national highways

Lower Thames Crossing

9.54 Comments on LIRs Appendix E – Kent County Council

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Lower Thames Crossing

9.54 Comments on LIRs
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Table 1.1 The Applicant's response to Kent County Council's Local Impact Report [REP1-241]

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Paragraph 8.3 **Page 20**	**Strategic Impact A: Improved Network Resilience** The LTC in creating a new crossing of the Thames relieves the capacity restrictions at the existing Dartford Crossing and reduces the current risk of a single point of failure on this part of the Strategic Road Network (SRN). When the flow of traffic through the existing Dartford Crossing is severely restricted due to incidents and/or its limited capacity (which often happens) there is no alternative crossing of the Thames outside of London (the nearest is the Blackwall Tunnel) and this results in the failure of the SRN to perform its junction. The Local Road Network is also gridlocked as traffic attempts to reroute and mixes with the high volumes of local traffic in the Dartford area. The LTC creates an alternative crossing and reduces the reliance on this single pinch point on the SRN and thus improves network resilience, a positive impact.
Applicant's Response	The Applicant welcomes the comments made in the Local Impact Report from Kent County Council (KCC).
Paragraph 8.4 **Page 21**	**Strategic Impact B: Reduced Journey Time Delays** The LTC provides relief to the restricted capacity of the existing Dartford Crossing and therefore reduces journey time delays. The effect of reduced journey time delays is reduced associated costs (value of time) for businesses and individuals, and ultimately encouraging economic growth both regionally and nationally, therefore this is a positive impact.
Applicant's Response	The Applicant welcomes the comments made in the Local Impact Report from KCC.
Paragraph 8.5 **Page 21**	**Strategic Impact C: Increased Journey Time Reliability** The LTC in creating increased crossing capacity of the Lower Thames, results in greater journey time reliability. Whereas currently with the existing Dartford Crossing, there is variability in journey times due to capacity restrictions and the resulting delays, creating uncertainty for how long trips will take. Greater journey time reliability provided by the additional capacity of the LTC will therefore create greater confidence in the time that journeys will take. This will provide residents and businesses with a much greater range of opportunities for work, education and leisure, a positive impact.
Applicant's Response	The Applicant welcomes the comments made in the Local Impact Report from KCC.

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Paragraph 8.6 and 8.8 **Page 21**	**Strategic Impact D: Supports Bifurcation between A2/M2 and M20/A20 Corridors** The LTC provides the first part of the new strategic route from the Midlands and the North to the Channel portals. This supports KCC's long-term transport policy aim of bifurcation, or splitting, of traffic to/from the Channel portals along the M20/A20 and M2/A2 corridors, releasing capacity and relieving pressure on the M20, especially in times of disruption to cross-Channel services. This is a significant potential positive impact but only if the entire A2/M2 corridor is improved including with the Department for Transport (DfT) and National Highways' Road Investment Strategy (RIS) pipeline projects of A2 Brenley Corner (M2 Junction 7) and A2 Dover Access (Lydden to Dover) delivered (they are both uncommitted). Realisation of this positive impact also requires improved linkages between the two motorway corridors, especially via the A229 Blue Bell Hill, a Large Local Major (LLM) scheme that is currently unfunded by the DfT and has a local funding gap, meaning delivery is uncertain (see Transport Impact C).
Applicant's Response	The Applicant welcomes the comments made in the Local Impact Report from KCC. The Applicant recognises that KCC supports the benefits of the Project in bifurcation, or splitting, of traffic to/from the Channel portals along the M20/A20 and M2/A2 corridors, releasing capacity and relieving pressure on the M20, especially in times of disruption to cross-Channel services. It is noted that KCC is concerned that the positive effect requires improved linkages between the two motorway corridors, especially via the A229. For more detail, please refer to the Applicant's response to paragraphs 8.23 to 8.26 of KCC's Local Impact Report within this table. As set out within Statement of Common Ground (SoCG) item 2.1.26 [**REP1-103**]: '*While the Applicant does not consider that there any transport impacts requiring mitigation by the Project, nor any subsequent intervention options needed, it notes that:* • *The Applicant is considering the need for enhancements along the A2/M2 corridor which are within the RIS3 pipeline.* • *The Applicant is continuing to progress the M2 junction 5 project separately to the Project.* • *The Applicant maintains a route strategy for the M25 south of the proposed connection with the Project, the M20, A2 west of the junction with the Project, and to the M2 east of junction 1.* *In addition, the Applicant has agreed a scope of work and funded this through a Planning Performance Agreement for Kent County Council to undertake a Strategic Outline Business Case (SOBC) study to identify the impacts of the Project on the Kent road network and to assess the business case of potential interventions to optimise the network.* *The outputs of this study will allow Kent County Council to develop more advanced business cases over the course of the next 10 years through existing processes.*'

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Paragraph 8.7 to 8.12 **Page 21 and 22**	**Strategic Impact E: Generation of Economic Benefits** The LTC will generate economic benefits to the local and national economy above that of the previously mentioned improved network resilience, journey time cost savings and reliability. The economic benefits of the scheme, as set out in Document 7.7 Combined Modelling and Appraisal Report - Appendix D - Economic Appraisal Package: Economic Appraisal Report [**APP-526**], demonstrate that, factoring in Level 2 wider economic benefits and journey time reliability have the potential to deliver a scheme that is of net economic benefit given the stated costs in the evidence, with an adjusted BCR around 1.22:1 reported in paragraph 12.2.3, representing a net gain of 22 pence for every pound spent on the scheme. This is a positive impact for the UK economy. As the business case correctly considers, the nature of the assets and their long life, providing a new strategic river crossing for up to 100 years, and likely more, could increase the Benefit Cost ratio further, delivering a net gain per pound spent of around 70 pence (see paragraph 12.2.6 d.). At a local level, we note (as reported in paragraph 12.2.5) that the distributional impact of the level 1 and level 2 benefits totals £2.762.8bn for the adjusted Benefit Cost Ratio for the standard 60 year appraisal period. Gravesham and the whole of Kent are covered within the area for which the applicant estimates these benefits will accrue. Whilst the total would be split with other authorities such as Essex, Medway and Thurrock, the magnitude of the economic benefit is nonetheless substantial over 60 years if assuming an approximate third accrue to Kent County Council's administrative area. This would total c. £900m in benefit or circa £15m per annum on average. All values above are in 2010 Present Values as reported in the scheme documents. This represents a positive impact for Kent County Council's administrative area and the residents and businesses within it. The scheme will result in significant investment being made in the new infrastructure through the construction process which will benefit the local supply chain. There is also potentially a multiplier effect with business confidence improved with this investment being made into infrastructure in Kent (and north of the river) as further investment is attracted in other projects as road connectivity and capacity is enhanced. North Kent becomes a more attractive place to do business with better connectivity across the SRN, hence business and employment growth will occur. Housing growth is also potentially supported although we defer to Local Planning Authorities to comment on that impact. Overall, the LTC will produce positive economic impacts. The scheme has the potential to have a positive impact on businesses within Kent and more widely, by attracting inward investment. As document 7.7 Combined Modelling and Appraisal Report - Appendix D - Economic Appraisal Package: Economic Appraisal Report [**APP-526**] states in paragraphs 10.9.5 to 10.9.7, the scheme has been assessed as having likely potential of increasing Foreign Direct Investment. Given the focus, efforts and status of the Thames Estuary within which the scheme lies, Kent businesses operating within the area would be likely beneficiaries of new foreign investment, helping to grow existing businesses and create new markets for the establishment of new businesses.

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Applicant's Response	The Applicant welcomes the acknowledgement that the tunnels have a long design life and that the Benefit Cost Ratio (BCR) of the Project over a 100-year appraisal period is 1.72. DfT Transport Analysis Guidance (TAG) Unit A1.3 paragraph 2.3.4 states, '*Whilst an appraisal period of 60 years is suitable for the majority of schemes, some projects will be constructed to have a design life far exceeding this, often having design lives of 100 years or more before a major renewal is needed*.' Table 2 in TAG Unit A1.3 shows that earthworks, bridges and tunnels may have an economic asset life of 100 years. Paragraph 2.3.1 in Tag Unit A1.2 states, '*The costs and benefits of a transport project or policy will typically occur over a long time period. For example, the initial capital expenditure of a transport investment may occur in the first couple of years but ongoing maintenance costs and impacts on factors like travel time or greenhouse gas emissions will last much longer. Therefore, to compare the costs and benefits of a scheme, the appraisal period, the period over which streams of costs and benefits are estimated, should 'cover the period of usefulness of the assets encompassed by the options under consideration*'. Given the long design life of the major elements of the Project, a sensitivity test was carried out using a 100-year appraisal period. This is reported in paragraph 11.3.31 of Combined Modelling and Appraisal Report Appendix D: Economic Appraisal Package: Economic Appraisal Report [**APP-526**]
Paragraph 8.15 **Page 23**	**Transport Impact A: Impacts of the LTC on the Strategic Road Network (SRN)** KCC has worked with National Highways since 2018 to study the traffic impacts of the LTC, using both National Highways' Lower Thames Area Model (LTAM) and KCC's proprietary Kent Transport Model (KTM). It was agreed between National Highways and KCC that the KTM provides more conservative output on impacts than LTAM and so there is a greater confidence level in the Kent impacts identified by the KTM. Future year transport and development scenarios were reviewed for the situation / scenario without the LTC and with the LTC. In our preliminary analysis, negative impacts manifested themselves in an increase in traffic volume to capacity (V/C) ratio on LTC implementation (the with-LTC scenario), with the road link or junction acting at or over capacity (where V/C = 100%).
Applicant's Response	The Applicant has supported the work by KCC to develop their own strategic transport model. This allows them to develop forecasts for different model years and to include different developments in its forecast years. This could for instance be of use to the local authorities within the county when they are exploring options for their Local Plans. The Applicant does not agree that the KTM would necessarily produce more conservative output on impacts, nor does it understand what is meant by a more conservative output. The Applicant also does not agree that a greater confidence level can be placed on the impacts in Kent identified by the KTM. This is because the KTM is a county-wide model and was not developed specifically for the purpose of assessing the impacts of the Lower Thames Crossing. The key behavioural responses as a result of the Project are a change in destination of trips, which is modelled through the variable demand modelling, and the re-routing of traffic. The LTAM is designed for this purpose. The LTAM covers a larger fully modelled area north of the Thames than the KTM, and this will affect the forecasts produced by the variable demand modelling.

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	It is worth noting that both models provide generally similar insights into which areas of the wider network will be affected by the opening of the Project. Given that the models use different software tools which, although they are both strategic modelling tools, model junctions in different ways, have different base years (2016 for LTAM, 2019 for KTM), have used different sources for the mobile phone trip data and have included different developments in the matrices, it is re-assuring that the insights from both models are often very similar. However, the Applicant would not agree that, when looking at the forecast effects of the Lower Thames Crossing, greater confidence can be placed in the model outputs from a general county-wide model focussed to the south of the River Thames.
Paragraph 8.16 **Page 23**	**Transport Impact A: Impacts of the LTC on the Strategic Road Network (SRN)** The recording of traffic impacts of the LTC in this section refers to the latest modelling results, where LTC Opening Year is 2030 and Design Year is 2045. Since the modelling for the project was carried out this schedule has been advanced by two years, although all impacts stated remain valid.
Applicant's Response	The Applicant agrees that all impacts as stated in the DCO application remain valid. This was set out in more detail in the Applicant's letter to the Examining Authority of 30 March 2023 [**AS-086**]
Paragraph 8.17 to 8.21 **Page 23 and 24**	**Transport Impact A: Impacts of the LTC on the Strategic Road Network (SRN)** In the latest KTM model runs, the following SRN junctions on the M25, A2, M2 and M20 were identified as negatively impacted by the LTC: • M25 J2 (A2/A282) is forecast to approach capacity in Opening Year 2030 PM Peak, with the V/C ratio for the A2 eastbound on-slip increasing from 93% without LTC to 98% with LTC. A similar impact is forecast to take this movement over capacity to 109% in the Design Year 2045 PM Peak. Additionally, the southbound M25 on-slip is forecast to approach capacity in the Design Year 2045 AM Peak, with the V/C ratio increasing from 87% without LTC to 96% with LTC. • A2 Pepper Hill (Hall Road) is forecast to exceed capacity in Opening Year 2030 AM Peak, with the V/C ratio for Hall Road Bridge northbound increasing from 106% without LTC to 118% with LTC. A similar impact is forecast for Design Year 2045 AM Peak. • A2/A227 (Tollgate) is forecast to exceed capacity in Opening Year 2030 AM Peak, with the V/C ratio for the Wrotham Road southbound approach increasing from 94% without LTC to 101% with LTC. A similar impact is forecast for Design Year 2045 AM Peak. In the Design Year 2045 PM Peak, the V/C ratio for Wrotham Road A2 underpass northbound increases from 84% without LTC to 96% with LTC. • A2 Gravesend East (Valley Drive) is forecast to exceed capacity in Opening Year 2030 AM Peak, with the V/C ratio for the Valley Drive southbound approach increasing from 90% without LTC to 101% with LTC. In the PM Peak the V/C ratio for

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	the Hever Court Road eastbound approach to Valley Drive increases from 82% without LTC to 96% with LTC. Similar impacts are forecast for Design Year 2045 AM and PM Peaks. • M2 J2 (A228) is forecast to exceed capacity in Opening Year 2030 AM Peak, with the V/C ratio for the A228 Sundridge Hill north-eastbound approach increasing from 93% without LTC to 103% with LTC. A similar impact is forecast for Design Year 2045 AM Peak. In the Design Year 2045 PM Peak the V/C ratio for the M2 southbound off-slip increases from 65% without LTC to 101% with LTC. Through traffic on the M2 main line is forecast to approach or exceed capacity in three out of the four peak periods studied. • M2 J3 (A229) is forecast to approach capacity in Opening Year 2030 PM Peak, with the V/C ratio for the M2 southbound off-slip increasing from 78% without LTC to 93% with LTC. This movement exceeds capacity with LTC in the Design Year 2045 PM Peak. Similarly, the A229 northbound off-slip approaches capacity in Opening Year 2030 PM Peak, with the V/C ratio increasing from 90% to 96% with LTC; the movement then exceeding capacity with LTC in the Design Year 2045 PM Peak. • M20 J6 (A229) is forecast to exceed capacity in all periods studied, with the V/C ratio for the M20 westbound off-slip increasing on LTC implementation to values between 114% and 141%. The following SRN junctions were previously identified as negatively impacted by the LTC in studies of the LTAM/KTM and – while they are not flagged as impacted in the latest KTM review – they may re-join the list later due to the postponement of LTC construction by two years and accompanying traffic growth: • M25 J3 (M20) • A2 Springhead (A2260 & B259) • M2 J1 (A289) (though we note and support the concerns of Medway Council on this Junction) • M2 J4 (A278) Transport Assessment [**APP-529**] Plates 7.2 and 7.3 indicate from the LTAM model that the highway links of the new junction of the LTC with the A2 are forecast to operate below 85% of capacity in the Design Year 2045 AM and PM Peaks. The KTM analysis is also able to assess highway "nodes" within the intersection, such as merges, diverges and roundabouts. The KTM shows that some nodes on this junction are operating at over 100% capacity in both AM and PM peaks in both Opening Year 2030 and Design Year 2045. The associated negative impacts are expected to be delays on the SRN and increased use of unsuitable routes on the local road network (LRN) to avoid SRN congestion in the vicinity of the A2/LTC intersection. Transport Assessment Appendix B Journey Time Changes 2030 (**APP-531**) and 2045 (**APP-532**) indicate an impact of LTC implementation on journey times on the section of the M2 between Junction 1 (A289) and Junction 4 (A278) in both Opening Year 2030 and Design Year 2045. These increased journey times may lead to a negative impact of encouraging traffic to find alternative routes (rat runs on unsuitable roads of the Local Road Network (LRN).

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Applicant's Response	As stated in the SoCG [**REP1-103**] item 2.1.157 (DL-1) as follows: '*As part of the development of the design of the A122 Lower Thames Crossing, the flow and capacity of individual merges and diverges on the new road and on connections between the existing road network and the new road have been assessed, and are within the appropriate standards.*' Regarding the performance of the M2/A2/A122 Lower Thames Crossing junction, the LTAM uses SATURN and the highway network has been coded such that it is also possible in the LTAM (as it is in the KTM), to assess highway "nodes" within an intersection, such as merges, diverges and roundabouts. In the LTAM, none of the nodes within the M2/A2/A122 Lower Thames Crossing junction are operating at over 100% capacity in 2030 or 2045. This is confirmed by the microsimulation VISSIM modelling of the junction. The Applicant has requested a cordon from the KTM for this area in order to investigate more fully how the Project has been coded into the KTM.
Paragraph 8.23 and 8.26 **Page 25**	**Transport Impact B: Wider Network Impacts (WNI)** Negative traffic impacts of the LTC on the LRN have been identified by KCC, using the same preliminary SRN analysis with the LTAM and KTM models, in studies that have been re-iterated several times during the consultation history of the Project. It was agreed between National Highways and KCC to review these impacts together in more detail, and to develop mitigations to the level of pre-Strategic Outline Business Case (SOBC) in the Wider Network Impacts (WNI) study. The WNI study has confirmed the following key corridors of negative impacts of the LTC identified in the earlier work: • See the A2 between Springhead and Gravesend East: Impacts for this corridor include the SRN junctions mentioned earlier (Pepper Hill, Tollgate and Gravesend East). Tollgate and Gravesend East are also forecast to experience queue lengths blocking back through upstream junctions in the with-LTC scenario, with associated delays and road safety risks. Journey time increases of up to 6% on roads north of the SRN junctions to/from Gravesend are forecast with LTC, resulting in congestion and delays. • The A227 between the A2 and the M20: Implementation of the LTC leads to significant increases in heavy goods vehicle (HGV) traffic on alternative routes between the A227 / Green Lane and A2 to access the LTC, including the villages of Meopham, Hook Green, Sole Street and Cobham. • The A228 between the M2 and the M20: The vast majority of junctions along the A228 are forecast to see significant increases in traffic in the with LTC scenario; with particularly HGV traffic flows along the A228 increasing by up to 160 vehicles per hour. A number of junctions are also forecast to operate over capacity with LTC, leading to further congestion and use of inappropriate alternative routes.

