement, in particular the local Directors of Public Health (DsPH), Clinical Commissioning Groups (CCGs) and through the community engagement exercises.	A Health and Equalities Impact Assessment (Application Document 7.10) has been submitted as part of the DCO application. A Community Impacts and Public Health Advisory Group (CIPHAG) was established and first met 26 November 2018. Please refer to the Health and Equalities Impact Assessment (Application Document 7.10) for a summary of all CIPHAG meetings. The meetings were held to discuss data sources and the scope of the Health and Equalities Impact Assessment (Application Document 7.10). Provisional findings were discussed with the group.
The impacts on health and wellbeing of the scheme will have particular effect on vulnerable or disadvantaged populations, including those that fall within the list of protected characteristics. The ES and EqIA should be considered in parallel and the findings integrated where appropriate. The HIA should identify the vulnerable or disadvantaged groups and the effects on health inequalities, along with specific mitigation measures.	The Health and Equalities Impact Assessment (Application Document 7.10) has identified the vulnerable or disadvantaged groups and the effects on health inequalities, along with specific mitigation measures.
The PEIR makes reference to potential topics for inclusion within a HIA throughout the document but does not provide a centralised scoping list. The scoping of the HIA will be important in order to ensure assessment of the appropriate wider determinants of health. There should be parity between mental and physical health, and any assessment of health impact should include the appreciation of both. The final scoping of the HIA should be agreed with PHE, local DsPH, and based on evidence from the community engagement and local data analysis (e.g. Joint Strategic Needs Assessments (JSNA), Public Health Outcomes Framework (PHOF)).	A Community Impacts and Public Health Advisory Group (CIPHAG) was established and first met 26 November 2018. Please refer to the Health and Equalities Impact Assessment (Application Document 7.10) for a summary of all CIPHAG meetings. The meetings were held to discuss data sources and the scope of the Health and Equalities Impact Assessment (Application Document 7.10). Provisional findings were discussed with the group.
The detail within the HIA must be expanded to include an assessment of the impact, proposed mitigation and an assessment of the subsequent effect on health and inequalities in relation to:	Noted.
• **Housing** – demand for temporary accommodation by the construction workforce should be identified and an assessment	

Public Health England comment	National Highways response
made regarding the impact on local housing supply and affordability, particularly in relation to homelessness provision of short term housing supply. Given the number of other large developments the cumulative impact on housing provision should be included.	The list of topics included for assessment, together with their justification for inclusion is provided in the Health and Equalities Impact Assessment (Application Document 7.10). In addition to those topics listed in Public Health England's comments, severance, road safety, climate change, pollution and electric management fields have also been assessed.
• **Use of health care services** – large numbers of construction workers can impact on the local health care system. Early liaison with the health care system (primary care, pre-hospital and secondary care) is required in order to identify impacts, e.g. increased demand from workers and delay in patient journeys or transfers during construction.	
• **Access to green/open space** – the open space assessment and noise assessments should identify impacts on the access, quality and usability by local communities. Any new or restored green / open space should be sited and designed to ensure access across the life course and account for the uneven distribution of access across communities. The mitigation plans should identify the design principles or standards that will be adopted and any support for community engagement to promote use of these assets to local communities.	
• **Mental health** – the perceived risk of and actual impact due to noise, disruption of activities, the loss of property / land and community severance can have a negative impact on mental health and wellbeing. Mental well-being is fundamental to achieving a healthy, resilient and thriving population. It underpins healthy lifestyles, physical health, educational attainment, employment and productivity, relationships, community safety and cohesion and quality of life. A scheme of this scale and nature has impacts on the over-arching protective factors, which are: – Enhancing control – Increasing resilience and community assets	

Public Health England comment	National Highways response
– Facilitating participation and promoting inclusion. There should be parity between mental and physical health, and any assessment of health impact should include the appreciation of both. The effects on mental health of the population and vulnerable groups should be assessed and appropriate mitigation measures identified as part of the HIA. A systematic approach to the assessment of the impacts on mental health, including suicide, is required. The Mental Well-being Impact Assessment (MWIA) could be used as a methodology. The assessment should identify vulnerable populations and provide clear mitigation strategies that are adequately linked to any local services or assets.	
• **Physical activity –** The PEIR identifies how non-motorised user (NMU) will be impacted through the loss or change impact on formal Public Rights of Way (PRoW) and cycle routes. Active travel forms an important part in helping to promote healthy weight environments and as such it is important that any changes have a positive long term impact where possible. Changes to NMU routes have the potential to impact on usage, create displacement to other routes and potentially lead to increased road traffic collisions. The overall risk to NMU and impact on active travel should be considered on a case-by-case basis, taking into account, the number of users and the effect that the temporary traffic management system will have on their journey and safety. Any traffic counts and assessment should also, as far as reasonably practicable, identify informal routes used by NMU which may be affected. The final ES should identify the temporary traffic management design principles or standards that will be maintained with specific reference to NMU. It should also identify opportunities to improve the provision of active travel infrastructure in the long term**.**	
• **Community impacts –** individual local communities and business within the zone of influence of the development should	