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	• Cycleway corridors: These corridors include sections of the A226 between Gravesend and Strood and a section of Chatham Road adjacent to the A229. Here the 2045 with-LTC scenario increases traffic flows in turn increasing the safety risks to cyclists in view of current active travel provision.
Applicant's Response	The Applicant remains of the view as set out within the SoCG [**REP1-103**] in items 2.1.25 and 2.1.26: '*The Applicant recognises that as a result of the Lower Thames Crossing opening, people will choose to make different journeys. In many places on the network, and within Kent, this will lead to beneficial transport impacts on the network, and in some cases will lead to adverse impacts. Overall, the benefits on the road network outweigh the adverse transport impacts, and this is reflected in the positive economic benefit of the Project within Kent.* *The Applicant has identified the adverse impacts on traffic flows across the local road network, and this assessment has been set out in the Transport Assessment [**APP-529**].* *The Applicant has assessed the wider network impacts of the Project and has considered these against the requirements set out in the National Policy Statement for National Networks (DfT, 2014), and based on this does not agree that the adverse impacts are unacceptable under this policy.* *The Applicant is obligated to work with local highway authorities and others to align national and local plans and investments, balance national and local needs and support better end to end journeys for road users (The Applicant Licence from DfT para 5.1.9) and will continue to deliver against this obligation in its collaborative work with local authorities.* *The Applicant has produced a Wider Network Impacts Management and Monitoring Plan (WNIMMP) [**APP-545**], which has been updated to take on board comments received to date. If the monitoring outputs from the monitoring plan identify issues/opportunities related to the road network as a result of traffic growth or new third party developments, local authorities will be able to use this as evidence within their intervention case making.* *The WNIMMP provides clarity on the proposition, including the expectations on funding streams.*' (item 2.1.25) '*The Applicant agrees that there are some likely increases in traffic across the network, which will in part be caused by the Project, but not wholly, and this is set out within the Transport Assessment [**APP-529**] and traffic modelling data issued to Kent County Council.* *While the Applicant does not consider that there any transport impacts requiring mitigation by the Project, nor any subsequent intervention options needed, it notes that:* • *The Applicant is considering the need for enhancements along the A2/M2 corridor which are within the RIS3 pipeline.* • *The Applicant is continuing to progress the M2 junction 5 project separately to the Lower Thames Crossing.* • *The Applicant maintains a route strategy for the M25 south of the proposed connection with the Lower Thames Crossing, the M20, A2 west of the junction with the Lower Thames Crossing, and to the M2 east of junction 1.*

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	In addition, the Applicant has agreed a scope of work and funded this through a Planning Performance Agreement for Kent County Council to undertake a Strategic Outline Business Case (SOBC) study to identify the impacts of the Project on the Kent road network and to assess the business case of potential interventions to optimise the network. *The outputs of this study will allow Kent County Council to develop more advanced business cases over the course of the next 10 years through existing processes.*' (item 2.1.26) The Applicant and KCC have been working together to finalise Stage 1 of the WNI study referred to by KCC and above in the SOCG, and are now working on the scope for remaining stages to complete the study. A similar study has been agreed with Thurrock Council (Daneholes Roundabout). A first draft of that report was shared with the Applicant in February, and following discussions, a final draft has been received on 17 July 2023. The Applicant can confirm that the conclusions and recommendations of the Stage 1 report have been agreed for the purposes of Stage 2 (tasks 2-8): the options appraisal stage. The Applicant would add that the WNI study is a KCC owned study, funded by the Applicant, to investigate impacts on the wider network in Kent. The Applicant does not consider that the proposed interventions are required to make the Project acceptable, and that they should be developed in line with Government policy and funding mechanisms outside of the consenting process for the Project. The Applicant has committed, pursuant to its licence, that it will cooperate with KCC in this matter. On a matter of detail, the LTAM outputs provided to KCC both in a cordon model and in GIS shapefiles do not show an increase in HGVs of 160 vehicles an hour on the A228 in any modelled time period. This increase in seen on the A229, in 2045 in the interpeak period only. The maximum increase in HGVs on the A228 is 77 vehicles in the 2045 AM peak modelled hour.
Paragraph 8.30, 8.34, 8.35, and 8.38. **Page 27 to 32**	**Transport Impact C: Impacts of the LTC on the A229 Blue Bell Hill** One of the most negative traffic impacts of the LTC on the local / major road network in Kent is that on the A229 Blue Bell Hill (including M20 J6 and M2 J3), as identified in the Applicant's DCO documents as well as in KCC analysis of the LTAM and KTM models. This impact has been identified and re-iterated in KCC's responses during the consultation history of the Project. KCC has also requested at every opportunity, that mitigation measures for the impacts on A229 Blue Bell Hill are included in the Project. A comparison of the with-LTC and without-LTC traffic model scenarios in the LTAM indicates that the LTC has a significant impact on A229 Blue Bell Hill and its motorway junctions. The Applicant's DCO documents indicate the following negative impacts of the LTC on the A229 Blue Bell Hill: • Changes in traffic volumes: Transport Assessment [**APP-529**] Plates 6.2 to 6.4 show that the A229 Blue Bell Hill already takes as much traffic as parts of the M2 and M20. Plate 7.10 indicates a forecast increase in AM Peak traffic volumes of between 501 and 1,000 vehicles northbound on the A229 with LTC in Design Year 2045; and between 101 and

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	250 southbound. Plate 7.14 indicates a forecast increase in PM Peak traffic volumes of between 251 and 500 vehicles northbound and between 101 and 250 southbound. • Changes in % traffic volumes: Plate 7.16 indicates a forecast increase in AM Peak traffic volumes of 10%-20% northbound on the A229 with LTC in Design Year 2045; and between +/-10% southbound. Plate 7.17 indicates a forecast increase in inter-peak traffic volumes of >=40% northbound and between +/- 10% southbound. Plate 7.18 indicates between +/-10% changes in PM Peak traffic volumes northbound and southbound. • Changes in traffic volume to capacity (V/C) ratios: Plates 7.19 and 7.20 indicate some increase in AM Peak traffic V/C ratios with LTC compared to without LTC, with the northern section of the A229 operating above 95% capacity in Design Year 2045. Plates 7.21 and 7.22 indicate an increase in inter-peak traffic V/C ratios to 85%-95% capacity with LTC, compared to 75%- 85% capacity without LTC along the northern section of the A229. Plates 7.23 and 7.24 indicate an increase in PM Peak traffic V/C ratios to 85%-95% capacity with LTC, compared to 75%-85% capacity without LTC along the southern section of the A229. • Scale of impacts: Plate 7.28 indicates adverse impacts of the LTC in the AM Peak of Opening Year 2030 according to the Applicant's scoring system based on V/C ratio changes with and without LTC. The figure indicates major adverse impacts of the LTC at the A229 intersections with the M2 and M20. Plate 7.29 indicates minor and moderate adverse impacts of the LTC at these intersections in the inter-peak. Plate 7.30 indicates a large number of minor and moderate adverse impacts of the LTC along the A229; together with one major adverse impact at the A229 intersection with the M2 in the PM Peak. • Changes in traffic journey times: Table 7.11 indicates the A229 journey times between the M2 and M20 would increase by 1.6 minutes (+26.8%) northbound and 1.4 minutes (+13.2%) southbound in the AM Peak Opening Year 2030. A slightly reduced journey time is forecast for the PM Peak core growth, yet both the High and Low growth complementary scenarios show increases in journey times. • Impacts on public transport: Table 7.14, Bus journey time impacts, does not cover bus route 101 (Maidstone - Gillingham), which is expected to be adversely impacted by increased traffic and delay on the A229 on implementation of the LTC. Plate 7.38, Bus/coach routes considered in analysis, indicates the A229 lies just outside the scope of the analysis. • Impacts on walkers, cyclists and horse riders: Plate 7.42 indicates a section of severance due to increased traffic along the A229 with the LTC, in the vicinity of the A229 intersection with the M20. Impacts on walkers, cyclists and horse riders are also covered in later paragraphs of Impact C and in further detail in the section of this Local Impact Report on Public Rights of Way (PRoW). A review of the outputs of LTAM model shapefiles provided to KCC by National Highways in April 2022 confirms the points made above. The following additional negative impacts of the LTC on the A229 Blue Bell Hill are apparent from the LTAM model shapefiles:

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	• Changes in HGV volumes: LTAM HGV flow plots indicate increases on northern sections of the A229 of approximately 100 HGVs with LTC in the AM and PM Peaks, although in the AM Peak the model appears to assign significant HGV traffic (100) to Warren Road. This route is a narrow, steep single carriageway which is signed as being unsuitable for HGVs. It is therefore expected that the HGVs assigned to this road in the model would actually use A229 Blue Bell Hill given that they are parallel routes. This is therefore giving an increase in HGV traffic on A229 of approximately 200 in the AM peak. • Changes in traffic volume to capacity ratios at intersections: LTAM V/C ratio plots at Taddington intersection (M2/A229) indicate both northbound and westbound approaches to the roundabout are taken over capacity in the PM Peak with-LTC scenario. Similar impacts are shown for Running Horse intersection (M20/A229) for the eastbound M20 on-slip; the westbound M20 off-slip; and the northbound connector between the two roundabouts. The A229 Blue Bell Hill Improvement Scheme work indicates the following negative impacts of the LTC on the A229 Blue Bell Hill: • LTC traffic generation on A229 Blue Bell Hill: A Select Link Analysis (SLA) of the LTAM cordon provided to KCC provides the volume of traffic on the A229 that also uses the Thames River crossings in the 2045 AM peak. As shown in the table below, the level of traffic with and without LTC is low for vehicles also using the Dartford Crossing, however, the traffic also using LTC is a considerable proportion of the A229 Blue Bell Hill traffic with LTC in operation. • The SLA shows that without LTC only 1.3% of two-way vehicles using A229 Blue Bell Hill will also use the river crossing at Dartford. In the scenario with LTC the use of the Dartford crossing by vehicles also using A229 reduces to 0.1% but vehicles using A229 and LTC is 21.4% of two-way traffic. Therefore, the LTC creates additional traffic on the A229 as route choices are changed as the LTC opens the opportunity to cross the Thames that was not previously there. In doing so, vehicles are routed up the A229 to join the M2/A2, whereas currently (with no LTC) to use the Dartford Crossing they continue on the M20 and join the M25. • Journey times: There is currently a wide variability in journey times using A229 and the LTAM cordon model journey times do not seem to provide a realistic Page 30 of 90 result given the proposed increases in traffic and HGVs in particular. It is anticipated that journey times would be greater than the results given and there would also be significant journey time variability. • HGV Traffic: Earlier paragraphs of Impact C provided details from the LTAM shape files on the increase in the number of HGVs expected on A229. KCC's work using the LTAM cordon model has also provided details of the proportion of HGVs on the network. The results shown in Tables 3 and 4 show significant increases in the percentage of HGVs, particularly in the PM peak (Table 4). It also shows that HGVs as a proportion of the total number of vehicles on the road increases indicating that LTC draws additional more HGVs than other types of traffic to use the route.

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	• Air Quality: Parts of the A229 and the M20, including M20 J6, lie within an Air Quality Management Area (AQMA). This was declared in 2018 due to exceedances of Nitrogen Dioxide. At the time of submitting the A229 Blue Bell Hill Improvement Scheme SOBC in December 2020, it was estimated that in order to meet the national air quality objectives, the M20 J6 required an 8.8% reduction in Nitrogen Dioxide concentrations and A229 Chatham Road required a 25% reduction in NO2 concentrations. There are a limited number of receptors quoted near M20 J6 in the Environmental Statement, Appendix 5.4 Air Quality Operational Phase Results (**APP-348**), but both show anticipated increases in Nitrogen Dioxide with LTC in operation. It should be noted that all 24 receptors (except one) around A229 Blue Bell Hill show increases in Nitrogen Dioxide which will mean that the required reduction in levels in the AQMA to meet national air quality objectives will become more difficult.
Applicant's Response	The Applicant acknowledges that the LTC would result in changes to traffic flows from baseline positions, such as changes to flows on the A229. The Applicant remains of the view as set out within the SoCG [**REP1-103**] in items 2.1.25 and 2.1.26 that: '*The Applicant recognises that as a result of the Lower Thames Crossing opening, people will choose to make different journeys. In many places on the network, and within Kent, this will lead to beneficial transport impacts on the network, and in some cases will lead to adverse impacts. Overall, the benefits on the road network outweigh the adverse transport impacts, and this is reflected in the positive economic benefit of the Project within Kent.* *The Applicant has identified the adverse impacts on traffic flows across the local road network, and this assessment has been set out in the Transport Assessment* [**APP-529**]. *The Applicant has assessed the wider network impacts of the Project and has considered these against the requirements set out in the National Policy Statement for National Networks (DfT, 2014), and based on this does not agree that the adverse impacts are unacceptable under this policy.* *The Applicant is obligated to work with local highway authorities and others to align national and local plans and investments, balance national and local needs and support better end to end journeys for road users (The Applicant Licence from DfT para 5.1.9) and will continue to deliver against this obligation in its collaborative work with local authorities.* *The Applicant has produced a Wider Network Impacts Management and Monitoring Plan (WNIMMP) [**APP-545**], which has been updated to take on board comments received to date. If the monitoring outputs from the monitoring plan identify issues/opportunities related to the road network as a result of traffic growth or new third party developments, local authorities will be able to use this as evidence within their intervention case making.* *The WNIMMP provides clarity on the proposition, including the expectations on funding streams.*' (item 2.1.25)

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	'*The Applicant agrees that there are some likely increases in traffic across the network, which will in part be caused by the Project, but not wholly, and this is set out within the Transport Assessment [**APP-529**] and traffic modelling data issued to Kent County Council.* *While the Applicant does not consider that there any transport impacts requiring mitigation by the Project, nor any subsequent intervention options needed, it notes that:* • *The Applicant is considering the need for enhancements along the A2/M2 corridor which are within the RIS3 pipeline.* • *The Applicant is continuing to progress the M2 junction 5 project separately to the Lower Thames Crossing.* • *The Applicant maintains a route strategy for the M25 south of the proposed connection with the Lower Thames Crossing, the M20, A2 west of the junction with the Lower Thames Crossing, and to the M2 east of junction 1.* *In addition, the Applicant has agreed a scope of work and funded this through a Planning Performance Agreement for Kent County Council to undertake a Strategic Outline Business Case (SOBC) study to identify the impacts of the Project on the Kent road network and to assess the business case of potential interventions to optimise the network.* *The outputs of this study will allow Kent County Council to develop more advanced business cases over the course of the next 10 years through existing processes.*' (item 2.1.26) In relation to air quality and effects on the AQMA, this matter is addressed by SoCG [**REP1-103**] item 2.1.90 as follows: '*National Highways provided a cordon of the Project's transport model to enable Kent County Council to examine in more detail National Highways' forecast impact on local roads. National Highways has updated the air quality assessments within the Environmental Impact Assessment (EIA), and further information on impacts and mitigation has been shared in ES Chapter 5: Air Quality as part of the DCO submission.* *This includes impacts on the M20 both within the AQMA and outside of the Maidstone AQMA, including changes in pollutants as a result of the Project.*' In addition, the Applicant confirms that air quality impacts have been predicted at 18 worst-case human receptors in the Maidstone AQMA, which includes parts of the A229 and the M20 including M20 J6, and these are presented in ES Chapter 5: Air Quality [**APP-143**]. The changes in nitrogen dioxide (NO_2) associated with the Project are predicted to be imperceptible (i.e. changes are 0.4µg/m^3 or less) at all these receptors. The maximum annual mean NO_2 concentration predicted at any of the receptors in the AQMA with the Project in operation is 26.4µg/m^3 (LTC136) which is well below the annual mean air quality objective of 40µg/m^3; therefore, the Project is not considered to prejudice any potential revocation of the Maidstone AQMA. The Applicant has worked collaboratively with KCC on their bid for funding to DfT for works to the A229 and its junctions. This has included modelling scheme design options provided by KCC's consultants in the full LTAM and providing the forecast traffic flows and other outputs, including cordon models to KCC and their consultants.

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	The Applicant has agreed a scope of work and funded this through a Planning Performance Agreement for KCC to undertake a Strategic Outline Business Case (SOBC) study to identify the impacts of the Project on the Kent road network and to assess the business case of potential interventions to optimise the network. The outputs of this study will allow KCC to develop more advanced business cases over the course of the next 10 years through existing processes.
Paragraph 8.39 **Page 32**	**Transport Impact D: Safety Impacts of the LTC** KCC recognises and supports that National Highways has used the International Road Assessment Programme (iRAP) approach to measure the safety of their network, and that they exceeded their 2020 target to see 90% of travel on their network on 3 star or above roads. In this respect KCC acknowledges the Project will have an overall positive impact on road safety, assuming an iRAP assessment of the design of the A122 and connections to the existing SRN confirms the claim made in DCO Document 7.9 Transport Assessment [**APP-529**] paragraph 9.3.16 that "the Project will be designed to the latest safety standards" and ensures that the new infrastructure is above the 3-star rating standard, so that there will be no detriment to existing scores on the SRN.
Applicant's Response	The Applicant welcomes the comments made in the Local Impact Report from KCC.
Paragraph 8.40 and 8.41 **Page 33**	**Transport Impact D: Safety Impacts of the LTC** However, Transport Assessment [**APP-529**], Plate 9.3, Spatial distribution of accidents by value over 60 years, indicates a negative impact of the Project on road safety on the A226, A227, A228 and A229. The Department for Transport's (DfT) Cost and Benefits to Accidents – Light Touch (COBALT) software accident analysis presented in Section 9.3, Collision analysis, uses default link rates for the local road network, but junctions do not appear to be assessed, as proposed by the COBALT User Manual. Even with this omission, the analysis identifies in Plate 9.3 increases in accident costs forecast with the Project for the A226, A227, A228 and A229. All these roads have a significant history of severe collisions, as evidenced by the historic junction accident analysis in Plate 9.5, Collisions A2/M2 junction, 2015 - 2019. An equivalent analysis of a wider area, including the A229, is shown in the Figure 1 [of Kent County Council's Local Impact Report]. If the COBALT analysis had been completed for junctions as well as road links, the A226, A227 and A228 in particular, with their many at-grade junctions, would likely incur significantly higher costs / safety impacts. It is important to see how this might affect the overall accident per km metric for the Project, which is currently presented to show a positive impact, with a saving under the 'With Scheme' scenario.