Public Health England comment	National Highways response
receive an individual assessment as part of any health equality or equity assessment. The route should be divided into sections based on community boundaries as well as route wide impacts and effects. The HIA should assess how communities can be affected through the loss of key businesses, community assets, creation of community severance or the potential for planning blight and identify suitable mitigation measures.	
• **Cumulative Impacts**– the PEIR identifies the potential for other developments to add impacts on the local communities. An assessment should be made that identifies these additional developments and reasonably foreseeable impacts on the local communities.	This has been undertaken. Please refer to ES Chapter 16: Cumulative Effects Assessment (Application Document 6.1).
In respect to health and wellbeing impacts and effects, consideration should be given to the need for monitoring where it would be beneficial to confirm initial assessments and provide early indications for additional mitigation measures. The final ES should consider this further including: • Impact on housing supply and affordability; • Impact on the use of health care services; • Impact on active travel; and • Impact on population mental health and wellbeing	Significantly affected private assets would be entitled to financial compensation. It would not be necessary to undertake any associated monitoring. Where there are permanent effects on community land as a result of land-take, replacement land of similar accessibility and quality has been provided. As such, it would not be necessary to undertake any monitoring. Of relevance to the human health assessment are the findings of ES Chapter 12: Noise and Vibration (Application Document 6.1). The chapter concludes some significant effects and have informed the assessment of a negative health outcome in relation to noise. In line with DMRB LA 111 (Highways England, 2020f), a range of monitoring and evaluation would be implemented. This is set out in the REAC, which can be found in the CoCP (ES Appendix 2.2).
Monitoring may need some liaison with local public health and health care system**.**	

19 Thurrock Council

Table 19.1 Thurrock Council Statutory Consultation

Thurrock Council comment	National Highways response
Assessment of health impacts – overview	
The PEIR does not contain a standalone assessment of human health impacts, instead taking the approach that the assessment can be carried out via other chapters. The approach taken is described in the LTC Scoping Report in para 5.5.4: *"[...] It is anticipated that effects on human health will be addressed in the People and Communities assessment and that effects reported in other chapters for example, air quality, noise and vibration will be used to inform this assessment.*"	A Health and Equalities Impact Assessment (HEqIA) (Application Document 7.10) has been produced and its findings are summarised in ES Chapter 13: Population and Human Health (Application Document 6.1).
It is acknowledged that the Scoping Report was published some time ago (October 2017) and that both the scheme and approach to the assessment have developed since that time. However, it considered that the risks posed to the health of community are sufficient to warrant a standalone and proportionate HIA that would provide a coherent, integrated and comprehensive assessment of health impacts, brought together as a single point of reference.	
Assessment of health impacts – Definition and understanding of human health in the EIA context	
Whilst overarching consideration of human health is provided in the People and Communities chapter, the context and background is not clear. Furthermore, a working definition of human health has not been provided in the chapter, which makes it unclear how determinants of health of relevance to the Consultation Scheme have been identified.	Definitions of health, wellbeing and equalities are included in the HEqIA (Application Document 7.10).
Assessment of health impacts – Data limitations	
There are limitations in data used to understand human health. Health Baseline data at the Local Authority level is not sufficiently detailed to	A detailed understanding of baseline conditions has been obtained through a variety of means, including a review of existing data sources,

Thurrock Council comment	National Highways response
understand nuances of the health baseline. Data should be provided at the Lower Layer Super Output Area (LSOA) level (as committed for the HIA) and the assessment should consider differential impact on specific groups. No deprivation data (key areas of deprivation in Tilbury, Chadwell St Mary, South Ockendon) or understanding of vulnerable groups to be considered is provided.	findings from statutory consultations and information from stakeholder engagement. The data sources used to determine baseline can be found in the HEqIA (Application Document 7.10).
Assessment of health impacts – Engagement	
It is not clear how vulnerable or 'hard to reach' groups have been engaged –the elderly, those with disabilities, those who may not be able to read or read English.	During Supplementary Consultation, a Disabled Road Users forum was set up to engage with disability and mobility groups to understand what concerns these road user groups have when driving through tunnels and how National Highways can communicate safety advice and specific safety features within tunnels. A meeting of the forum was convened on 9 March 2020, providing an opportunity for representatives of disability and mobility groups to provide feedback on Project proposals during supplementary consultation, including the tunnel designs and systems. One of the objectives of the meeting was to develop the tunnel evacuation strategy with input from disability/mobility drivers and passengers. National Highways commissioned a third-party agency to reproduce a version of the Project's Guide to Consultation in an 'Easy Read' format. The purpose of Easy Read is to convey information in a style that, by making use of infographics and short statements, is more easily understood by people who have difficulty reading. The Easy Read version of the Guide to Consultation was available at Public Information Events and other engagement events during the consultation. It was also possible to request copies of documents in alternative languages and formats, by calling the National Highways telephone line advertised on consultation materials or by email.
Assessment of health impacts – Engagement and stress impacts	
Potential impacts on human health during construction include stress related to the planning process itself. In this respect an assessment on human health should include how communities have been engaged.	A series of community focus groups and mapping exercises was undertaken in 2019. The aim of the focus groups was to specifically engage with harder to reach groups. The focus groups have focused

Thurrock Council comment	National Highways response
	particularly on issues such as local connectivity, public health and community wellbeing as well as the wider opportunities for local people that may be presented by the Project. More information can be found in the HEqIA (Application Document 7.10).
Assessment of health impacts – Key health impacts not identified	
A key potential impact during operation is the severance of communities from social networks and facilities, and natural capital.	Severance is a topic covered in the HEqIA; please refer to the HEqIA (Application Document 7.10).
Additionally, there is no preliminary Transport Assessment in the PEIR using standard practice methodology which assesses fear and intimidation, pedestrian amenity and delay, which will be key health determinants associated with the scheme.	A Transport Assessment has been prepared for the DCO application, please refer to Transport Assessment (Application Document 7.9).
Assessment of health impacts – Recommendations	
Given the recent establishment by HE of the Community Impacts Advisory Group whose remit will include topics (and oversight) of the assessments relating to health and well-being and equalities, a watching brief is recommended to ensure that the scope of the assessment, issues and potential mitigation being appropriately addressed as the assessment work proceeds.	Discussions on the scope, methodology and potential mitigation relating to the HEqIA (Application Document 7.10) has been ongoing at the Community Impacts Advisory Group meetings. The advisory group was established in 2018 as a body for public health officials and other local authority representatives to attend that could provide support during the preparation of the HEqIA (Application Document 7.10) in terms of information sharing, provision of technical advice and guidance around best practice.
PEIR-stage Environmental Impact Assessment methodology – Identification of receptors	
Receptors are identified and put on a scale of Negligible to Very High based on a number of criteria, generally related to scale and perceived importance. The determination of the significance of the receptors was undertaken by the applicant, in the absence of input from local authorities like Thurrock Council should be rectified.	The EIA has been undertaken in accordance with DMRB LA 104 (Highways England, 2020c) which includes descriptions for assigning value, magnitude of impact and significance.
PEIR-stage Environmental Impact Assessment methodology – Data limitations	

Thurrock Council comment	National Highways response
A number of surveys are reported as still ongoing and will input into the environmental assessment at a later date but have not informed the PEIR. These are surveys that relate to ground investigation, ecological, archaeological, air quality and noise.	This would have been expected at the PEIR stage. Since this time, surveys have been ongoing and are completed. Trial trenching for sensitive areas has been completed. The assessment of buried archaeology in ES Chapter 6: Cultural Heritage (Application Document 6.1) has been undertaken on a robust and precautionary basis. Trial trenching for sensitive areas has been completed. The assessment of buried archaeology has been undertaken on a robust and precautionary basis. Further trial trenching will continue after the submission of the DCO application, for completeness, and enabling works would not take place until that is completed. Please refer to ES Appendix 6.8: Trial Trenching Reports for Priority 1 areas.
PEIR-stage Environmental Impact Assessment methodology – Significance of Environmental Effects	
The PEIR states that, in the ES, the significance of environmental effects will be assessed using criteria that reflect current best practice, as set out in the EIA Scoping Report, and taking into consideration the Scoping Opinion provided by PINS. It is considered that the Scoping Opinion does not reflect the likely significant environmental effects of the Consultation Scheme and that a new scoping exercise should be undertaken (see Section 8.2 below).	There have been no substantial changes to the Project between the issue of the Scoping Opinion to the submission of the DCO application that would warrant a new Scoping Opinion.
PEIR-stage Environmental Impact Assessment methodology – Cumulative Effects	
No preliminary assessment of cumulative effects has been provided in the PEIR. The ES proposes to include an assessment of the cumulative effects of the Project, as set out in the EIA Scoping Report, and following the guidance in PINS' Advice Note 17: Cumulative Effects Assessment. A list of developments for inclusion in the assessment of cumulative effects shown be drawn up by HE, in consultation with affected local authorities.	ES Chapter 16: Cumulative Effects Assessment (Application Document 6.1) includes an assessment of the inter-project effects. These effects can occur due to the Project in combination with other existing and/or approved development. Each ES topic chapter assesses the cumulative impact of the Project as a result of interrelationships between different environmental topics. A technical note on the approach to the Cumulative Effects Assessment and the long list and short list of developments to be included was shared with local authorities in March 2020. Essex and Kent County Council, London Borough of Havering and Gravesham Borough Council provided comments which have been duly considered. Dartford

Thurrock Council comment	National Highways response
	Borough Council confirmed they had no comment to make. Comments were received from Thurrock Council in October 2020 which were unable to be duly considered prior to the submission of the DCO application.
Approach to mitigation	
Specific measures to mitigate adverse environmental effects during the construction phase of the LTC are not described in the consultation documents. Each environmental topic in PEIR Volume 1 concludes with a section on Potential Effects and Mitigation Measures. The measures contained there in are generic approaches to mitigation. Specific mitigation measures are instead proposed to be incorporated within a Code of Construction Practice (CoCP) as part of the Environmental Statement. These mitigation measures will relate to the construction phase of the project. Provisions relating to operational phase mitigation are discussed at the ends of these sections.	The Project as submitted with the DCO application includes a range of environmental commitments. Each technical ES chapter includes relevant commitments as embedded and essential mitigation and good practice approaches and actions. These commitments fall within the following categories, and each topic chapter of the ES identifies those that are relevant to the topic assessment: • Embedded mitigation: measures that form part of the engineering Design Principles (Application Document 7.5), developed through the iterative design process. • Good practice: approaches and actions identified to avoid or reduce potential impacts, and typically applicable across the whole Project. • Essential mitigation: 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 additional measures have been identified by environmental topic specialists, taking into account the effect of embedded mitigation and good practice commitments. Embedded mitigation is also included in the Design Principles (Application Document 7.5). Good practice and essential mitigation are included in the REAC, which can be found in the CoCP (ES Appendix 2.2). Environmental Impacts and Mitigation workshops were held with local authorities and Statutory Environmental Bodies to report on potential significant effects and emerging mitigation proposals. These workshops