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Applicant's Response	This matter is addressed by SoCG [**REP1-103**] item 2.1.119 (DL-1) as follows: '*The Applicant considers that junctions were taken into account - the appraisal combines links and junctions, which means that although junctions were not individually assessed, the impact of the Project on them is included in the accident numbers and costs.* *As a result of the Project the overall accident rate decreases per vehicle kilometre driven is as stated in paragraph 9.3.12 of 7.9 Transport Assessment [**APP-529**].* *The default combined link/junction accident rates were applied to the A226, A227, A228 and A229* [as part of the Cobalt appraisal]. *The Applicant is currently undertaking a Wider Network Impacts (WNI) study with Kent County Council, specific to the corridors mentioned, with safety being a key aspect. National Highways would welcome further discussions with regards to the benefits and rationale of carrying out iRAP assessments in addition to the existing study.* *The Applicant has committed to the implementation of the CLOCS standard in Environmental Statement Appendix 2.2: Code of Construction Practice, First Iteration of Environmental Management Plan (CoCP) [**REP1-157**] and the Outline Traffic Management Plan for Construction [**REP1-175**].* *This matter remains under discussion subject to Kent County Council's review of the Applicant's position set out above.*'
Paragraph 8.42 **Page 33**	**Transport Impact D: Safety Impacts of the LTC** KCC notes a COBALT analysis has not been carried out for the 11 phases of LTC construction, which have been modelled in the LTAM, so potential impacts on road safety during the construction phase of the project are not able to be quantified.
Applicant's Response	The Applicant has not carried out a COBALT assessment for each of the construction phases. The Applicant's position is that following the principles of TAG Guidance, undertaking such detailed analysis is not proportionate at this stage of the Project development. GIS shapefiles showing the change in traffic flows on each link in the network, for each construction phase in each modelled hour, was provided to KCC.
Paragraph 8.43 **Page 34**	**Transport Impact E: Public Transport and Active Travel Impacts of the LTC** As mentioned at the beginning of this Highways section, KCC acknowledges that both positive and neutral traffic impacts of the LTC tend to occur in areas where the effects of the crossing are diminished, or where traffic is dispersed by the presence of two Thames crossings. This tends to have a positive or neutral impact on public transport in the vicinity of the LTC once it is in operation. In particular, KCC believes the LTC will have a positive impact on Fastrack A and the Dartford bus network.

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Applicant's Response	The impact of the Project on bus times when the Project is operational is reported in Chapter 7 of the Transport Assessment [**APP-529**]. Overall, the impact on public transport is positive and the improvements in journey time reliability at the Dartford Crossing may encourage more operators to run services over it as well as improving the quality of the service provided by Fastrack.
Paragraph 8.44 to 8.46 **Page 34**	**Transport Impact E: Public Transport and Active Travel Impacts of the LTC** KCC has identified where construction of the LTC will have a negative impact on bus journey times. The Transport Assessment [**APP-529**] Section 8.9, Impacts on the public transport network, sets out the predicted delay to buses during the construction phase, where these are expected to be over two minutes per service per direction. The accumulation of delays on a bus trip increases journey time, requiring adjustment to schedules either to increase the cycle time or to reduce the level of service, both leading to a loss in patronage. Reductions in public transport service level often engender private car trips and reduction in revenue, which both need to be avoided. KCC has taken the information in Transport Assessment [**APP-529**] Tables 8.70 to 8.79, identifying affected bus routes in the impacted first 10 phases of construction, and calculating the average delay per trip; the total additional hours; and the associated costs of the impacts. This analysis covers the costs of the known delays to buses, but not potential delays resulting from such things as temporary closure / diversions that have been referred to in the Transport Assessment [**APP-529**], but which cannot be quantified by National Highways at this stage. For the highest frequency services which are likely to suffer from Thong Lane closure and A226 Contraflow, bus priority should also still be considered. KCC has identified negative impacts on active travel modes, largely in terms of what is not provided by the Project. Mitigations of these omissions are discussed in our Written Representation.
Applicant's Response	This matter is addressed by SoCG [**REP1-103**] item 2.1.108 (DL-1) as follows: '*The Transport Assessment [**APP-529**], Section 8.9, outlines the impacts on public transport during the construction period (which is broken down into 11 phases for assessment).* *Mitigation is proposed as part of the DCO application in a number of documents, namely, the Transport Assessment, Section 10.1, outlines the management of impacts during construction including specific mitigation such as the construction of site haul routes to reduce usage on the public network. The section also references the relevant control documents which set out the mitigation measures and mechanisms which would be in place during construction.* *Notably, the oTMPfC [**REP1-175**] details the mechanisms throughout the document which would be in place (such as the Traffic Management Forum* [TMF]*, Section 3.2) which would allow for discussions to take place on matters such as appropriate mitigation for public transport impacts during construction. When developing the TMP, specific measures are outlined to address and minimise the impacts on public transportation, including public transport users and operators; this is set out in Table 2.3 of the oTMPfC. These measures are designed to keep the impacts on public transport users and*

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	operators, which includes buses to a minimum, demonstrating a commitment to maintaining the service and accessibility of public transportation during the Project. *It should be noted, whilst the Transport Assessment [**APP-529**] outlines the envisaged impacts based on a possible construction scenario, the actual impacts will only become known once construction commences and monitoring as set out in para 2.4.8–2.4.24 of the oTMPfC [**REP1-175**] is put in place.* *The results of this monitoring would be discussed within the TMF, as would the development of appropriate mitigation where required at the appropriate time, such as the impacts on bus routes in terms of possible delays due to the Project works. Kent County Council would be able to recommend mitigation packages at the TMF which would be discussed and agreed where appropriate.* *The Applicant welcomes continued engagement and mitigation proposals from Kent County Council that can be discussed and explored before construction commences and during the construction via the TMF.*' It should be noted that there are no bus routes on the section of Thong Lane which would be closed, so the bus route that uses the northern section of Thong Lane will not be affected.
Paragraph 8.47 **Page 34**	**Transport Impact F: Severance Issues for Walkers, Cyclists and Horse Riders (WCH)** DCO document 7.7 Combined Modelling and Appraisal Report – Appendix D – Economic Appraisal Package: Distributional Impact Appraisal Report (**APP-525**), Tables 7.17 and 7.18 show 'Distributional analysis for links potentially impacted by traffic related severance' for the regional study area and for England & Wales respectively. Whilst it is noted that Gravesham and Tonbridge & Malling are predicted to receive some 'slightly beneficial – large beneficial' impacts, which will have a positive impact, Valley Drive, Wrotham Road and Forstal Road are predicted to receive 'slightly adverse – large adverse' impacts, yet no mitigation is proposed in these locations which will be impacted negatively. KCC has considered the nature of these highways and the land uses along their length and concluded that no mitigations would be required along Forstal Road. In comparison, Valley Drive has residential land uses along its entire length on each side, interspersed with local commercial / retail / community land uses. As such, increases in severance, assessed as moderate adverse, should be mitigated. Severance along built-up sections of Wrotham Road should also be mitigated.
Applicant's Response	This matter is addressed by SoCG [**REP1-103**] item 2.1.126 (DL-1) as follows: '*Tables 7.17 and 7.18 of the Distributional Impact Appraisal report [**APP-525**] show the 'Distributional analysis for links potentially impacted by traffic related severance' Regional and England & Wales respectively. This has informed a more detailed analysis of potential impacts arising from traffic-related severance, which is presented in the Health and Equalities Impact Assessment (HEqIA) [**APP-539**].*

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	Table 7.9 of the HEqIA lists locations where there may be a moderate increase or decrease in traffic-related severance during the operational phase of the Project; this is followed by a closer review of these locations in Table 7.10, which takes into account factors such as land-use and local demographics. *Paragraph 7.3.31 of the HEqIA notes that "further actions may be required in certain locations to enhance the road crossing provision for local residents and thereby ensure that effects do not impact on people's ability to cross roads and access community services and infrastructure. A commitment has been made as part of the Section 106 Agreements Heads of Terms for further investigation at identified locations to discuss the need for, and provision of, pedestrian crossing infrastructure". This commitment is included within Section 106 Agreements - Heads of Terms [**APP-505**].* *Paragraph 7.5.3 of Section 106 Agreements – Heads of Terms [**APP-505**] states that "National Highways will pay a sum to the relevant local highway authorities to implement the identified improvements from the feasibility assessment. Local highway authorities are afforded powers under section 62 the Highways Act 1980 which enables them to undertake agreed improvement works to the local highway. All works can be accommodated within the existing highway extent". Locations specified include Elaine Avenue (Strood), Brennan Drive (Tilbury) and Valley Drive (Gravesham).* *Wrotham Road is included as part of the qualitative assessment presented in Table 7.10 of the HEqIA [**APP-539**]. Although there are various land-uses along Wrotham Road including residential development, services and facilities, there are also a number of pedestrian refuges at a number of locations. As such traffic-related severance at this location was not considered to be significant.* *The project agrees with the statement by Kent County Council that in light of the nature of the highway and the land use along its length no mitigation would be required along Forstal Road.'*
Paragraph 8.48 **Page 35**	**Transport Impact G: Dangerous Goods Vehicles and Oversized Vehicles** DCO Document 7.9 Transport Assessment [**APP-529**], Table 7.4, Hourly forecast cross-river flows, indicates that the Project will have the effect of reducing traffic flows using the Dartford Crossing by between 9% and 21% in the key AM and PM Peak periods of 2030 and 2045. Table 7.5, Comparison of HGV vehicle numbers on the Dartford Crossing and the A122 Lower Thames Crossing, indicates HGV reductions of between 17% and 33% in these key peak periods. In this respect KCC acknowledges the Project should have a positive impact in reducing delays related to the escort of Dangerous Goods Vehicles (DGVs), as well as incidents due to oversized vehicles.
Applicant's Response	The Applicant welcomes the comments made in the Local Impact Report from KCC.

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Paragraph 8.49 **Page 35**	**Transport Impact G: Dangerous Goods Vehicles and Oversized Vehicles** KCC is not aware of any commitment to divert all DGVs and oversized vehicles to use the Project, which is designed to accommodate them, in order to phase out the use of the Dartford Traffic Management Cell, which organises the escorts. With HGV reductions of between 17% and 33% in the key peak periods, a negative impact of these two issues will therefore remain at the Dartford Crossing, albeit reduced, when it could easily be removed.
Applicant's Response	The Project does not seek to alter existing operational regimes at Dartford Crossing nor propose that all DGVs and oversized vehicles will be diverted to the A122, but provides an alternative route for those vehicles. For DGVs and oversized vehicles that currently travel longer distances on the M25, a diversion to the Project would often involve them travelling a greater overall distance. For example, for a vehicle on the M25 anticlockwise south of the River Thames going to the Purfleet oil refinery would have to travel along the A2, A122 and then the A13 and M25 southbound. With the construction of the Project there will be a reduction in HGVs and DGVs using the existing crossing (and those that do would face less congestion), and as such it is anticipated that the duration, and therefore impact, of escorts will reduce.
Paragraph 8.50 **Page 36**	**Transport Impact H: Construction Shifts and Deliveries** KCC acknowledges that, while the modelling of construction activities has been aligned with the LTAM peak periods (0700-0800 and 1700-1800) to provide a reasonable worst-case analysis, Transport Assessment [**APP-529**] paragraph 8.1.7 h ii confirms the proposed shift times will not align with peak traffic flows. This should result in a neutral impact, assuming shift times do not align with the local road network (LRN) peaks (0800-0900 and 1700-1800).
Applicant's Response	The intention of the Applicant's construction modelling was to highlight the forecast impacts on the highway network, in order to inform discussion as to where and how the proposed impacts could be managed.
Paragraph 8.51 to 8.54 **Page 36**	**Transport Impact H: Construction Shifts and Deliveries** Plates 8.30 onwards show significant changes in peak hour traffic flows for the LRN around the Kent construction compounds for the various construction phases (typically in the two bands between +51 and +250 PCUs). Figures are not provided to demonstrate whether construction traffic increases congestion. The accompanying tables (Table 8.37 onwards) show increases in journey times of over 2 minutes or +18% on the A226 and over 1.4 minutes or +14% on Brewers Road / Halfpence Lane for some phases, suggesting there will be negative impacts of LTC construction if the proposed shift times do indeed align with peak traffic flows. Similarly for construction deliveries, Transport Assessment [**APP-529**], paragraph 8.6.19 indicates the modelling of construction deliveries has also been aligned with the LTAM peak periods (0700-0800 and 1700-1800) to provide a reasonable worst-case analysis. It is expected that construction deliveries will not align in practice with the LRN peaks (0800-0900 and 1700-1800).

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	KCC has worked with National Highways to review modelled traffic congestion on an agreed worst-case PM Peak scenario during construction Phase 6. It was found that traffic volumes exceeded 90% of capacity with construction traffic in two key areas, with the resultant delays: • A226 Gravesend Road near the LTC construction compound – eastbound traffic delay of 27s; • A2 main line traffic management scheme (reduced lane widths and speed limits) – eastbound traffic delay of 87s – a delay which could encourage traffic to avoid the A2 main line and use unsuitable rural routes. At the time of writing, KCC and National Highways has discussed mitigations for these impacts in terms of improved access to the A226 construction compound and for all construction related traffic to avoid peak periods on the LRN (0800-0900 and 1700-1800).
Applicant's Response	GIS shapefiles have been provided to KCC that show the change in flow, time and volume/capacity ratio on each link in the network. The impacts of construction traffic on the A226 Gravesend Road and on the A2 are acknowledged by the Applicant, and as stated by KCC these matters will continue to be discussed with KCC through the Traffic Management Forum process set out within the oTMPfC [**REP1-175**] and mechanisms within the FCTP [**APP-546**].
Paragraph 8.55 **Page 36**	**Transport Impact H: Construction Shifts and Deliveries** With regard to avoiding peak periods on the LRN, Framework Construction Travel Plan (**APP-546**), paragraph 1.1.6 indicates it will be required of contractors to develop Site-Specific Travel Plans (SSTPs) in respect of the sites for which they are responsible, rather than National Highways. Paragraph 10.5.2 indicates contractors rather than National Highways would be expected to provide a sum of money for each site to cover proportionate remedial measures. While KCC acknowledges this initiative, which should have a positive impact on the construction worker Travel Plan, the lack of commitment to funding from National Highways is concerning.
Applicant's Response	The Applicant notes that, as part of their appointment, Delivery Partners would be required to deliver against the commitments of the Framework Construction Travel Plan (FCTP) [**APP-546**] which is a Control Document. The FCTP is legally secured by draft DCO Schedule 2 Requirement 11 [**REP1-042**] and delivered through Site-Specific Travel Plans (SSTPs) which must be substantially in accordance with the FCTP. As such, the Applicant considers that the commitment to appropriate funding is secured. In addition, there is a mechanism within paragraph 10.5.3 of the FCTP that confirms that, should pre-agreed funding require review, this is also considered: '*If remedial measures are required at a particular site, these would be proposed as set out in Section 10.4* [of the FCTP]. *If the measures agreed require funding in excess of that available, or the funding set aside has been previously exhausted, National Highways and the Contractors will enter discussions to agree the source for funding between them.*'

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Paragraph 8.56 **Page 37**	**Transport Impact I: Construction Traffic Routeing** DCO document 7.9 Transport Assessment Appendix E – Construction Traffic Assessment Supporting Information (**APP-534**), Plate 1.2, Southern Tunnel Entrance Compound and Shornefield Road Utility Hub access and egress arrangements, shows access and egress for staff and HGVs from the A226. Transport Assessment [**APP-529**] Table 8.3 indicates that Haul Road H18, the haul road between the A2 and Southern tunnel entrance compounds, would be available between construction Phases 2 and 11. The use of haul roads is welcomed by KCC as they will help to reduce the impact on the LRN. However, given the existing congestion during the peak hours, KCC remain concerned with the negative impact on the LRN. All vehicles accessing the southern tunnel compound should be able to use Haul Road H18 when it becomes operational. This would reduce the impact on the LRN and in particular benefit the site access junction on the A226, thereby reducing delays to all traffic (see earlier KCC comments on modelled delays due to Phase 6 PM Peak construction traffic).
Applicant's Response	The Applicant notes that there would be a connection across Thong Lane for a period which would connect the A2 with A226. The Applicant notes that the Contractor for the "Tunnels and Approaches Package", as set out in paragraph 4.1.1(a) of the CoCP for the delivery of these works (north of Thong Lane) is not yet appointed, so detailed design and a detailed programme for this construction has not been developed. The Applicant currently anticipates that access from the A2 to A226 would be intermittent depending on phasing, and therefore it is not possible to completely remove an access point from the A226. However, this will be explored further following appointment of the Contractor and discussed with relevant stakeholders at the Traffic Management Forum. The Applicant would seek to maximise the use of the A2 and haul road, subject to availability, to reduce concerns.
Paragraph 8.57 **Page 37**	**Transport Impact I: Construction Traffic Routeing** Transport Assessment Appendix E [**APP-534**] paragraph 1.1.7 states "There would be no left turn allowed at the egress location [of the Southern Tunnel Entrance Compound] for HGVs so these would need to turn right onto the A226. Staff would be allowed to turn left onto the A226". Whilst KCC welcome this proposal, we are concerned that this may not be provided or enforced, as this is one of two key negative impact points on the LRN for construction traffic (see earlier KCC comments on modelled delays due to Phase 6 PM Peak construction traffic).
Applicant's Response	This matter is addressed by SoCG [**REP1-103**] item 2.1.102 (DL-1) as follows: '*It is confirmed that there will be a left-turn ban for construction-related HGVs when exiting the Southern tunnel entrance compound, joining the A226 – this is set out in Table 2.2 of the oTMPfC.*' The oTMPfC [**REP1-175**] is secured by draft DCO Schedule 2 Requirement 10 [**REP1-042**] and would be delivered through a Traffic Management Plan (TMP) which must be substantially in accordance with the oTMPfC.