Thurrock Council comment	National Highways response
	provided consultees with an opportunity to comment and provide input. Meetings on mitigation proposals were held with specific consultees where required and requested.
Environmental impacts of construction and the CoCP	
The consultation material puts a strong reliance on developing a Code of Construction Practice (CoCP) in order to control environmental impacts during construction. No discussion has been identified about designing out the construction impacts from the outset which help to assure consultees that adverse environmental impacts were not only being mitigated, but avoided entirely, where possible. It is recommended that a technical meeting is convened early with the Council to engage over this critical document.	Effective design is an iterative process informed by the EIA process and working to avoid significant effects on environmental receptors. DMRB suggests design measures which can be incorporated within highways design where appropriate, to mitigate impacts arising from highways development that cannot be avoided. This has been referred to on the Project as embedded mitigation which can be found in the following: • Design Principles (Application Document 7.5) • Each relevant ES topic chapter (Application Document 6.1) • ES Figure 2.4: Environmental Masterplan (Application Document 6.2). Technical meetings on the Code of Construction Practice (CoCP) (ES Appendix 2.2) have been held with local authorities and drafts of the CoCP have been shared with the host local authorities for comment.
Summary of review of PEIR environmental chapters	
Air Quality	
A number of potential significant effects are misrepresented or excluded because of flawed assumptions or inconsistencies. For example: The PEIR has not included an assessment of construction phase traffic effects which may be significant for a scheme like LTC.	Please refer to Section 1.1.3 to 1.1.5 of this appendix. It was recognised in the PEIR that the construction phase has the potential to affect air quality because of emissions of construction dust, and emissions from plant and construction vehicle movements. Mitigation measures for dust were outlined in the PEIR. As stated in the PEIR, a full assessment of the air quality effects of the construction and operational phase has been reported in ES Chapter 5: Air Quality (Application Document 6.1). The assessment of potential air quality effects from the construction of the Project comprises: • Construction phase dust assessment

Thurrock Council comment	National Highways response
	• Construction phase combined assessment of additional construction traffic and traffic management Please refer to ES Chapter 5: Air Quality (Application Document 6.1) for more information.
The PEIR has not assessed all relevant road receptors following modelled changes in traffic.	The air quality assessment has been undertaken in accordance with DMRB LA 105 (Highways England, 2019a). Sensitive receptors for human health and designated habitats were included in the assessment within 200m of the affected road network (ARN). Sensitive receptors are defined in Local Air Quality Management Technical Guidance (TG16) (Defra, 2016). Internationally, nationally and locally designated sites of ecological conservation importance on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity (known as designated habitats) within 200m of the ARN are included in the air quality assessment.
The PEIR does not consider a key pollutant with known health effects, recommended by WHO guidelines (PM2.5).	Operational impacts from particulate matter finer than 2.5µg/m^3 ($PM_{2.5}$) are considered within this assessment, in response to comments from the Planning Inspectorate, Gravesham Borough Council and Thurrock Council. National Highways continually reviews the $PM_{2.5}$ levels across England; there are no breaches of the EU levels. There is nowhere on the Strategic Road Network which is close to exceeding the limit. National Highways has calculated that even a large increase in vehicles at a single point would cause a very minor increase not sufficient to cause an exceedance or even be close to exceedance. There is no need therefore to specifically model $PM_{2.5}$ as part of DMRB assessments to determine whether the Project may result in significant effects. $PM_{2.5}$ concentrations have not been specifically modelled as this is not a requirement of DMRB LA 105 (Highways England, 2019a). However, the modelled PM_{10} results have been utilised here (as they contain the $PM_{2.5}$ fraction) to demonstrate that there will be no risk of $PM_{2.5}$ exceeding statutory thresholds.

Thurrock Council comment	National Highways response
The PEIR provides standard techniques for mitigating effects such as construction dust but omits numerous effective techniques that warrant consideration.	Construction phase good practice mitigation measures for air quality are included in the REAC, which can be found in the CoCP (ES Appendix 2.2). These measures would reduce the air quality effects associated with construction dust as well as emissions from Non-Road Mobile Machinery (NRMM) and construction vehicles.
Techniques for mitigation during operational stage will only be considered if the ES determines there will be significant effects. It is currently assumed there won't be, so the analysis does not speculate as to what these might be in the scheme.	The conclusion of the operational air quality assessment is that the Project is not considered to result in any significant air quality effects, so no air quality mitigation has been included for the operational phase.
Cultural Heritage (including Archaeology):	
The LTC project should establish a Heritage Panel, involving local authorities like Thurrock Council, to ensure a proactive, consistent and engaged approach to the scheme.	Bilateral meetings between Historic England, Essex Place Services, Greater London Archaeology Advisory Service (GLAAS) and Kent County Council, with the Applicant and sub-contractors were held frequently since December 2019. Environmental workshop were held April and June 2020 to discuss environmental impacts and mitigation. Essex Places Services have attended the bilateral meetings on behalf of Thurrock Council.
The PEIR should acknowledge all appropriate guidance principles – including Historic England's GPA2 and GPA3 principles.	Historic England's (2015) Good Practice Advice in Planning: 2 (GPA2) and (2017) Good Practice Advice in Planning: 3 (GPA3) principles have been used in devising the methodology and data collection and assessment of cultural heritage impacts. Please refer to ES Chapter 6: Cultural Heritage (Application Document 6.1) for the full list of standards and guidance used.
The PEIR should consider all relevant effects within its own cultural heritage analysis, such as Historic Landscape, and the effects of vibration on the fabric of heritage assets.	Historic landscape assessment is included within ES Chapter 6: Cultural Heritage (Application Document 6.1) and ES Appendix 6.1: Cultural Heritage Desk-based assessment.
A study area of 1km is not justified, nor is 100m for collecting condition information on designated heritage assets –both areas should be expanded.	An outer study area 1km from the Order Limits was used to create the baseline. This was refined by consultation, the Zone of Visual Influence (ZVI), noise assessment and professional judgement, which extended the study area in some places and reduced it in others. Additional

Thurrock Council comment	National Highways response
	consultation with stakeholders along with professional judgement added heritage assets that are located outside the ZVI or 1km that are considered to potentially experience an impact and therefore required assessment, for example where groups of heritage assets with group value extend beyond the ZVI. This study area has been used to assess the impact on any designated assets and the setting of any heritage asset. Any assets scoped out of the assessment are listed in the ES Appendix 6.1: Cultural Heritage Desk-based Assessment. The study area is shown in relation to archaeological remains, built heritage and historic landscape on ES Figures 6.1, 6.2 and 6.3, respectively (Application Document 6.2).
It is recommended that HE engages proactively with Thurrock Council to reduce impacts on the Thurrock Council-owned Coalhouse Fort, an important heritage asset and popular tourist attraction.	Bilateral meetings between Historic England, Essex Place Services, Greater London Archaeology Advisory Service (GLAAS) and Kent County Council, with the Project team and sub-contractors were held monthly since December 2019. Essex Places Services have attended the bilateral meetings on behalf of Thurrock Council. Environmental workshop were held April and June 2020 to discuss environmental impacts and mitigation. The Applicant has sought to reduce impacts on Coalhouse Fort. The importance of Coalhouse Fort from the perspective of the National Policy Statement National Networks (NPSNN) (Department for Transport, 2014) relates to its designation as a scheduled monument, which has been assessed in ES Chapter 6: Cultural Heritage (Application Document 6.1). The assessment of the impact of the Project on Coalhouse Fort in its capacity as a tourist attraction has been assessed as part of ES Chapter 13: Population and Human Health (Application Document 6.1).
The PEIR needs to extend its assessment to significant non-designated assets, for example those associated with the Grey Goose Farm scheduled monument.	ES Chapter 6: Cultural Heritage (Application Document 6.1) includes an assessment of non-designated assets, including those at Grey Goose Farm.

Thurrock Council comment	National Highways response
There is concern that the sensitive nature of the area of the grave terraces and interface with the grazing marsh is not fully acknowledged with the submitted documentation.	The grave terraces are included in the cultural heritage assessment, including the specialist Historic Landscape Character study. External specialists were procured for those aspects of the historic environment which require focused assessment, e.g. Palaeolithic remains, marine archaeology and Historic Landscape Character. The latest guidance on assessment of impacts to heritage assets has been utilised by the specialists. Please refer to ES Chapter 6: Cultural Heritage (Application Document 6.1).
Intrusive surveys need to be undertaken in order to properly determine the significance of the heritage assets to be affected.	Trial trenching has been undertaken within the Order Limits. This comprise targeted trenches, based on the results of the aerial mapping study and geophysical survey. The targeted trenches test the reliability of the other assessment methodologies in the specific area and provide further detail regarding the nature and significance of any identified heritage assets. These results of the work carried out prior to the submission of the DCO application are presented in ES Appendix 6.8: Trial Trenching Reports for Priority 1 areas.
Landscape	
The PEIR should be more explicit on which guidance it is using for its assessment methodology.	The guidance used for the landscape and visual assessment was shared with stakeholder during environmental workshops in April and June 2020. Please refer to ES Chapter 7: Landscape and Visual (Application Document 6.1) for the full list of guidance used.
The PEIR's methodology does not clearly set out how levels of sensitivity and magnitude have been defined and how these judgements may be combined within the LVIA to establish significant effects for receptors.	The assessment methodology of the effects on landscape and visual are detailed in ES Appendix 7.2: Landscape and Visual Assessment Methodology which includes detail on the following: • Definition of receptor sensitivity (having regard for a combination of the value of a landscape/visual receptor and its ability to accommodate specific change) • Definition of the magnitude and nature of effect • The evaluation of significance of landscape effect/on visual amenity