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	The oTMPfC [REP1-175], Section 2.4 sets out the requirement for contractors to monitor their vehicle movements. The monitoring system will be used to capture real-time data to ensure compliance with agreed vehicle routeing requirements. The monitoring data will be reported monthly to the Traffic Management Forum, where non-conformances will be addressed.
Paragraph 8.58 **Page 37**	**Transport Impact I: Construction Traffic Routeing** Transport Assessment Appendix E [APP-534] paragraph 1.1.9 refers to access and egress for the A226 Gravesend Road compound, indicating HGVs will use the A226 and staff will use Lower Higham Road. KCC are concerned about the negative impact on Lower Higham Road. Construction workers should be permitted to use either access to reduce the impact on this access.
Applicant's Response	The workforce associated with the A226 Gravesend Road compound would be able to access the compound via Lower Higham Road or the A226. The routes shown in Transport Assessment Appendix E: Construction Traffic Assessment Supporting Information [APP-534] provide a scenario modelled, which informs environmental impact assessments and represents a reasonable worst-case scenario. To establish and finalise a specific access route for the workforce to reach the compound, it is crucial to recognise the existence of several unknown factors and considerations at present. These include the specific locations from and to which construction workers would commute daily, as well as details about individual members of the workforce. Consequently, the access routes for the workforce are not finalised yet but will be developed as part of the SSTP, allowing for a tailored approach to address potential travel impacts in the most efficient manner. The FCTP [APP-546] sets out that SSTPs (for each compound or Utility Logistics Hub (ULH) or groups of compounds or ULHs where they are closely located with similar levels of accessibility) will be produced and these would reflect the local environs at the time of production. The FCTP also sets out details of the Travel Plan Liaison Group (TPLG), which KCC would be invited to, and this would offer an opportunity to raise such matters at the time.
Paragraph 8.59 **Page 37**	**Transport Impact I: Construction Traffic Routeing** DCO document 7.14 Outline Traffic Management Plan for Construction (OTMPfC) [APP-547] paragraph 2.4.11 g confirms monitoring data will be captured and reported on "adherence to agreed vehicle routeing" by Main Works Contractors and utilities contractors for each compound. Given the congestion on the LRN and the rat running through local villages that already occurs on Kent roads, vehicle routing will be an important part of the construction process. Monitoring of adherence to the route is therefore welcomed.
Applicant's Response	The Applicant welcomes the comments made in the Local Impact Report from KCC.

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Paragraph 8.59 **Page 37**	**Transport Impact I: Construction Traffic Routeing** In response to previous KCC questions on how adherence to agreed routes would be managed, National Highways identified the use of a delivery booking system as described in DCO document 6.3 Environmental Statement – Appendix 2.2 Code of Construction Practice, First Iteration of Environmental Management Plan – Annex B – Outline Materials Handling Plan (**APP-338**) paragraph 3.5.11. KCC considers this does not go far enough and requires more detailed monitoring to mitigate these negative impacts.
Applicant's Response	A delivery booking system (as described in paragraph 3.5.11 of ES Appendix 2.2 Annex B: Outline Materials Handling Plan (oMHP) [**APP-338**]) and monitoring data collected by the Contractors will be used to ensuring that Contractor deliveries adhere to the agreed vehicle routes and timing. Monitoring will be provided in addition to the use of delivery booking system. By analysing the monitoring data, Contractors will be able to assess the compliance of deliveries with the specified routes and identify any deviations or non-compliance. The data will provide insights into various aspects such as actual vs planned deliveries, vehicle arrival and departure times, adherence to agreed vehicle routeing, and non-compliance with Project route bans. By closely monitoring these parameters, the Contractor can evaluate the performance of the Contractors in adhering to the prescribed routes and take appropriate actions to address any issues or non-compliance. This may include providing guidance and feedback to the Contractors, implementing corrective measures, or initiating discussions to resolve problems. The monitoring data will serve as a valuable tool in ensuring that Contractor deliveries are carried out in accordance with the agreed vehicle routes, minimizing disruptions to the local road network and promoting efficient traffic management throughout the construction phase.
Paragraph 8.60 **Page 38**	**Transport Impact I: Construction Traffic Routeing** The OTMPfC (**APP-547**) Plates 4.1, 4.2, 4.5 and 4.6 show the proposed routing of construction vehicles. These are welcomed as they propose to retain trips on the SRN where possible. However, Kent suffers from both traffic congestion and rat running through local villages and along unsuitable routes to avoid congestion; both of which have a detrimental impact on Kent residents and the LRN. As a result, the routing plans should be conditioned so that deviations can be monitored and enforced where necessary to mitigate these negative impacts.
Applicant's Response	The Applicant notes that the TMP, which must substantially accord with the oTMPfC [**REP1-175**] is legally secured under Requirement 10 in Schedule 2 to the draft DCO [**REP1-042**] The oTMPfC is a Control Document and as such this is effectively secured mitigation. The TMPs will be consulted on (including with KCC) prior to their submission and approval by the Secretary of State. In order to adapt to increases in journey times across the Strategic and Local Road Network, the performance of traffic management will be monitored and reviewed at the Traffic Management Forum. Emerging trends and any lessons learnt will

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	used to adapt existing traffic management and shape any future phases of construction so as to minimise the impact on the travelling public. The Traffic Manager will escalate any changes required that cannot be agreed at the forum to the Joint Operations Forum for resolution, as described in Table 4.1 of ES Appendix 2.2: CoCP [**REP1-157**].
Paragraph 8.61 to 8.65 **Page 38**	**Transport Impact J: Construction Impacts on the Condition of the Existing Local Road Network (LRN)** KCC has significant concerns over the negative impacts of LTC construction on the condition of the existing LRN and KCC's ability to maintain it. Construction traffic for the LTC will place an increased loading on KCC's network resulting in faster deterioration than it would otherwise experience. The County Council has previous experience of dealing with the impact of construction and maintenance works on the A2 and is fully aware of the significant additional loads a project the scale of the LTC will place on KCC's roads from diverted traffic and especially local traffic that is rat-running due to delays caused by the works. This is especially an issue for local and rural routes which are structurally weaker and more likely to experience failures due to increased traffic. Maintenance works on failed areas of carriageway will need to be carried out earlier and to a higher standard to avoid conflicts with the LTC construction works. KCC's network currently has a backlog of over £500million of planned renewal and preservation works, so it is of critical importance that the County Council spends its limited resources where they will achieve the most benefit to its network. Repairs due to the impact of this project do not necessarily represent good asset management practice and will divert resources and funding away from other areas of KCC's network which are in more need and may otherwise deliver more benefit. Sections of roads that do reach the end of their service life during the LTC construction period, due to normal deterioration or otherwise, will either require more expensive interventions or more short-term repairs (which deliver poor value for money) to avoid having a significant impact on the LRN which will be especially sensitive during this time. Where this cannot be avoided, significant negative impacts on local residents and businesses may occur due to the combined impacts from the LTC works and required KCC maintenance works. KCC has undertaken a review of its network and identified areas of concern that are on the principally affected routes likely to see significant construction traffic, diverted traffic or routes known from previous experience that locals will use to bypass other delays. These sites are approaching the end of their life, but the County Council believes failure during the LTC construction would present an unacceptable risk to both the existing road network and the LTC project.
Applicant's Response	This matter continues to be under discussion and is set out within the SoCG [**REP1-103**] item 2.1.8 as follows: '*The Applicant continues to engage with Kent County Council to agree an appropriate approach to monitoring and mitigating potential effects.*

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	The Applicant agrees with the principle of mitigating significant adverse effects related to the Project and considers that joint inspections are a good way forward. *The Applicant considers that details of the approach should be agreed subject to Kent County Council's programme/plan of capital works.* *Kent County Council and the Applicant are engaging in order to develop an approach to identifying where routes that the Project will use for its construction logistics may be known to require short to medium-term asset maintenance activity, and to bring forward a method to deliver works where practicable.* *The outline Traffic Management Plan for Construction (oTMPfC) [**REP1-175**] also addresses this issue of Heavy Goods Vehicle (HGV) movements and local roads. Access routes are outlined in the oTMPfC.* *Kent County Council has provided an estimate for a mitigation package that the Applicant is currently reviewing ahead of further engagement.*'
Paragraph 8.66 and 8.67 **Page 39**	**Transport Impact K: Highways Asset generation and impact of transference from National Highways to Kent County Council** Within document 2.5 General Arrangement Plans, and specifically in respect of document numbers TR010032/APP/2.5 and TR010032/APP/2.13, indicate that some structures will become the responsibility of KCC under the proposed highway boundaries. This will have a negative impact on KCC arising from the cost and time to undertake the necessary assurance and approval process and the ongoing liability for operation, maintenance, renewal and replacement of the assets over their life. The extent of the negative impact cannot be fully ascertained owing to the applicant not providing information confirming which structures will seek the be transferred to Kent County Council.
Applicant's Response	This matter is addressed by SoCG [**REP1-103**] items 2.1.12 and 2.1.122 (DL-1) as follows: In relation to the Green Bridges specifically '*The Applicant will maintain the structure (up to and including the waterproof layer), as well as bridge parapets and the green element (via third party at The Applicant's cost); the remainder being the responsibility of the Local Highway Authority.* *The Applicant has shared a draft Side Agreement with Kent County Council and will continue to work with Kent County Council to discuss the transfer of assets and maintenance agreements in relation to WCH routes including resourcing for design input and sign-off.* [For clarity, this refers to resourcing for the Council's representations for the design stage, and then 'sign-off' via a final certificate to confirm transfer of the asset once works are complete].

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	Maintenance is in-line with existing approaches in terms of roles and responsibilities, and so subject to Kent County Council confirmation (and further discussion on transfer of WCH assets), National Highways considers that this is likely to be a matter agreed in subsequent drafts.' *The maintenance of both local highways and the strategic road network is funded by the Department for Transport. Local highway funding is mainly based on a formula linked to the total mileage of A roads, B and C roads, and unclassified roads in each area, together with the numbers of bridges, lighting columns, cycleways and footways. This funding is refreshed every few years to take account of changes in road length and number of highway structures. Accordingly, as local highway works are carried out under the DCO, the amount of funding that each local highway authority receives will be amended to recognise these additional responsibilities. Given that this process already exists, it is not appropriate to require National Highways to provide funding for the maintenance of parts of the local network out of the money given to it to maintain the strategic road network.* *Article 10(1) of the draft DCO [**REP1-042**] provides that where a new local highway is constructed, it must be completed to the reasonable satisfaction of the local highway authority, who becomes responsible for its maintenance from completion. …* *Article 10(2) of the draft DCO makes provision for alterations or diversions of existing local roads. Both provisions enable National Highways and the local highway authority concerned to reach different arrangements for specific maintenance responsibilities, but otherwise the default position is that once the local highway authority is satisfied that the highway has been properly completed, it becomes responsible for the maintenance of these highways just as it is for other public highways in its area.* *This arrangement is well-precedented for local highway works carried out by National Highways in connection with Nationally Significant Infrastructure Projects (NSIP) schemes. It strikes an appropriate balance between National Highways' ability to carry out its works, and local highway authorities' duties to maintain public highways in their areas*'
Paragraph 8.68 **Page 39**	**The Wider Network Impacts Management and Monitoring Plan** (**APP-545**) The Applicant proposes to address many of the negative impacts of the LTC mentioned above by means of a Wider Network Impacts Management and Monitoring Plan (WNIMMP) (**APP-545**). Our response to this proposal is detailed in our Written Representation.
Applicant's Response	The Applicant has provided a detailed response to issues raised by KCC regarding the approach to the WNIMMP within the SoCG [**REP1-103**] at items 2.1.25, 2.1.136 (DL-1), 2.1.137 (DL-1), 2.1.138 (DL-1) and 2.1.157 (DL-1). A precis of the Applicant's position is as follows: • '*The Applicant has produced a Wider Network Impacts Management and Monitoring Plan (WNIMMP) [**APP-545**], which has been updated to take on board comments received to date. If the monitoring outputs from the monitoring plan identify*

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	issues/opportunities related to the road network as a result of traffic growth or new third party developments, local authorities will be able to use this as evidence within their intervention case making. • *The WNIMMP provides clarity on the proposition, including the expectations on funding streams.*' (item 2.1.25) • '*The monitoring locations set out in the WNIMMP requires that traffic data collection be undertaken at least one year prior to the opening of the Project (mainline), not prior to construction as proposed by Kent County Council.* *The monitoring locations set out in the WNIMMP were selected on the following basis:* – *Locations situated on the SRN that are geographically close to the A122 junctions as informed by the 'scale of impacts' analysis in the Transport Assessment [**APP-529**] (the nearest and second nearest junctions on the SRN and major road network (MRN) located adjacent to the junctions with the A122, the A2, the A13 and the M25)* – *Locations requested for monitoring from local highway authorities following a review of the consultation feedback.* *A mechanism allowing for review of the proposed monitoring locations is provided through Requirement 14 in Schedule 2 of the draft DCO, which requires the preparation of an operational traffic monitoring plan, which must be approved by the Secretary of State following consultation with the relevant highways authorities. Relevant highways authorities will be able to propose locations for inclusion, which will be considered by The Applicant during the development of the operational traffic monitoring plan. The final decision on inclusion will be made by the Secretary of State through the approval process, as set out in Part 2 of Schedule 2 of the draft DCO [**REP1-042**].*' (items 2.1.136 (DL-1), 2.1.137 (DL-1) and 2.1.157 (DL-1)) • '*The Applicant does not consider it necessary to include additional locations at this time, as the mechanism set out above will allow for the introduction of new locations at a future date, following a consultation with relevant authorities on actual traffic flows closer to the opening year.*' (items 2.1.137 (DL-1) and 2.1.157 (DL-1)) • '*The monitoring scheme must include the following information:* *a. Details of a before-and-after survey to establish the baseline traffic levels and the changes in traffic* *b. The locations to be monitored* *c. The methodology to be used to collect the required data* *d. The periods over which operational traffic is to be monitored* *e. The method of assessment of traffic data* *f. Programme for the provision of the collected data to local highway authorities.* *It would not be appropriate to define the requirements at this time, because new technologies may become available that would better deliver the objectives of the monitoring scheme. Relevant authorities will have the opportunity to advise on*

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	their requirements through the consultation necessary as part of process of discharging Requirement 14 of Schedule 2 of 3.1 draft Development Consent Order [REP1-042] which secures the monitoring scheme.' (item 2.1.138 (DL-1))
Paragraph 9.8 **Page 40**	**PRoW Impact A: Enhancements to PRoW Network** KCC has identified the following positive and neutral impacts of the Applicant's plans and proposals regarding public rights of way (PRoW): • The provision of a coherent network of walking, cycling and horse riding (WCH) routes is welcomed; some of the network severance issues arising from earlier transport schemes are addressed and our view of the proposed future network is broadly positive. • The provision of new parking and equestrian parking facilities at Thong Lane is considered a positive benefit in providing an additional gateway to the new routes. • The construction of green bridges at Brewers Road and Thong Lane provides segregated non-motorised user (NMU) provision and is considered a positive benefit.
Applicant's Response	The Applicant welcomes the positive comments made in the Local Impact Report from KCC.
Paragraph 9.10 **Page 40**	**PRoW Impact B: Hares Bridge** The omission of improvements to bring Hares Bridge up to cycling / equestrian standard is considered a negative impact of the PRoW proposals for the Project. Hares Bridge is shown in DCO document 2.7 Rights of Way and Access Plan Volume B (APP-025) (points 8/28 to 10/4) Sheet 6 and currently meets pedestrian requirements but is inadequate for cycle and equestrian use. It is a key link in the NMU network; the layout of which may encourage use that it was not designed to support and is unlikely to be adequately mitigated by a sign requiring cyclists to dismount. Cycle dismount signs are not permitted in current standards, as they are not inclusive, as disabled people often cannot dismount.
Applicant's Response	The Applicant has noted this comment. Due to technical complexities and constraints associated with the upgrade of the existing bridge over HS1 it was not considered viable to modify this structure. This bridge would require extensive structural work including widening and/or replacement to provide adequate shared provision to the latest design standards and guidance. Alternative routes are available further east.
Paragraph 9.11 **Page 40**	**PRoW Impact C: Future Provision** In a similar vein, KCC is unable to determine from the following structures plans whether provision has been made for future improvements to bring the following structures cross sections up to cycling / equestrian standard as per the requirements of LTN 1/20 and CD 143 Designing for walking, cycling and horseriding. Failure to provide for this would be considered a