Thurrock Council comment	National Highways response
The LVIA should consider all relevant landscape character area, features, key characteristics, key landscape qualities and key landscape conditions as set out in the Thurrock Landscape Capacity Study.	Thurrock Landscape Capacity Study has been referred to in the landscape and visual assessment which considers the relevant landscape character area, features, key characteristics, key landscape qualities and key landscape conditions.
The assessment should consider 'distant' viewpoints, including identified strategic and local views.	The landscape and visual assessment considers distant viewpoints. The representative viewpoints for assessment of visual effects have been shared and discussed with relevant stakeholders.
Early indication of operational mitigation proposals would suggest they may not be adequate or effective.	Since the production of the PEIR, assessment has been completed which has informed appropriate mitigation measures. Although the results of the PEIR remain valid, all mitigation options were refined as the assessment evolved. The emerging mitigation options were discussed with relevant stakeholders before DCO submission.
Terrestrial Biodiversity	
The omission of an analysis of temporary loss of functional land potentially used by SPA species during construction means significant effects could have been missed, and furthermore may inflate the compensation areas required as mitigation.	An analysis of temporary loss of functional land is included in the Habitats Regulations Assessment (HRA) (Application Document 6.5) and ES Chapter 8: Terrestrial Biodiversity (Application Document 6.1).
The PEIR has not indicated any commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, National Highways policy, and local policy.	National Highways has committed to achieving no net loss in biodiversity by the end of RIS 2 and will work towards net biodiversity gain by 2040 across its estate. Although the construction of the Project would have significant adverse effects on statutory designated sites and irreplaceable habitats, such as veteran trees and some sections of ancient woodland, the design has sought to provide biodiversity gains wherever possible, and this has resulted in a 15% increase in habitat value. No likely significant effects are predicted on terrestrial biodiversity during operation. An assessment of baseline biodiversity value and that achieved by the Project's design post development is presented within the Sustainability Statement (Application Document 7.11). Please refer to the Need for Project (Application Document 7.1) for more information.

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The extent of surveys has fallen short of minimum standards in the case of Barn Owl studies.	Since the production of the PEIR, further field surveys have been undertaken to compile a terrestrial biodiversity baseline for the Project. Please refer to ES Appendix 8.7: Ornithology for details on the Barn Owl survey methodologies.
The effectiveness of recreating particular habitats, including LWS sites, is highly limited in some cases, and it is offered as potential mitigation in the PEIR. This mitigation should be given scrutiny against alternatives.	The terrestrial biodiversity assessment has been completed which has informed appropriate mitigation measures. Although the results of the PEIR remain valid, all mitigation options were refined as the assessment evolved. The emerging mitigation options were discussed with relevant stakeholders before DCO submission.
Marine Biodiversity	
The PEIR is limited by its sole reliance, so far, on desk-based studies, and as such the determination of impacts and mitigation are likely to be less accurate and reliable.	In addition to desk-based studies, fieldwork was undertaken, which was agreed with the Environment Agency and MMO. Benthic macroinvertebrate samples were collected as part of a marine ground investigation programme in 2019. The results are presented in ES Chapter 9: Marine Biodiversity (Application Document 6.1).
There is a lack of clarity on the Zone of Influence of the project, and therefore the justification of both the European sites, and the National Sites taken forward for assessment.	The study area for the marine biodiversity has since been finalised. The core construction study area includes an area of 11km both up and downstream of the Order Limits to account for the movement of water and sediments within an average tidal excursion. The extent of the construction study area is presented in ES Figure 9.1: Nationally and internationally designated sites within 11km of the Order Limits (Application Document 6.2). Operational effects would be limited to the immediate vicinity of the tunnel crossing and portal areas, and as such the construction study area is considered as adequate to inform the assessment of operational effects. This is because of the small-scale nature of the proposed marine design elements, and the significant and rapid dilution and dispersion capacity of the Thames near the proposed drainage discharges.
The PEIR does not provide opportunities for enhancement for marine receptors, as suggested by the NNNPS.	Please refer to ES Chapter 9: Marine Biodiversity (Application Document 6.1) which identifies the opportunities taken to protect and

Thurrock Council comment	National Highways response
	enhance biodiversity and geological conservation interests through mitigation and design.
Geology and Soils	
The lack of intrusive investigations mean that it is not possible to be sure that HE have considered the environmental implications of worst case scenarios that can only be understood if long-term monitoring is carried out.	A programme of intrusive ground investigation (GI) works was carried out in two phases to help develop the reference design and, where data has been available, support the core assessments of the DCO application. Phase 1, completed between September 2017 – February 2018 and September 2018 – January 2019, was focused on the alignment of the tunnel and the areas surrounding the proposed North and South Portals. Phase 2 of the GI was carried out between April 2019 and April 2020 and included investigations along the whole Project route, as well as further works in the South and North Portal areas. Both phases of ground investigation included a range of intrusive and non-intrusive investigation, *in situ* testing, geotechnical and geo-environmental laboratory testing as well as hydrogeological testing. Where possible, relevant data obtained from the ground investigations have been incorporated into the baseline and used to validate the assessment of effects on the geological environment.
A minerals safeguarding assessment and PSSR have not been included in the PEIR which are important sources of information that would assist stakeholders.	Please refer to ES Appendix 11.2: Mineral Safeguarding Assessment.
The study area of 250m is insufficient as it may not capture areas outside the buffer that may contain higher risk features.	The study area for geology and soils was based on the standard outlined in DMRB LA 109 Geology and Soils (Highways England, 2019b). The study area considered the Order Limits, the locations of contaminative sources outside the Order Limits that could migrate onsite and affect receptors, and the locations of offsite sensitive receptors. For further justification of the geology and soils study area, please refer to ES Chapter 10: Geology and Soils (Application Document 6.1).

Thurrock Council comment	National Highways response
The analysis excludes the potential for leachate and cavity formation in made ground, which are environmental risks that should be considered.	A generic quantitative risk assessment of the available Phase 1 and Phase 2 ground investigation data (soil, soil leachate, groundwater and gas results) was undertaken and the findings were included in the baseline of the Phase 1 Geo-Environmental Interpretative Report (ES Appendix 10.11) and the Phase 2 Preliminary Geo-environmental Contaminated Land Risk Assessments (ES Appendix 10.7). A soil leachate assessment was also undertaken, please refer to ES Chapter 10: Geology and Soils (Application Document 6.1).
Materials	
There is insufficient detail on the possible use of the river and rail for the movement of materials, and the environmental and transport impacts of such a move. Considering the benefits of these modes, they should be seriously considered.	The Project does not include a new jetty option, but the environmental assessment has taken into account river transport using the existing East Tilbury jetty at Goshems Farm, and the refurbishment/maintenance, operation and decommissioning of this jetty. It was assumed that the operation of the jetty would be used for the import of concrete segments to the supply the tunnelling only. The barge movements would be constrained by the tide and would coincide with high tide, limited to two a day (one movement per tide cycle). Originally the Scoping Report referred to the possibility of transporting materials by rail. This has since been discounted by the Project as it would have involved upgrading the Tilbury Loop railway line and creating additional access roads.
The LTC should make a genuine commitment to local sourcing, extending to materials, workers, plant and equipment, where possible.	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 to the proximity principle.
The analysis should also include the movements of other suitable materials, plant and equipment, and potentially transport by river/rail.	Construction traffic and movements of materials and waste have been included in the traffic model, please refer to the Combined Modelling and Appraisal Report (Application Document 7.7).
The use of highly sustainable and innovative methods of movements should be appraised, such as the use of clean fuel and hybrid vehicles in the supply chain and on site.	The REAC, which can be found in the CoCP (ES Appendix 2.2), includes a commitment on NRMM which ensures the vehicles meet various emission standards.

Thurrock Council comment	National Highways response
The PEIR does not demonstrate how the reuse within the project of materials has been maximised to minimise the need for off-site haulage and handling.	The reuse of the Project materials has been considered, please refer to ES Chapter 11: Material Assets and Waste (Application Document 6.1).
Noise and Vibration	
The study area boundary of 300m is not justified reasoning behind why impacts beyond this distance are unlikely is not explained and should consider the night-time construction activities proposed.	The study area for the construction noise assessment comprises an area up to 300m from any proposed construction activities associated with the Project, unless the closest sensitive receptor to the Project alignment is outside of this area, in which case the closest receptor has been selected. The study area was also determined in accordance with guidance provided in BS 5228-1 (British Standards Institution, 2014). BS 5228-1 states that generally at distances over 300m noise predictions should be treated with caution because of the increasing importance of meteorological effects. As such, the prediction of construction noise levels has generally been limited to within 300m, aside from in areas where the closest sensitive receptor is outside of this distance and still demonstrates a potential for adverse impacts. The operational study area is presented on ES Figure 12.3: Operational Road Noise and Vibration Study Area (Application Document 6.2); specified on the basis of the following: • 600m from any road affected by the Project, or bypassed by the Project • 1200m from the Project alignment itself to account for the separation distances to receptors and the nature of the Project • 50m from other road links where a change in BNL as a result of the Project in excess of 1.0dB(A) in the short term is predicted
The impacts assessment from construction should consider other sensitive receptors beyond dwellings and include schools, hospitals, and so on.	Receptors have been defined in accordance with DMRB LA 111 (Highways England, 2020f) and comprise of dwellings, hospitals, healthcare facilities, education facilities, community facilities, END quiet areas or potential END quiet areas, international and national or