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	negative impact of the PRoW proposals for the Project. These structures will provide for key active travel movements across the A2 and the LTC itself: • Brewers Road Bridge, as shown in DCO document 2.13 Structures Plans (Volume B) (Sheets 12 to 79) [APP-044] Structures Plans 5(2)(o) Work No. 1D Sheet 20 Page 41 of 90 • Thong Lane Green Bridge (over A2), as shown in (APP-044) Structures Plans 5(2) (o) Work No. 1H Sheet 21 • Thong Lane Green Bridge (over A122 LTC), as shown in [APP-044] Structures Plans 5(2) (o) Work No. 3B Sheet 26 • Marling Cross Overbridge, as shown in [APP-044] Structures Plans 5(2) (o) Work No. 2F Sheet 71
Applicant's Response	The Applicant has set out some relevant information in relation to this issue in the SoCG [REP1-103] at items 2.1.120 (DL-1) and 2.1.121 (DL-1) and through information provided via direct engagement with KCC outside of the SoCG process – in summary: • '*WCH routes within Kent are shown on the General Arrangement drawings found within the General Arrangement Plans (Volume B) [APP-016].* • *The proposed WCH routes are also shown within the Rights of Way and Access Plans (Volume B) [APP-025]. These drawings should be read in conjunction with the draft DCO [REP1-042], with reference to Schedule 4 – Permanent Stopping Up of Streets and Private Means of Access.* • *Details on all WCH routes can be found within the Project Design Report – Part E – Design for Walkers Cyclists and Horse riders [APP-512]. The design specifications for these WCH routes will be dependent upon the environment within which they are located and their intended users.* • *Defining the widths/surfacing will be undertaken at the detailed design stage. Specific WCH design principles can be found within Table 4.1 Project-wide design principles: Connecting people within the Design Principles [APP-516]. All WCH routes will be designed to the latest design standards and guidance listed under Clause No. PEO.04.*' (item 2.1.120 (DL1)) • '*Part E of the Project Design Report sets out the preliminary design for PRoW and permissive paths including diversions, resurfacing/upgrades, crossings, designations; and the Design Principles sets out how the Applicant and Delivery Partner must consider and accord with design guidance/standards as set out in PEO.01 to PEO.13.* • *The Applicant and Kent County Council are working on a Side Agreement which seeks to address the issue of transfer of assets to the Local Highway Authority, including resourcing for appropriate design input and sign-off on completion.*' (item 2.1.121 (DL-1)) [For clarity, this refers to resourcing for the Council's representations for the design stage, and then 'sign-off' via a final certificate to confirm transfer of the asset once works are complete]. In addition to the above, the following references within the Design Principles [APP-516] confirm the widths for the green bridges and assigned space for WCH:

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	• Table 5.3 Section-specific principles: Section 3, 4 & 5 – Gravesend Link and South Portal, Thong Lane north - Clause S3.18 • Table 5.2 Section-specific principles: Section 2 – M2/A2/A122 Lower Thames Crossing junction, Thong Lane south - Clause S2.12 • Table 5.1 Section-specific principles: Section 1 – A2/M2 Corridor, Brewers Road green bridge Clause S1.17
Paragraph 9.12 **Page 41**	**PRoW Impact D: Designation of temporary National Cycle Route (NCR) 177** The designation of temporary National Cycle Route (NCR) 177 as a permissive route in DCO document 2.7 Rights of Way and Access Plan Volume B (APP025) Sheets 5 & 6 (between points 6/53 and 8/22) is considered a negative impact. KCC remains concerned that what is to be a key link in the NMU network, and integral to long-term east-west connectivity south of the M2 corridor, is to be delivered by means of a permissive agreement. The route is also to accommodate NCR 177 on a temporary basis through the construction phase. There is no clarification as to the nature of the permissive agreement, the terms of the agreement or the parties to the agreement. There can therefore be no certainty moving forward that permission will not be rescinded – removing the link for NMUs and specifically equestrians and cyclists. Currently the provision south of the M2 corridor through Jeskyns Community Woodland cannot be considered adequate. Should the permission be revoked at some future point the only viable alternative for recreational users would be the replacement NCR 177 route; this route is conceived as meeting the needs of commuting cyclists. It will inevitably, given its location, be of considerably lower amenity and unlikely to be used by equestrians given the proximity to traffic. Permissive access cannot and should not be viewed as a suitable alternative/compensatory provision for NMUs. The permissive route needs to have Public Bridleway designation.
Applicant's Response	The Applicant has set out its position relating to this matter within the SoCG [**REP1-103**] at item 2.1.123 (DL-1). In summary: '*A WCH strategy has been developed that includes new or improved pathways and bridges, which are designed to encourage active travel and promote health and wellbeing across the region. These WCH routes will provide access between parks, woodlands, heritage sites and employment centres in Kent, Thurrock, Brentwood and Havering. Both formal PRoWs and permissive routes have been informed by the surrounding environment and through discussions with landowners. Please refer to the Project Design Report: Part E Walkers, Cyclists and Horse Riders [**APP-512**] and Chapter 5 of the Planning Statement [**APP-495**] which provides our WCH strategy.* *At the Design Refinement Consultation, a permanent alternative route to NCR177 for WCH was proposed through Jeskyns Community Woodland and Ashenbank Woods where a formal PRoW Bridleway would be provided. In the case of Jeskyns Community Woodland this route was partially along an existing equestrian route and partially along existing pedestrian-cycle tracks through the site. This route is to be used as part of the temporary NCR177 cycle route while the main highway works were being undertaken.*

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	Further engagement with Forestry England and Woodland Trust was undertaken following the Local Refinement Consultation. A detailed discussion on the type of routes (bridleways) and their intended users (walkers, cyclists and horse riders) located through their woodland was held. Formal PRoWs with permanent bridleways were deemed unacceptable for fear of increased footfall in sensitive areas and the management of their routes. Concerns on the interaction and potential conflict between cyclists and horse riders particularly through Jeskyns Community Woodland were raised. As horse riders are already provided with a dedicated horse trail through Jeskyns Community Woodland, Forestry England did not see the need for a formal bridleway. Our enhanced WCH network will connect Jeskyns Community Woodland's existing permissive horse-trail to further green spaces via our proposed green bridges across the A2. *Forestry England want to retain the flexibility to manage their land as appropriate and have made the decision to reject the proposed bridleway. As Jeskyns Community Woodland is on Crown Land, the Project cannot impose a bridleway on them. However, they will continue to provide permissive access through their woodland via their existing dedicated horse trail. To our knowledge, this will remain free and open to horse riders. However, it is our understanding that there may be scope to explore some form of licensed permissive path should this be acceptable to Forestry England, offering some level of future security for access rights.* *Forestry England agreed for a new temporary pedestrian/cyclist route to be located through the eastern part of the Jeskyns Community Woodland site while the NCR177 highway works are being constructed, and to maintain the existing permissive equestrian trail, being separate from the new pedestrian-cycle route. To the west of the site part of an existing pedestrian/cycle track, as well as a new link to Henhurst Road would be made permissive bridleway to create a new link for pedestrians, cyclists and horse riders to Henhurst Road and the new bridleway parallel to Church Road. Once the permanent route for NCR177 is operational, the temporary pedestrian and cycle routes through the woodlands would be removed if requested by Forestry England.*' The Applicant notes that, regarding the position above, the scope to explore some form of licensed permissive path should this be acceptable to Forestry England, offering some level of future security for access rights, may only apply to the section of the route through Ashenbank Wood. The Applicant has provided a response related to this matter in its Post-event submissions, including written submission of oral comments, for OFH2 [**REP1-185**] from paragraph 3.1.1).
Paragraph 9.13 **Page 41**	**PRoW Impact E: Absence of construction detail** The absence of construction detail for the Public Rights of Way / WCH routes to be provided is a negative impact. In the absence of such detail, it is not possible to assess the suitability of the construction or to calculate commuted sum requirements.

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Applicant's Response	The Applicant has set out some relevant information to this issue within the SoCG [**REP1-103**] at items 2.1.120 (DL-1), 2.1.121 (DL-1) and 2.1.122 (DL-1) – in summary: • '*Details on all WCH routes can be found within the Project Design Report – Part E – Design for Walkers Cyclists and Horse riders [**APP-512**]. The design specifications for these WCH routes will be dependent upon the environment within which they are located and their intended users.* • *Defining the widths/surfacing will be undertaken at the detailed design stage. Specific WCH design principles can be found within Table 4.1 Project-wide design principles: Connecting people within the Design Principles. All WCH routes will be designed to the latest design standards and guidance listed under Clause No. PEO.04.*' (item 2.1.120 (DL-1)) • *Part E of the Project Design Report sets out the preliminary design for PRoW and permissive paths including diversions, resurfacing/upgrades, crossings, designations; and the Design Principles sets out how the Applicant and Delivery Partner must consider and accord with design guidance/standards as set out in PEO.01 to PEO.13.* • *The Applicant and Kent County Council are working on Side Agreements which would set out how assets would be transferred to the Local Highway Authority, including resourcing for appropriate design input and sign-off on completion.*' (item 2.1.121 (DL-1)) [For clarity, this refers to resourcing for the Council's representations for the design stage, and then 'sign-off' via a final certificate to confirm transfer of the asset once works are complete].
Paragraph 9.14 **Page 41**	**PRoW Impact F: Existing leisure/recreation PRoW use** LTC construction will have a negative impact on existing leisure / recreation PRoW use, with the prolonged closure of PRoW within the red line boundary of the Project. These effects will need to be monitored effectively. Their impact is also more likely to be prolonged or permanent if PRoW are not restored to pre-construction standard or better.
Applicant's Response	Impacts on PRoWs within the Order Limits to the south of the River Thames during construction are described in Table 13.64 of ES Chapter 13: Population and Human Health [**APP-151**]. The table provides details relating to the estimated duration of effects together with likely changes in journey length for users. Diversions are proposed for the majority of routes. The table concludes moderate adverse impacts in relation to six PRoWs as a result of the increase in likely length of route during the construction phase. For PRoWs NS167, NS174, NG17/1, the Project would aim to install new routes and open these to the public within a month of closing the existing route, thereby reducing negative impacts on existing leisure/recreation routes (for example in order to maintain connectivity between Shorne Woods Country Park and residential areas to the west during the construction phase). This is secured in the oTMPfC [**REP1-175**]. There are four PRoWs for which no diversion route has been provided and which would be closed for long periods of time. These are sections of NS164 and NS165, plus Footpaths NG7 and NG8 which are located near the South Portal and for which new routes would not be available until towards the end of the construction phase. PRoW user surveys established the

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	nature of PRoWs and their usage by WCH; the surveys indicated that the majority of PRoWs crossed by the Project route (which included NS165 and Footpath NG7 as representative routes within this area) have a low level of usage. Section 7.5 of the Health and Equalities Impact Assessment [**APP-539**] considers the impacts of the Project in relation to active travel. Table 7.18 concludes the assessment of health outcomes for active travel during construction as neutral, and notes that in instances where no diversions are proposed, alternative routes remain available for the local community to use, such that impacts on existing leisure and recreational use are not considered to be significant. As a result of the various factors described above, no monitoring of usage of PRoWs has been proposed during construction. In relation to restoration of routes following construction, Project Design Report Part E [**APP-512**] sets out the preliminary design for PRoWs and permissive paths including diversions, resurfacing/upgrades, crossings and designations; and the Design Principles [**APP-516**] sets out how the Applicant and Delivery Partner must consider and accord with design guidance/standards as set out in PEO.01 to PEO.13.
Paragraph 10.8 to 10.12 **Page 42**	**Minerals and Waste Impact A: Mineral Safeguarding** LTC DCO Document 6.3 Environmental Assessment Appendices Appendix 11.2 – Mineral Safeguarding Assessment (MSA) (**APP-436**) identifies that the tunnel bore will affect safeguarded mineral deposits, these being the sub Alluvial River Terrace Deposits and River Terrace Deposits, identified on the Gravesham Borough Council minerals map (Lynch Hill and Taplow sand and gravel). The safeguarded minerals are located beneath and adjacent to the Thames Estuary and Marshes Special Protection Area and Ramsar site. The Applicant's MSA (**APP-436**) quantifies it being of an area of approximately 14,500m2 (1.4ha) though does not identify a tonnage or potential tonnage. Given that this deposit has a 5m average thickness [according to the British Geological Survey] there could be as much as 72,500m3 or 116,000 tonnes of mineral sterilised by the project. This would normally require prior extraction to be explored. However, as the area has an international designation due to its ecological and hydrological importance, prior extraction is not deemed appropriate due to the potential negative impact. Paragraph 4.2.5 of the Applicant's MSA (**APP-436**) recognises this and states: '*Although the Project would result in the potential sterilisation of a proportion of the safeguarded sub-Alluvial River Terrace Deposits and the River Terrace Deposits, prior surface extraction under Policy DM 9 is not deemed appropriate due to the potential adverse effects the works may have on the Thames Estuary and Marshes Ramsar site, which has an international designation*.' Moreover, where a proportion of the mineral is actually intercepted by the tunnel bore the Applicant's MSA (**APP-436**) states that: '*It should be noted, however, that the Project is in tunnel in this area, and it is envisaged that some mineral resources would be extracted through the tunnelling works and reused, recycled and recovered in the Project works.*' This demonstrates that the Applicant is proposing some mitigation for potential loss of overall mineral resources to a wider sterilisation, though it

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	is accepted that any prior extraction would not be environmentally acceptable. Therefore, the use of these materials in the project is considered a neutral impact derived from the overall scheme. In conclusion, from a mineral safeguarding position the local impact is considered neutral.
Applicant's Response	The Applicant notes that KCC accepts the conclusions detailed in ES Appendix 11.2: Mineral Safeguarding Assessment [**APP-436**].
Paragraph 10.14 to 10.16 **Page 43**	**Minerals and Waste Impact B: Waste Generation** While it is understood that a degree of non-hazardous waste and hazardous waste will be produced by the project that may require management off-site, the main concern is the inert waste arisings (called construction, demolition and excavation wastes or C,D and E wastes) from the project's main activity (tunnel boring) and how that will be managed. DCO Document 6.1 Environmental Statement Chapter 11 – Material Assets and Waste (**APP-149**) states: '*Current construction, demolition and excavation (CDE) waste reuse, recycling and/or recovery 11.4.11 DMRB LA 110 Material assets and waste (Highways England, 2019) requires highways schemes to divert material from disposal. DMRB LA 110 states that 'at least 70% (by weight) of CDW shall be subjected to material recovery in accordance with the Waste Directive'. 11.4.12 Through a combination of one or more of reuse, recycling and/or recovery the Contractors shall achieve a minimum of 70% (by weight) with a target of 90% (by weight) of non-hazardous excavated wastes and a minimum of 70% (by weight) with a target of 90% (by weight) of nonhazardous construction and demolition waste that are destined for off-site waste management outside the Order Limits, and therefore would be diverted from final disposal in landfill (REAC Ref. MW013).*' Therefore, only relatively limited quantities of waste, with a particular emphasis on the C,D and E wastes, would require management outside the parameters of the project and is to be used as part of the construction material needs of the project. This would have a positive impact of not taking up the now relatively limited and finite inert landfill resources in both Kent and Essex at this time. In this regard KCC is of the view that the proposed project's local impact in waste management capacity and waste hierarchical terms is positive.
Applicant's Response	The Applicant welcomes KCC's view that the Project's local impact in waste management capacity and waste hierarchical terms is positive.
Paragraph 11.8 and 11.9 **Page 44**	**SUDS Impact A: Departure on Peak Rainfall** Paragraph 4.72 of DCO Document 6.3, Appendix 14.6, Part 6 (**APP-465**) states: "*the Environment Agency verbally agreed at a meeting held on 4 May 2022 that a 5% departure on peak rainfall intensities was acceptable*" Whilst KCC accepts that this departure has been agreed (see item number 2.1.63 of the Statement of Common Ground Ref (5.4.1.1) between National

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	Highways and The Environment Agency) it would appear to solely relate to the 100 year critical rainfall event, no consideration appears to have been given to the now required uplift to the 30 year critical rainfall event. Given that the requirement is for a 35% uplift to be applied to the 30 year event and that this is above the 5% accepted departure (being that no uplift has been applied to the 30 year event) there is a possible negative impact to Local Area whereby the risk of flooding could be increased due to the recommend climate change uplift factor not being applied to the 1 in 30 year critical rainfall event.
Applicant's Response	Following engagement on matters raised within KCC's Relevant Representation [**RR-0557**], a matter referring to the above comment was added to the SoCG [**REP1-103**] at item 2.1.154 (DL-1) as follows: '*Given the DMRB requirement to ensure no overtopping of attenuation features during all events up to and including the* [1 in 100 year] *1% AEP (inclusive of climate change allowance), a departure specific to the* [1 in 30 year] *3.3% AEP event was not discussed with the EA.* The Applicant notes that sensitivity testing has been undertaken to demonstrate that the attenuation features are effective in response to consecutive [1 in 30 year] 3.3% and [1 in 10 year] 10% AEP storms, in addition to the 1% AEP storm with a 40% uplift for climate change. In all these events there would be no overtopping of attenuation features.' The modelling has therefore demonstrated that the drainage attenuation features would have sufficient capacity to accommodate the runoff generated by the 1 in 30 year critical rainfall event inclusive of the climate change uplift factor. There would be no negative impact to local area due to increased risk of flooding. Following engagement and subsequent sharing of information on matters raised by KCC in their Relevant Representation undertaken in May 2023, the Applicant considers this matter to now be agreed.
Paragraph 11.10 and 11.11 **Page 44**	**SUDS Impact B: Drainage design of realigned or widened highway** Paragraph 6.3.17 of DCO Document 6.3, Appendix 14.6, Part 6 [**APP-465**], states with regards to existing sections of the highway which are to be realigned or widened in association with the LTC commits that: "*If the latest drainage standards are more stringent than the ones used to design the current highway, a more robust drainage design would be afforded*". KCC is pleased to note this commitment and are of the opinion that this would result in a positive impact to the local area given the more stringent requirements and the associated benefits afforded to managing flood risk.
Applicant's Response	The Applicant welcomes the comments made in the Local Impact Report from KCC.
Paragraph 11.12 and 11.13 **Page 45**	**SUDS Impact C: Watercourse channels** DCO Document 6.3, Appendix 14.6, Part 6 [**APP-465**], Paragraph 6.3.23 states: *"Alteration of watercourse channels and structures would only be considered as a last resort. Exceptions could include the following: a. Where there is an opportunity*

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	to change an engineered (straight) channel to a more natural (meandering) channel Page 45 of 90 b. Replacing an undersized structure, which acts as a constraint to freewater flow c. Returning culverted sections of watercourse to open channel where possible and practicable." Improvement of existing watercourse channels structures as part of the scheme would have a positive impact on the Local Area, at best should no works be undertaken the impact should remain neutral.
Applicant's Response	The Applicant welcomes the comments made in the Local Impact Report from KCC.
Paragraph 11.14 and 11.15 **Page 45**	**SUDS Impact D: Discharge rates** DCO Document 6.3, Appendix 14.6, Part 6 [**APP-465**], Paragraph 6.3.26 states: *"Reducing discharge rates from existing highway drainage assets (e.g. retention ponds) will hold back and slow down the flow of water in watercourses, thereby reducing flood risk on a catchment level".* Any reduction in the discharge rate from existing highway drainage, from a flooding aspect, will benefit downstream flood risk and as such should have a positive impact on the local area.
Applicant's Response	The Applicant welcomes the comments made in the Local Impact Report from KCC.
Paragraph 11.16 and 11.17 **Page 45**	**SUDS Impact E: Surface flooding 1** Paragraph 8.2.4. of DCO Document 6.3, Appendix 14.6, Part 6 [**APP-465**] states: *"Some isolated pockets of surface water flooding within the curtilage of the highway would be lost and some would be partially lost. This may cause a minor redistribution of surface flooding beyond the curtilage of the Project road, but this is not considered to present a significant flood risk. Furthermore, any such redistribution would mostly lie within land for which National Highways would be seeking permanent acquisition"*. Whilst it is understood that the redistribution of surface flooding maybe regarded as minor and that it will 'mostly' lie in land which will be in the ownership of the Applicant, this would still be seen as a negative impact given that areas of flooding could occur where they did not before.
Applicant's Response	As secured by commitments RDWE001 and RDWE006 within the Register of Environmental Actions and Commitments (within ES Appendix 2.2: CoCP [**REP1-157**]), the Contractor shall develop: • a construction phase flood risk assessment (FRA) that considers all construction phase activities and temporary works necessary to deliver the Project. The construction phase FRA shall consider on-site and off-site flood risk and include details of how offsite impacts would be prevented; and

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	• a construction phase drainage plan, demonstrating how surface water runoff across worksites would be managed, including details of how offsite impacts would be prevented. Implementation of the FRA's recommendations and the drainage plan would therefore prevent areas of flooding occurring where they did not before. During operation of the Project, any redistribution of surface water flooding would be highly localised given the efficacy of the operational drainage system and it is considered that any impacts would not be perceptible.
Paragraph 11.18 to 11.20 **Page 45**	**SUDS Impact F: Surface flooding 2** DCO Document 6.3, Appendix 14.6, Part 6 [**APP-465**], Paragraph 8.2.6. indicates three areas within KCC's responsibility, as LLFA, whereby the project may have an offsite impact on surface water flooding as shown from the long-term flood risk information map for surface water (Environment Agency, 2022c), these being: a. EFR-1-SW-01: Western end of the A2/M2 corridor (Marling Cross Interchange) Page 46 of 90 b. EFR-1-SW-02: M2/A2/Lower Thames Crossing junction c. EFR-1-SW-03: Eastern end of the A2/M2 corridor (Park Pale Interception) Further detailed descriptions are provided within Tables 8.1 through 8.3 of the possible risk from surface water that could be experienced, and the mitigation measures proposed, these being: a. EFR-1-SW-01: Risk: Existing High Risk of Surface Water Flooding due to existing low point where water naturally accumulates. Mitigation: Where the Project ties in with the existing A2/M2 highway, the existing highway drainage infrastructure would be reconfigured to accommodate runoff from new catchments and catchments affected by the Project, all in accordance with current DMRB standards. b. EFR-1-SW-02: Risk: Existing surface water flow path which crosses the projects red line and could be restricted/terminated by the project proposals. Mitigation: No mitigation required: The slip road would be on viaduct where it crosses the flow path (the level of the viaduct would exceed the surface water flooding level at the crossing point. c. EFR-1-SW-03 Risk: Known existing widespread flooding exacerbated by overland surface water flow paths. Mitigation: Where the Project ties in with the existing A2/M2 highway, the existing highway drainage infrastructure would be reconfigured to accommodate runoff from new catchments and catchments affected by the Project, all in accordance with current DMRB stand Given that these relate to existing flood issues and that mitigation is proposed to either reduce the issues experienced or 'do nothing' (EFR-1-SW-02) KCC is of the opinion that this has a neutral to positive impact on the Local Area.
Applicant's Response	The Applicant welcomes the comments made in the Local Impact Report from KCC.

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Paragraph 11.21 to 11.23 **Page 46 and 47**	**SUDS Impact G: Flood issue** DCO Document 6.3, Appendix 14.6, Part 6 [**APP-465**], Paragraph 8.2.9 details that a further flood issue is known of via the Highways Agency Drainage management System (HADDMS) – *"The hotpot encompasses the western part of junction 1 of the M2 (Park Pale Interchange) end extends westward, along both carriageways, to Cobham junction"* Proposed mitigation to resolve this issue is given in subsequent para 8.2.12 whereby *"the Project would encompass the location of all reported flood events so any legacy issues associated with these events would be eliminated. Furthermore, the new drainage provisions would extend across the full length of the flood hotspot"* KCC would therefore regard the elimination of known flood issues in this area as a positive impact.
Applicant's Response	The Applicant welcomes the comments made in the Local Impact Report from KCC.
Paragraph 11.24 **Page 47**	**SUDS Impact H: Surface water flow path** Drawing number HE540039-CJV-EFR-SZP_GNZZZZZZZZ-DR-LF-00130 as provided in DCO Document 6.3, Appendix 14.6, Part 9, Annex A (**APP-469**) provides details of the extent of known surface water flooding and whilst the areas above are referenced with regards to mitigation measure to resolve the issues we note there is an existing Surface water flow path shown to the west of A2 which crosses the projects red line (immediately south of the golf course) but does not appear to be considered in the Flood Risk Assessment. Should the work proposed in this area be such that they could interfere with the existing flow path (an embankment for example) it could increase the risk of flooding from surface water and thus have a negative impact on the local area.
Applicant's Response	The Applicant can confirm that the flow path noted emanates from just north of the Order Limits, flowing towards the south, crossing through the Project boundary, illustrated in the figure above. The works in this area comprise woodland planting and below-ground multi-utility diversion works, as illustrated on Sheet 7 of the General Arrangement Plans [**APP-016**]. Works would not interfere with this existing flow path, so there would be no increase in the risk of surface water flooding and no associated negative impact on the local area.
Paragraph 11.27 to 11.31 **Page 47 and 48**	**SUDS Impact I: Groundwater flooding** The majority of the risk from groundwater flooding to the project is mitigated by the fact that the highway in locations at risk of groundwater flooding is within the tunnel and below the superficial deposits associated groundwater risk thereby having a neutral effect. The risk of groundwater flooding resulting from the project is given as being in association with the possibility of intercepting perched water (essentially water trapped between permeable and impermeable stratums) as a result of civil construction works e.g. the creation of a cutting.

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	Should the emittance of groundwater occur in association with the works proposed, this will be managed through incorporating appropriate drainage details such as combined surface and sub-surface drains. Whilst this will be a negative impact with regards to the possible emittance of groundwater where it did not occur before, by it being managed should it occur, we deem the risk of impact to the local area as neutral. With regards to the project possibly impacting on the existing groundwater flow regime, none of the cuttings proposed within catchment EFR-1 transgress into the Chalk Formation aquifer water table and so are deemed to have a neutral effect on the regime and hence local impact. Paragraphs 8.2.21 and 8.2.22 consider the impact of the proposed infiltration basins on ground water levels and the resultant risk of groundwater flooding. Whilst it is stated that "the detailed assessment presented in Appendix 14.5: Hydrogeological Risk Assessment [**APP-458**] shows that the proposed infiltration basins would not cause mounding that would reach ground surface" on checking it is apparent that (from para 2.5.8 of DCO Document 6.3, Appendix 14.5, Part 1 of 2 [**APP-458**]) that the departure from standard as agreed with the Environment Agency, and as already discussed in SUDS Impact A above, that no climate change uplift assessment has been made for the 3.3% AEP event and as such we cannot be certain that the introduction of surface water to ground water via infiltration will not ultimately lead to excessive mounding of ground water resulting in flooding and a negative impact to the local area.
Applicant's Response	ES Appendix 14.5: Hydrogeological Risk Assessment (Part 2 of 2) [**APP-459**], Annex M: Infiltration Basins Detailed Assessment South of the River Thames, assesses the effects of the drainage infiltration from a 1 in 100-year storm (24 hours infiltration), associated with a 20% increase in peak rainfall intensity due to climate change and a further sensitivity test carried out with a 40% increase in peak rainfall intensity due to climate change (Scenario 3). Under this scenario, the assessment demonstrates that there will be no flooding due to excessive mounding below the infiltration basins. The 1 in 100-year storm event assessed is equivalent to 1% AEP plus climate change uplift which, in terms of infiltration below ground, is a worst case when compared to a 3.3% AEP plus climate change uplift. Therefore, there would be no negative impacts in the local area.
Paragraph 11.32 and 11.33 **Page 48**	**SUDS Impact J: Flooding from sewers and water mains** DCO Document 6.3, Appendix 14.6, Part 6 [**APP-465**], Paragraph 8.2.25 through 8.2.27 considers the risk of flooding from sewers and water mains and that these items will have been diverted prior to the construction works taking place thus having little to no associated flood risk for the operational phase of the proposals. There is however a risk of a sewer or water main becoming damaged in association with the works whereby they are diverted which could have a temporary negative impact on the Local Area, although one would assume the method of these diversion works would be approved/overseen by the various asset owners.

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Applicant's Response	The design, planning and management of the works, coupled with typical working practices and continued engagement and consultation with the relevant utility undertaker, are measures proposed to mitigate this risk. The Applicant and the relevant undertakers are agreeing Protective Provisions as per Schedule 14 Part 1 of the draft DCO [**REP1-042**] or separate agreements to protect the interests of those undertakers, including provisions ensuring those utility undertakers have reviewed the Applicant's proposals prior to commencement of the works.
Paragraph 11.34 and 11.35 **Page 48**	**SUDS Impact K: Surface water run off** DCO Document 6.1, Chapter 2 [**APP-140**], Paragraph 2.4.85, discusses how surface water run off from the tunnel approaches will be manged and states that: *"The surface water runoff collected at the southbound sump would be pumped to an infiltration basin."* Given the use of the tunnel the surface water runoff collected from the entrances will be of a highly polluted nature and whilst methods of treatment are considered further on in the chapter (para 2.7.66), no specific mention is given to the treatment of run off from the tunnel entrance. Given the seemingly direct link via pumping from collection mechanism to the infiltration basin, there is a risk of pollution to ground water which would have an obvious negative effect to the local area.
Applicant's Response	As illustrated on Sheets 11 and 13 of the Drainage Plans [**APP-048**], the pumping station that serves the approaches to the South Portal would discharge into a ditch that would convey surface water flows into a cascading infiltration basin system. The system will collect water from the approach roads only, not the tunnel itself, which will drain via the North Portal. Detailed assessments of the potential for discharge of operational road drainage have been undertaken, using both the HEWRAT methodology from the DMRB, and detailed groundwater modelling. The results of these assessments are presented in Annex O and Annex M of ES Appendix 14.5: Hydrogeological Risk Assessment [**APP-459**], which concluded there are no significant risks to groundwater quality. There is however a small risk of a sewer or water main becoming damaged during the works or during the operation of the Project which could have a temporary negative impact on the local area. The design, planning and management of the works, coupled with typical working practices and continued engagement and consultation with the relevant utility undertaker, are measures proposed to mitigate this risk. The Applicant and the relevant undertakers (inc. Southern Water) have agreed Protective Provisions as per Schedule 14 Part 1 of the draft DCO [**REP1-042**] or separate agreements to protect the interests of those undertakers, including provisions ensuring those utility undertakers have reviewed the Applicant's proposals prior to commencement of the works.

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Paragraph 11.36 and 11.37 **Page 49**	**SUDS Impact L: Discharged water run off** DCO Document 6.1, Chapter 2 [**APP-140**], Paragraph 2.7.64 states that *"Where required, temporary attenuation of construction site generated surface water runoff to existing discharge rates / greenfield run off rates would be provided."* Given that it is proposed for water to be discharged at the equivalent greenfield runoff rate, this would have a neutral impact to the local area.
Applicant's Response	This comment is noted.
Paragraph 11.38 and 11.39 **Page 49**	**SUDS Impact M: Contamination** DCO Document 6.1, Chapter 2 [**APP-140**], Paragraph 2.7.65 considers the issue of possible contamination in association with surface water run off and states: *"Temporary drainage systems would incorporate pollution control systems designed in line with industry good practice guidance and comply with the requirements of DMRB CG 501 (Highways England, 2020f)."* Whilst the issue of contamination is an undesirable one, KCC is of the opinion that it has been considered and that via the use of suitable pollution control systems as proposed, its impact will be neutral to the Local Area.
Applicant's Response	This comment is noted.
Paragraph 11.40 and 11.41 **Page 49**	**SUDS Impact N: Permanent Drainage System** DCO Document 6.1, Chapter 2 (**APP-140**), Paragraph 2.7.68 considers the permanent drainage system in association with the operational phase of the proposals and states: *"Drainage works would also include the construction of drainage ponds to store and treat surface water. These would be excavated prior to earthworks where practicable, and could be used during the construction phase to meet temporary drainage requirements, for example drainage from completed sections of road."* Given the ultimate design of the drainage system is to serve a much wider catchment, it could be assumed that there is no risk in association with temporary drainage connections. However, these will not be what the system has been designed for and so could have a negative impact on the local area.
Applicant's Response	New drainage attenuation features constructed to serve the Project road during its operation all provide for restricted discharges to receiving surface watercourses at greenfield runoff rates or infiltration to ground, following settlement of sediments and treatment via vegetative systems. Should the ponds receive runoff from completed sections of road, this runoff would therefore be treated and attenuated prior to its release into the water environment so as to have no negative impact on the local area. As noted in the response to item 'SUDS Impact S', below, any new retention pond used to manage construction phase drainage that is to form part of the

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	operational drainage system of the Project would be renovated following the construction phase, inclusive of silt removal, to ensure no compromise to the function of the ponds during operation of the Project. The securing mechanism for this is commitment RDWE043 in the REAC, within ES Appendix 2.2: CoCP [REP1-157].
Paragraph 11.42 and 11.43 **Page 49**	**SUDS Impact O: Box Culvert Installation** DCO Document 6.1, Chapter 2 (APP-140), Paragraph 2.7.75 provides a general description on the general installation method in association with a box culvert and details the application of a bitumen coating as a waterproof membrane. Given that the box culvert is to be used for the conveyance of surface water there are concerns raised with regards to the use of bitumen as a waterproofing material and possible issues of contamination to the water as a result which could have a negative impact to the local area as a result.
Applicant's Response	Following engagement on matters raised within KCC's Relevant Representation [RR-0557], a matter referring to the above comment was added to the SoCG [REP1-103] at item 2.1.150 (DL-1) as follows: '*Noted. The Applicant is seeking the views of the Environment Agency as to their acceptance of this aspect.*' The Applicant notes KCC's concerns. As noted in paragraph 2.7.73 of ES Chapter 2: Project Description [APP-140], the final methodology to be followed would depend on the sensitivity of the watercourse and would be subject to consultation and agreement with the relevant Lead Local Flood Authority or the Environment Agency during detailed design.
Paragraph 11.44 and 11.45 **Page 50**	**SUDS Impact P: Management of surface water** DCO Document 6.1, Chapter 2 (APP-140), Paragraphs 2.7.161 through 2.7.164 considers the management of surface water in association with the southern tunnel entrance compound and proposes a series of interconnected settlement ponds whereby the final settlement pond will discharge via a pumped mechanism to the ditch network supplementing the Ramsar area water. The Ramsar site itself is not overseen by KCC, so ultimately the approval to discharge there is granted by others. However, the proposals to deal with settlement of solids prior to the discharge of waters at the equivalent greenfield runoff rate appear acceptable and KCC is of the opinion that it would have a neutral impact to the local area.
Applicant's Response	To the south of the River Thames, surface water discharges from the Project are limited to rainfall runoff from the southern tunnel entrance construction compound. Water would be discharged to the Thames via a ditch that flows along the boundary of the Thames Estuary and Marshes Ramsar, and prior to discharge, commitment RDWE033 (within ES Appendix 2.2: CoCP [REP1-157]) would ensure attenuation and treatment to the standard specified within a discharge consent granted by the Environment Agency. The water quality standards for the discharge into the ditch would be set following consultation with Natural England and other consultees, with the standards not environmentally worse than those recorded during the pre-