Thurrock Council comment	National Highways response
	statutorily designated sites, Public Rights of Way and cultural heritage assets.
A number of methodological issues are present, including, for example: in line with national policy, assessment of impacts associated with the road traffic scheme should also be assigned specifically to LOAEL and SOAEL's defined in PPG.-there is no reference to topography data being applied in the modelling used.	Please refer to ES Chapter 12: Noise and Vibration (Application Document 6.1), which sets out the national policy framework relevant to noise and vibration, and the Applicant's response. In line with Noise Policy Statement for England (Department for Environment, Food and Rural Affairs, 2010) and NPSNN (Department for Transport, 2014), the influence of the absolute resultant level of the noise or vibration exposure would be above or below a Significant Observed Adverse Effect Level (SOAEL) or a Lowest Observed Adverse Effect Level (LOAEL) for the given situation, has been identified. The noise modelling takes into account topography.
There is no quantitative description of the number of noise sensitive receptors that could be impacted, which fails to inform Thurrock Council and other stakeholders of the significance of impacts identified.	Noise impacts from the construction of the Project have been assessed at 171 selected closest/worst case sensitive receptors which are presented on ES Figure 12.1: Construction Noise and Vibration Study Area (Application Document 6.2). Vibration impacts from the construction of the Project have been assessed to 62 sensitive receptors within 100m of any structures requiring percussive or vibratory piling activities and presented in ES Figure 12.4: Operational Ventilation Noise Sensitive Receptors (Application Document 6.2). The operational noise assessment includes 81, 557 sensitive noise receptors, shown on ES Figure 12.3: Operational Road Noise and Vibration Study Area (Application Document 6.2). Noise impacts from the operation of the tunnel ventilation system have been considered at selected closest identified sensitive receptors. The receptors considered in the ventilation assessment are presented on ES Figure 12.4: Operational Ventilation Noise Sensitive Receptors (Application Document 6.2). Noise baseline surveys were undertaken, which are presented on ES Figure 12.5: Baseline Noise Monitoring Locations (Application

Thurrock Council comment	National Highways response
	Document 6.2) and ES Appendix 12.5: Baseline Noise Survey Information.
The mitigation options should explore means of designing out adverse noise effects, through for example changes to the vertical alignment or of speed restrictions.	The Project has incorporated embedded noise mitigation for both the construction and operational phases. For example, during the construction phase, construction compounds would be located as far as possible from sensitive receptors (subject to the practicality constraints of constructing and operating the Project). Operational phase embedded mitigation of relevance to noise and vibration has been embedded through the design of the alignment within a cutting or false cutting/bund to reduce road traffic noise levels at identified noise sensitive receptors. Refer to ES Chapter 12: Noise and Vibration (Application Document 6.1) for more information.
People and Communities	
The PEIR does not give adequate consideration to the NPPF and the presumption of sustainable development for communities, and especially falls short of demonstrating that the benefits are not significantly outweighed by adverse impacts.	Paragraphs of the National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2019) relevant to the population and human health assessment have been included in ES Appendix 13.1: Population and Human Health Legislation and Policy complete with the Applicant's response. The Project would adhere to sustainability principles in its delivery through improvements to the local and wider economy, improving the connectivity of communities, and providing additional opportunities for recreation through improvements in the local footpath and cycling network.
The PEIR takes a selective approach to identifying proposals for new employment, residential and leisure development within the local and wider region, and numbers that are provided are not properly evidenced.	The existing baseline in relation to ES Chapter 13: Population and Human Health (Application Document 6.1) was established via data collection using published sources as well as findings from consultations (where relevant), site visits, spatial data mapping and survey work.

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Road Drainage and Water Environment	
Key relevant guidance –such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991) – have not been reference in this section.	Planning Inspectorate (2017b) Advice Note Eighteen: The Water Framework Directive was a key guidance document in the production of ES Chapter 14: Road Drainage and the Water Environment (Application Document 6.1). The Land Drainage Act 1991 has been referenced in preparation of ES Appendix 14.6: Flood Risk Assessment. Environmental permits have been discussed with the Environment Agency and would be applied for as required during detailed design. Further details are provided in the Consents and Agreements Position Statement (Application Document 3.3).
The PEIR does not make it clear if the EIA will be underpinned by a whole system water balance approach.	A study to understand the baseline water balance of the Thames Estuary and Marshes Ramsar and Special Protection Area is presented in ES Appendix 14.5: Hydrogeological Risk Assessment. The Project also includes for restoration of wetland habitats in the Mardyke catchment, which will encourage water retention and slow down runoff processes. The drainage strategy incorporates a range of features to capture, attenuate and treat rainfall runoff, prior to discharge into the water environment.
The PEIR lacks important information on existing flood defences and their condition.	Surveys completed post Statutory Consultation observed flood defences and their condition and this has informed the assessment of flood risk. Please refer to ES Appendix 14.4 Hydromorphology Assessment and ES Appendix 14.6 Flood Risk Assessment.

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Climate	
The United Kingdom Climate Projections 2018 (UKCP18) have been released. The scenario used within the assessment will need to be agreed with the LPA as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable.	Data for the climate assessment have been sourced from UKCP18, which was released in November 2018. Further details on how the methods used to establish the climate baseline and assessment can be found in ES Chapter 15: Climate (Application Document 6.1).
In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed.	The in-combination effects, or 'intra-project' effects, have been considered in ES Chapter 15: Climate (Application Document 6.1).
It is unclear on the scope of Greenhouse Gases to be assessed.	The greenhouse gas (GHG) assessment assesses operation and 'use' of the Project, including those emissions resulting from mechanical and electrical energy use such as tunnel lighting and ventilation and the impact from a variation in vehicle journeys travelling on the road and surrounding area. Refer to ES Chapter 15: Climate for more information (Application Document 6.1).

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