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	construction water quality surveys. The runoff collection and management system would be operated until full reinstatement of the compound area is complete. During operation of the Project, to the south of the River Thames there are no proposed discharges to the River Thames. Road drainage discharges would be received by the proposed infiltration drainage features included within the drainage design, which provide for robust treatment of runoff, to safeguard groundwater quality
Paragraph 11.46 and 11.47 **Page 50**	**SUDS Impact Q: Sustainable Drainage Systems** DCO Document 6.1, Chapter 14 (**APP-152**), Paragraph 14.5.9b states: *"b. The drainage design incorporates Sustainable Drainage Systems (SuDS) and reduces the risk of causing flooding elsewhere by using attenuation features as presented on Figure 2.4: Environmental Masterplan (6.2). Drainage of operational areas on greenfield sites would be designed to ensure that post-development surface water runoff rates do not exceed existing rates (LSP.16). Where this attenuation is provided via ponds, the ponds would be designed to appear as naturalistic elements within the wider setting, with planting provided to soften edges where this is appropriate (LSP.17). Conveyance of runoff would be by means of drainage ditches and pipes, and drainage ditches would be used wherever practicable (LSP. 28). This strategy would protect receiving watercourse flow regimes as well as preventing increased scour near drainage outfalls and changes to sediment deposition/accretion in downstream reaches."* Given that it is proposed that the conveyance of post development surface water runoff is to be at a rate not in exceedance of the existing, we would deem the proposals to have a neutral impact on the risk of flooding from surface water.
Applicant's Response	This comment is noted.
Paragraph 11.48 and 11.49 **Page 50 and 51**	**SUDS Impact R: Ponds** DCO Document 6.1, Chapter 14 (**APP-152**), Paragraph 14.5.9h and paragraph 14.5.9.i states: *"Where a natural pond would be removed as part of the construction, this would be replaced. These newly created ponds would be of a similar area, depth and habitat characteristic to the removed ponds and would be provided as part of the proposed landscape mitigation illustrated in Figure 2.4: Page 51 of 90 Environmental Masterplan (Application Document 6.2). Further details are provided in Chapter 8: Terrestrial Biodiversity."* And "*Realigned channels would be constructed to reflect the size and form of existing channels to accommodate baseline flow and sediment regimes. The Design Principle S9.10 (Application Document 7.5, Design Principles) commits to, where practicable, constructing realigned channels that are more naturalised in form and that follow historic ditch patterns, promoting morphological and habitat diversity."*

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	Whilst it could be argued these are to have a neutral to positive effect on flood risk due to the 'like for like' replacement of existing ponds. Should they be required to be removed and the existing channels improved, there will be a negative impact on the area given the possible loss of habitat and the time taken for the newly created areas to become established.
Applicant's Response	Where ponds that support protected species are being removed, replacement ponds would be provided in advance of existing ponds being removed – this requirement is embedded in legally binding protected species licensing requirements. In addition, REAC commitment LV029 (with ES Appendix 2.2: CoCP [**REP1-157**]) ensures that planting identified on the Environmental Masterplan [**APP-159** **to** **APP-168**] would be undertaken at the earliest practicable opportunity following conclusion of construction activities, and REAC commitment TB021, which specifically relates to watercourse diversion planting, commits to providing successful reinstatement of vegetation (with higher levels of planting diversity) with an achievement criteria that requires successful reinstatement of vegetation at these locations within 12 months. This should avoid any shortfall in availability of wetland habitats resulting from construction activities so far as possible.
Paragraph 11.50 and 11.51. **Page 51**	**SUDS Impact S: Infiltration basins** DCO Document 6.1, Chapter 14 (**APP-152**), Paragraph 14.5.9 states: *"Infiltration basins to form part of the operational drainage system shall only be used to receive runoff from completed sections of highway; general site runoff shall not be discharged to these infiltration basins"* This would seem to contradict the statement referenced under Impact N whereby the use of operational ponds for the construction phase works is given as a possibility. Should the infiltration basins be utilised as part of the construction phase works there is a risk that excessive siltation loads could be imposed on the basins, meaning they would not operate effectively and result in a negative impact due to an increased risk of flooding to the local area.
Applicant's Response	The quoted text is from commitment RDWE043 in the REAC, within ES Appendix 2.2: CoCP [**REP1-157**]. The full content of the commitment distinguishes between existing drainage attenuation features that currently serve the A2/M2 and would be affected by the Project and the new drainage features that would be constructed by the Project. The commitment states that '*In order not to compromise their function, existing drainage features … affected by the Project … would not be used to receive construction work site runoff*'. The commitment goes on the state that any new retention pond used to manage construction phase drainage that is to form part of the operational drainage system of the Project would be renovated following the construction phase, inclusive of silt removal, and the new infiltration basins that are proposed to form part of the operational drainage system serving the Project to the south of the River Thames '*shall only be used to receive runoff from completed sections of highway; general site runoff shall not be discharged to these infiltration basins*'. This strategy would ensure no compromise to function of drainage attenuation features.

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Paragraph 11.52 to 11.54 **Page 51 and 52**	**SUDS Impact T: Rainfall runoff** DCO Document 6.1, Chapter 14 (**APP-152**), Paragraph 14.6.34 states: *"Rainfall runoff from the southern tunnel entrance compound would be discharged to a ditch, referred to as the western ditch, in Filborough Marshes. The ditch, and wider interconnected network of watercourses, would convey the runoff to the River Thames via an existing outfall. Impacts on baseline water quality would be prevented through provision of a treatment system at the compound that would, for example, remove suspended sediments and chalk fines. As secured by REAC Ref RDWE033, measures would also be taken to manage runoff from large areas of chalk stockpiles at the compound. The quality of the discharge would be governed by the conditions of an EA discharge consent. The water quality attribute of the ditch network is assigned high importance, and a negligible magnitude of impact is assessed, due to the provision of treatment measures as described above. The overall significance of effect is classified as temporary slight adverse, which is not significant."* Similarly, DCO Document 6.1, Chapter 14 (**APP-152**), Paragraph 14.6.42 states: *"During the construction phase, it is proposed to discharge treated rainfall runoff from the southern tunnel entrance compound to a ditch that is in Filborough Marshes. The ditch, and wider interconnected network of watercourses, would convey the runoff to the River Thames via an existing outfall. The outfall structure would cause a very localised and temporary effect on the ditch while being installed. However, discharges would be limited to the 1 in 2-year greenfield runoff rate or 1l/s (whichever is greater) to prevent scour/erosion or changes to the hydrological regime (RDWE033). The hydromorphology attribute of the ditch is assigned low importance and the impact magnitude is assessed as minor. Therefore, the overall significance of effect is classified as temporary slight adverse, which is not significant."* Even though the impact has been identified as temporary, a slight adverse effect on surface water quality will result in a negative impact to the local area.
Applicant's Response	As secured by commitment RDWE033 in the REAC, within ES Appendix 2.2: CoCP [**REP1-157**], the nature of the temporary discharge of surface water drainage from the southern tunnel entrance compound, in terms of its quality and quantity, would be governed by the conditions of an Environment Agency Discharge Consent. A likely condition of the Discharge Consent will be monitoring of the water quality of the receiving ditch to demonstrate the efficacy of the treatment systems in place. Should the monitoring detect change in the pre-construction baseline water quality above pre-determined trigger levels, adjustment to treatment would be required and implemented to prevent negative impacts to water quality in the local area.
Paragraph 12.8 to 12.11 **Page 53**	**Health Impact A: Air Quality during construction and operation** DCO Document 7.10 Health and Equalities Impact Assessment (HEqIA) (APP_539), Tables 7.25 and 7.28, Health outcome - air quality, assessed changes in air quality during construction and operation as neutral.

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	As detailed in DCO Document 6.1 Environmental Statement Chapter 5 (**APP-153**) – Air Quality paragraph 5.1.1, air quality impacts are determined in relation to compliance with Air Quality Strategy objectives and Limit Values. Using these measures KCC acknowledges the evidence provided the project will have a neutral impact on compliance with air quality objectives and limit values. KCC notes that the World Health Organisation (WHO) have developed air quality guidelines which consider evidence of effects on mortality lower than UK Air Quality Standards. As stated in DCO Document 7.10 HEqIA (**APP-539**) in paragraph 1.1.1: *"This Health and Equalities Impact Assessment (HEqIA) reports the findings of the assessment of likely effects of the construction and operation of the A122 Lower Thames Crossing (the Project) on human health and equality."* However, KCC is unable to determine how the assessed changes in air quality during construction and operation will impact on human health. Further information is required to determine whether there will be a positive, neutral or negative impact.
Applicant's Response	The Applicant has noted KCC's concerns regarding the need for further information to determine how the assessed changes in air quality during construction and operation will impact on human health. This has been reflected within the SoCG [**REP1-103**] at items 2.1.140 (DL-1) and 2.1.141 (DL-1), which set out the Applicant's position as follows: • '*The air quality assessment presented in Environmental Statement Chapter 5 Air Quality [**APP-143**] has been carried out in accordance with DMRB LA 105 (Highways England, 2019). The predicted pollutant concentrations at receptors are compared to the appropriate legal thresholds including Limit Values and Air Quality Strategy Objectives. This is to ensure compliance with the National Networks National Policy Statement (NN NPS), particularly when determining whether the scheme has a significant impact on air quality. The change in pollutant concentration is described in the assessment, both positive and negative, in Chapter 5 Air Quality [**APP-143**] between paragraphs 5.6.30 and 5.6.112*.' The WHO air quality guidelines are not legally binding limits; they are designed to offer guidance on reducing the health impacts of air pollution which world governments can use to inform air quality policy based on their own specific circumstances. The WHO guidelines have not been adopted as legal air quality thresholds in the UK and so it would not be appropriate to consider these in the ES. '*Section 7.8 of the Health and Equalities Impact Assessment [**APP-539**] … draws from the findings of the air quality assessment presented in Environmental Statement Chapter 5: Air Quality [**APP-143**]. The assessment of health outcomes relating to changes in air quality during the operational phase is set out in Table 7.28. The assessment refers to the fact that, across the study area for air quality, there are locations predicted to experience both improvements and deteriorations in air quality and that the majority of changes in air quality are forecast to be imperceptible or small at human receptors. The table also notes that groups particularly sensitive to deteriorations or improvements in air quality and who may be more likely to experience changes to health outcomes as a result of air quality changes include children, older people and people with existing respiratory conditions*.' (item 2.1.140 (DL-1))

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	• '*The Environmental Statement - Chapter 5 - Air Quality [APP-143] concluded that the Project is not expected to lead to a significant air quality effect on human health. … The LA105 Standard requires us to assess whether the impacts of the scheme are significant or not significant on human health based on the approach described in paragraphs 2.89 to 2.96 of the standard. This is required to determine compliance with Paragraph 5.12 of the National Networks National Policy Statement.* *Paragraphs 5.6.132 and 5.6.133 of Chapter 5 of the Environmental Statement: Air Quality [APP-143] state: 'There are a total of nine receptors which experience a worsening in NO2 concentrations, and 16 receptors which experience an improvement in NO2 concentrations where the annual mean NO2 AQS objective is exceeded. When judging whether the Project leads to a significant effect, the change in concentration and the total number of receptors are considered against the guideline bands in DMRB LA 105 (Highways England, 2019) as described in paragraphs 5.3.132 to 5.3.137'.* *Further, there are no exceedances of AQS objectives predicted for PM2.5 or PM10 with or without the Project.* *The health assessment in relation to air quality is presented within Section 7.8 of the Health and Equalities Impact Assessment [APP-539]. This describes the positive and negative impacts reported in Environmental Statement - Chapter 5 - Air Quality [APP-143] and concludes a neutral health outcome in relation to construction and operation phases. The sensitivity of particular populations to deteriorations or improvements in air quality (for example children, older people and people with existing respiratory conditions) has been taken into account in the assessment.* *Paragraph 3.6.18 of the HEqIA describes the limitations and assumptions for the assessment, stating that for all topics, the assessment has been aggregated to ward level unless otherwise specified. Health effects are therefore considered at a population, rather than an individual level. A neutral assessment has been recorded for air quality on the basis that no significant impacts are reported in Environmental Statement Chapter 5 – Air Quality and that both positive and negative changes in air quality are reported along the route*.' (item 2.1.141 (DL-1)) The Environmental Statement was appropriately scoped with all regulatory authorities and statutory consultees, and included an appropriate air quality assessment (6.1 Environmental Statement– Chapter 5 – Air Quality [Application Document [APP-143]). This considered sensitive receptors, existing air quality and was assessed to the relevant air quality thresholds in the assessment years (Air Quality Objectives and Limit Values, which are inherently protective of the environment and health). The methodology applied follows the National Highways DMRB LA105, to ensure the applicant can test the Project's impacts against the requirements in the National Networks National Policy Statement (NN NPS, 2014). This assessment was completed, submitted and concluded that the operational phase does not result in a significant effect on Human health receptors. Whilst sufficient to determine compliance with NN NPS (2014), residual concerns were noted through wider engagement, and additional clarity was deemed of value to set potential risk of changes in pollutants into context. This was deemed useful to

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	respond to concerns from stakeholders in relation to non-threshold pollutants, and the perceived potential health risk from any changes in air quality as a result of the Project, regardless of meeting the legal air quality thresholds for protective of health. The voluntary Air Quality Quantitative Health Impact Assessment (AQQHIA) was therefore carried out, applying the approach and supporting evidence base collated by the Department of Health's Committee on the Medical Effects of Air Pollutants (COMEAP) and the Clean Air for Europe (CAFE) programme. The methodology includes the use of robust concentration response functions recommended for quantification by COMEAP, and applies a consistently precautionary approach, for example overly pessimistic PM2.5 concentrations using modelled road PM10 component added to PM2.5 backgrounds. The AQQHIA has no lower threshold to the assessment, so changes of all magnitudes (no matter how small) both above and below the threshold objectives have been considered. The quantitative exposure response assessment as part of the AQQHIA demonstrates that the impact of changes in air pollution as a result of the operation of the Project is not significant, with no measurable change in public health. This conclusion further reinforces the findings of the submitted air quality assessment, that the impacts on Human Health receptors are not significant. On the above basis, the applicant maintains we have followed the most appropriate guidance to determine whether the Project complies with the NN NPS (2014). Engagement with stakeholders identified residual health concerns. The voluntary AQQHIA was commissioned to respond to such concerns, it concludes that the relative change in air quality within the area studied is neither at a concentration or exposure sufficient to quantify any measurable change in public health. A technical note will be produced which will provide the detail underpinning this conclusion, this will be provided in deadline 3.
Paragraph 12.12 and 12.16 **Page 53 and 55**	**Health Impact B: Active Travel Impacts by Ward** DCO Document 7.10 HEqIA (**APP-539**) Table 1.4, Summary of health outcomes by ward for sensitive populations (operation) indicates positive impacts on active travel in all but four wards in Gravesham outlined as wards directly or indirectly affected by the project, these are Riverside, Northfleet South, Central and Coldharbour where the impacts are indicated as neutral. Overall KCC supports the evidence base outlined by the Applicant and recognises the impacts during operation on active travel of the wards outlined in Table 1.4 as positive and neutral.
Applicant's Response	This comment is noted. The Applicant welcomes the positive comments set out within the Local Impact Report from KCC. The assessment of impacts on active travel during construction and operational phases of the project is presented in Section 7.5 of the HEqIA [**APP-539**]. As noted by KCC, there are several wards affected by the diversion and closure of PRoW during the construction phase which have been categorised as being of high sensitivity (for example Westcourt ward), by virtue of the demographic, economic and health characteristics of the ward population. Paragraph 7.5.24 of the HEqIA notes that, through engagement with stakeholders, the Applicant has committed to the creation of two Community Funds – one each covering affected communities to the north and south of the River Thames. This

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	would be secured via Section 106 (S106) agreement. Grants would be available for eligible community-led initiatives across four key themes identified based on the impacts/opportunities arising from the development, one of which is connecting communities and may include projects that enhance or encourage active travel. Eligible wards include those, such as Westcourt ward, which are in close proximity to construction activities, with funding available annually across the six years of construction and one year post construction. The Applicant welcomes a continued discussion with KCC about opportunities to raise awareness of active travel routes and the associated health benefits.
Paragraph 13.8 to 13.10 **Page 56**	**Biodiversity Impact A: Foraging/Commuting Bats and associated habitat (APP-397 and APP-408)** The impacts on foraging/commuting bats could have been under estimated due to habitats overall being assessed as moderate, while some habitats (such as Ancient Woodland) provide high suitability for foraging/commuting habitat. The Applicant's surveys have not fully assessed the significance of how bats commute across the A2/HS1 line. However, it is clear there will be a loss of habitat resulting in a decline in suitable foraging/commuting habitat. This impact is negative but has the potential to be neutral in the long term if the key habitats being lost (hedgerows and woodland) are successfully established/managed/monitored in the long term.
Applicant's Response	Data gathered through field survey and analysis of biological records indicates predominantly common species of bats are active in this area (over 90% activity recorded was from the pipistrelle species group), with the highest levels of activity occurring south of the A2 and HS1 railway where the Project is having minimal impact. The overall valuation of the bat assemblage south of the River Thames is assessed as being of County level importance (i.e. the geographic scale at which the loss of the bat assemblage would be felt would be at county level). It is considered that this baseline dataset is robust and allows the characterisation of potential impacts to be determined and the likely effect of those impacts to be assessed, as reported in ES Chapter 8: Terrestrial Biodiversity [**APP-146**], paragraphs 8.6.130 to 8.6.153. Surveys of bats commuting across the A2/HS1 line were undertaken and recorded bats crossing this infrastructure but a relatively low levels of activity, and not representative of the activity levels recorded in adjacent woodlands (e.g. Ashenbank Wood). It is therefore considered that there is not a clear and regularly used flightpath for bats crossing the A2/HS1 line. The existing vegetated central reserve may be beneficial to bats looking to cross this infrastructure as it could function as a hop-over for bats, although it is certainly not designed as such. although the central reserve would be lost as a result of the Project, the two bridges at Thong Lane South and Brewers Road would be converted to green bridges with vegetation planting tying into the adjacent habitats. These would provide strong commuting opportunities in this area which do not currently exist and therefore would be beneficial for bats. The green bridges are shown in ES Figure 2.4: Environmental Masterplan Sections 1 & 1A and 2 [**APP-159 and APP-160**], with the associated design principles secured in the Design Principles [**APP-516**], clauses STR.08, S1.04, S1.17, S2.12.

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	The general loss of woodland habitats used for foraging and roosting, and hedgerows used for commuting and foraging would be offset through the landscape design for the Project which would result in a significant increase in high quality woodland, scrub, and semi-natural species-rich grassland than is currently present. These newly created habitats are also designed to link into existing semi-natural habitats across the wider landscape, helping establish coherent ecological networks and facilitating movements of species throughout these networks. It is acknowledged that these habitats would take time to establish so would be a resource available to bats in the long-term, but there is significant available resource within the wider landscape to support the extant bat assemblage. The long-term management proposals for newly created habitats are reported in the outline Landscape and Ecology Management Plan [**REP1-173**], which include objectives to maximise value for species such as bats. The commitment to monitoring habitats and structures for bats over a 10-year period is reported in ES Appendix 8.16: Draft EPS Mitigation Licence Application – Bats [**APP-408**].
Paragraph 13.11 **Page 56**	**Biodiversity Impact B: Roosting Bats (APP-397 and APP-408)** The impact of the Project on Roosting Bats has the potential to be neutral but the replacement roosts need to be located in an area where connectivity and foraging will be retained/maintained (Potential impacts discussed within Biodiversity Impact A). Individual species needs (e.g. light adverse species) to be taken in to account.
Applicant's Response	Of the known bat roosts being impacted, all but one are considered to be day roosts, the one exception being a hibernation roost used by brown long-eared (*Plecotus auritus*), Natterer's (*Myotis nattereri*), and Daubenton's bats (*M. daubentonii*), within an air raid shelter in Shorne Woods. The baseline for bats south of the River Thames is reported in ES Chapter 8: Terrestrial Biodiversity [**APP-146**], paragraphs 8.4.52 to 8.4.60. Bat boxes would be used to compensate for the loss of tree roosts and, where appropriate, roosts in other structures. The type of bat box used would be based on its similarity in size and function to the roost being lost. In addition to compensation for the loss of roosts, bat boxes would also be provided to compensate for the loss of trees with suitable roosting features as these contribute to the roosting resource within the area. Bat boxes would be installed within areas of retained woodland either within the Project Order Limits, such as areas within Ashenbank Wood, or within woodland under agreement with the landowner such as Shorne Woods. The amount of woodland that will be lost south of the River Thames is 47.9ha (including 34.8ha of plantation woodland). The area of woodland in which bat boxes will be installed is 148.6ha including 97ha of woodland within Shorne Woods Country Park. These woodland blocks are shown on ES Appendix 8.16: Draft EPS Mitigation Licence Application – Bats, Figure E3, pg. 136 [**APP-408**]. For the potential loss of structures supporting roosts which cannot be adequately mitigated through the provision of bat boxes (e.g. maternity or hibernation roosts of certain species), the Project includes the provision for the construction of four bespoke bat structures south of the River Thames. These structures are located adjacent to retained foraging and commuting habitats, in areas proposed for semi-natural habitat creation as part of the Project design.

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Paragraph 13.12 to 13.24 **Page 56**	**Biodiversity Impact C: Dormouse APP-398 and APP-414** DCO Document 6.3 Environmental Statement – Appendix 8.9 – Dormouse (**APP-398**) has not fully demonstrated why the proposed vegetation clearance approach is appropriate given it's deviation from current best practice guidelines. Ultimately, the impact on Dormouse is negative as there will be a short to medium term loss of habitat resulting in a decline in suitable foraging/commuting/nesting habitat. From the EPS draft licence (6.3 Environmental Statement - Appendix 8.18 - Draft EPS Mitigation Licence Application – Dormouse **APP-414**) information, KCC understands that 52ha of optimum habitat and 5km of hedgerow will be lost, supporting an estimated 202 dormice. Table D5.2 stated that habitat supporting an estimated 134 dormice will be lost, and habitat supporting an estimated 68 dormice will be disturbed. However, this impact has the potential to be neutral in the long term if the key habitats being lost (hedgerows and woodland) are successfully established/managed/monitored in the long term.
Applicant's Response	"The non-standard persuasion method as detailed within **[**APP-414] has been developed by the Project, and has been discussed with Natural England in multiple meetings. Proposed receptor sites have also been discussed with Natural England during licencing meetings. The habitat found within the major receptor site of Shorne Woods Country Park is already in the process of being managed for the benefit of dormice, and this will be further enhanced using dormouse boxes to increase the number of nest sites. Woodland, scrub and hedgerow creation would provide more high quality habitat which dormice would begin to use within 5-10 years of planting. The long-term management of these habitats is reported in the outline Landscape and Ecology Management Plan [**REP1-173**], together with objectives to maximise their value for dormice. Monitoring of dormouse populations within the area is detailed in ES Appendix 8.18: Draft EPS Mitigation Licence Application – Dormouse [**APP-414**].
Paragraph 13.15 to 13.17 **Page 57**	**Biodiversity Impact D: Badgers APP-401 and APP-415** Limited information has been provided by the Applicant on how badgers commute/forage through the site. This restricts understanding of the impact the proposal will have on commuting/foraging badgers and how it will impact badgers in any setts which are being retained outside/edge of the Order Limits. The Project will result in a negative impact on badgers as there will be a short to medium term loss of habitat, resulting in a decline in suitable foraging/commuting habitat. The loss of habitat also increases the risk of badgers going on the roads (both existing and proposed) which could cause an increase risk of Road Traffic Accidents. However, this impact has the potential to be neutral in the long term if the key habitats being lost (chalk grassland, hedgerows and woodland) are successfully established/managed/monitored in the long term.

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Applicant's Response	At the request of KCC and subject to a Non-Disclosure Agreement, the Applicant shared the following confidential documents with KCC on 12 January 2023: • ES Figure 8.29: Badger Survey Results [**APP-290**] • ES Appendix 8.12: Badger [**APP-401**] • ES Appendix 8.19: Draft Badger Development Licence Application [**APP-415**] In relation to long-term management, there are a number of securing mechanisms in place including the following: • ES Figure 2.4: Environmental Masterplan [**APP-159** to **APP-168**] • Specific REAC commitments (e.g. for badgers TB008) within ES Appendix 2.2: Code of Construction Practice [**REP1-157**] • the draft protected species licence (Confidential Document) [**APP-415**] • oLEMP [**REP1-173**] • draft DCO (Schedule 2 Requirement 7) [**REP1-042**] These will all compel the Contractor and the Applicant to implement the necessary mitigation measures and to ensure its adequately monitored and maintained. The approach to badger mitigation has been agreed with Natural England and the Applicant has received a Letter of No Impediment with respect to badgers. A wide range of semi-natural habitats which would provide good quality foraging and shelter for badgers is proposed, including grassland, open mosaic habitat, scrub and woodland. The long-term management of these habitats is reported in the outline Landscape and Ecology Management Plan [**REP1-173**].
Paragraph 13.18 to 13.20 **Page 57**	**Biodiversity Impact E: Water Voles APP-399 and APP-416** It will be imperative that the works to displace water vole are not carried out outside the recommended period (15th Feb – 31st March in SE England, Water Vole Cons Handbook Dean 2016, Appendix 1 Displacement Protocol). Furthermore, mitigation should follow best practice to avoid impacts on young born during that calendar year. Displacing the water voles may not be sufficient and a translocation must be required. Habitats must be established sufficiently prior to works commencing. This impact has been identified as being neutral pending protection of retained water course/habitat during construction of the LTC.

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Applicant's Response	The Applicant recognises and will comply with Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), relating to requirements for the translocation of species in the Order Limits prior to the commencement of construction. Detailed information on the mitigation strategy for water vole is provided in ES Appendix 8.20: Draft Water Vole Conservation Licence Application [**APP-416**].
Paragraph 13.21 **Page 57**	**Biodiversity Impact F: Otter [APP-400]** The impact on Otters has currently been identified as neutral, pending protection of retained water course/habitat during construction. However, there is a need for updated surveys to inform a detailed mitigation strategy.
Applicant's Response	The requirement for pre-construction surveys is secured in the draft DCO [**REP1-042**], specifically Schedule 2 Requirement 7 – Protected Species. These would include surveys for otter to ensure appropriate measures were provided should they return positive presence of otter in the zone of influence of the Project.
Paragraph 13.22 to 13.26 **Page 57 and 58**	**Biodiversity Impact G: Invertebrate APP-392** The Project will result in a loss of overwintering invertebrate habitat through the removal of scrub/hedgerows. Furthermore, an increase in lighting within the whole site negatively impacting invertebrates. No Moth surveys have been carried out by the Applicant to understand how they will be impacted by the works. Loss of veteran trees and no proposal to retain standing deadwood/strapping of deadwood or veteranisation. The Register of Environmental Actions and Commitments document (not submitted by the Applicant as part of the DCO application) has not been updated to include specific and explanatory wording committing to veteranisation, strapping of veteran hulks, retention of standing deadwood, retention of scrub material and dead hedging. It is therefore deemed that the Project will have a negative impact on Invertebrate in the local area.
Applicant's Response	The SoCG [**REP1-103**] at item 2.1.132 (DL-1) confirms that: '*For all surveys undertaken to develop an ecological baseline against which the assessment of likely significant effects has been made, any limitations around extent of surveys and divergence from best practice have been detailed within the relevant technical appendices supporting the application. Any assumptions made in relation to such limitations are also reported, and support a precautionary approach that provided a robust assessment of likely significant effects and an appropriate and proportionate mitigation/compensation strategy.*' *With respect to terrestrial invertebrates, notably moths, baseline survey data is reported in ES Appendix 8.3: Terrestrial Invertebrates, Section 6: Assumptions and limitations being the relevant section and Paragraph 6.1.2 specifically relating to moths. …*

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	Further pre-construction survey work is secured within the draft DCO, specifically Schedule 2 Requirement 7 – Protected Species.' (emphasis added) The SoCG [**REP1-103**] also provides specific information regarding KCC's position on veteranised hulks and retention of standing deadwood, retention of scrub material and dead hedging within items 2.1.50 and 2.1.134 (DL-1): '*It is agreed that where possible, the loss of veteran trees and ancient woodland should be avoided.* *The Applicant has worked to avoid impacts, but where they are unavoidable, has sought to design a compensatory package of planting and other measures, in discussion with the Kent Downs AONB unit, Kent County Council, the Forestry Commission and Natural England.* *Where the loss of veteran trees is unavoidable, the hulks of those trees would be translocated. Other trees will be 'veteranised' as further compensation.*' (item 2.1.50) '*The removal of trees to facilitate construction of the Project is discussed in ES Appendix 7.12: Arboricultural Impact Assessment [**APP-387**].* *The worst-case assumption on the likely loss of trees in paragraph 5.2.11 of the Arboricultural Impact Assessment is that six potential veteran trees (trees identified during Project surveys as displaying the features of a veteran tree but not recorded on the Ancient Tree Inventory) would be removed to facilitate the Project. Three of these six potential veteran trees would be lost south of the River Thames. However, commitment LV001 of the REAC mandates an aim for the detailed design for the Project, including diverted utilities, to reduce the removal of trees and vegetation as far as reasonably practicable. This includes potential veteran trees.* *In accordance with commitment LV032 set out in the REAC, a minimum of 30 specimen trees would be replanted as replacement for lost veteran trees, 15 of which would be planted to the south of the River Thames in Kent. This specimen tree planting would be in addition to the extensive native woodland planting also proposed south of the River Thames, as shown on the Environmental Masterplan Sections 1 & 1A, 2, 3 4.* *Where felling of veteran trees cannot be avoided, the intact hulk would be retained and relocated in close proximity to a nearby veteran tree or within a parkland to allow fungi and invertebrates to relocate and promote habitat creation (in the form of standing dead wood). This measure is secured via the REAC commitment LV031.*' (item 2.1.134 (DL-1)) The REAC was submitted as part of the DCO application, within ES Appendix 2.2: CoCP [**REP1-157**]**.** As set out above, the REAC includes commitments relating to veteran trees and deadwood (LV001, LV032 and LV031). The omission of arboreal moth surveys is recognised as a limitation in ES Appendix 8.3: Terrestrial Invertebrates [**APP-392**]. A precautionary approach was taken in evaluating arboreal sites to account for such limitations. Of the five woodland sites identified, two were of national importance, one was of regional importance and two were of county importance. As such the assessment of importance is deemed suitably precautionary.

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	For full details of the lighting assessment, please refer to '**Biodiversity Impact K: Lighting**' below.
Paragraph 13.27 and 13.28 **Page 58**	**Biodiversity Impact H: Loss of Ancient Woodland** The Project will result in a loss of Ancient Woodland vegetation and potentially soils. The exact amount is pending contamination surveys and detailed design, however, if the soil is contaminated then Ancient Woodland soil translocation cannot be carried out. It is therefore deemed that the Project will have a negative impact on Ancient Woodland in the project area, especially the Ancient Woodland that makes up Shorne Woods Country Park.
Applicant's Response	The Applicant's position regarding this matter is detailed within the SoCG [**REP1-103**] at items 2.1.46, 2.1.50, 2.1.51 and 2.1.53 – in summary: • '*The Applicant agrees that loss of ancient woodland cannot be mitigated, and acknowledges the impact on irreplaceable habitats, and is proposing compensatory habitat*.' (item 2.1.53) • '*The Applicant notes that effects on archaeology of all areas of woodland planting have been considered within Chapter 6: Cultural Heritage within the ES [**AS-044**]*. Effects on ecology and woodlands themselves are considered in ES Chapter 8: Terrestrial Biodiversity [**APP-146**]*.' (item 2.1.51) • '*The Applicant has worked to avoid impacts, but where they are unavoidable, has sought to design a compensatory package of planting and other measures, in discussion with the Kent Downs AONB unit, Kent County Council, the Forestry Commission and Natural England*.' (item 2.1.50) • '*Ancient woodland soils will be salvaged where possible for use in new areas of compensatory planting*.' (item 2.1.53) • *The Applicant has altered the design* [throughout the pre-application period] *to minimise the footprint of the road itself through the AONB. The lanes of the A2 previously shown as widening the corridor would now be within the existing highway boundary and would not impact Shorne Woods Country Park, and revisions to the requirements of construction and utility diversions have further reduced the requirements for loss of ancient woodland*. *In terms of land-take for utilities, the diversion design has been developed and the easement width – previously estimated at 60m – has been reduced to around 15m (subject to discussions with utility companies). The route would be largely aligned with an existing access track, in order to limit the impact on the woods. Impacts remain between the Inn on the Lake and the Brewers Road overbridge.* *The Applicant has provided a detailed response to these concerns which sets out the evolution of the proposals in an effort to mitigate likely adverse effects on SSSIs as far as possible, reducing the overall area of land-take and developing sensitive mitigation and compensation measures*.' (item 2.1.46)

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	In terms of veteran trees within this classification, the SoCG [REP1-103] item 2.1.134 (DL-1) sets out that: '*The removal of trees to facilitate construction of the Project is discussed in ES Appendix 7.12: Arboricultural Impact Assessment [APP-387].* *The worst-case assumption on the likely loss of trees in paragraph 5.2.11 of the Arboricultural Impact Assessment is that six potential veteran trees (trees identified during Project surveys as displaying the features of a veteran tree but not recorded on the Ancient Tree Inventory) would be removed to facilitate the Project. Three of these six potential veteran trees would be lost south of the River Thames. However, commitment LV001 of the REAC mandates an aim for the detailed design for the Project, including diverted utilities, to reduce the removal of trees and vegetation as far as reasonably practicable. This includes potential veteran trees.* *In accordance with commitment LV032 set out in the REAC, a minimum of 30 specimen trees would be replanted as replacement for lost veteran trees, 15 of which would be planted to the south of the River Thames in Kent. This specimen tree planting would be in addition to the extensive native woodland planting also proposed south of the River Thames, as shown on the Environmental Masterplan Sections 1 & 1A, 2, 3 4.* *Where felling of veteran trees cannot be avoided, the intact hulk would be retained and relocated in close proximity to a nearby veteran tree or within a parkland to allow fungi and invertebrates to relocate and promote habitat creation (in the form of standing dead wood). This measure is secured via the REAC commitment LV031* [REP1-157].'
Paragraphs 13.29 to 13.32 **Page 58**	**Biodiversity Impact I: Birds APP-396** **Breeding birds** There will be a short to medium term loss of habitat resulting in a decline in suitable foraging/commuting/nesting habitat for breeding birds, resulting in a negative impact. However, there is the potential for this impact to be neutral in the long term if the key habitats being lost (hedgerows and woodland) are successfully established/managed/monitored in the long term. An area of suitable habitat could expand across the Order Limits as land gets taken out of current management (for example the Southern Valley Golf Course) and the breeding bird interest increases across the site. **Wintering Birds** The impact on wintering birds would be neutral if the Applicant includes proposals to manage land to support wintering birds associated with the SPA during the construction period.

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Applicant's Response	As set out in paragraph 4.6.2 of ES Appendix 2.2: CoCP [**REP1-157**], '*Habitat and protected species surveys for the following species have been undertaken to inform the ES and subsequent delivery and management of mitigation measures identified in the REAC to control environmental effects:… g. breeding birds… h. wintering and 'on passage' wetland birds.*' This also includes the following relevant commitments to wintering birds in the SPA in Kent: • REAC commitment HR001: *'Works to construct the infrastructure for the new South Portal construction drainage discharge would not take place within the Thames Estuary and Marshes Ramsar, and any work within functionally linked land, as shown on HRA Figure 2 (Application Document 6.5) would only be undertaken during April, May, June and July to avoid disturbance to passage and overwintering birds associated with European designated sites unless otherwise agreed with SoS in consultation with Natural England.'* • REAC commitment HR003*: 'To avoid impacts to wintering birds during prolonged periods of sub-zero temperatures, activities potentially causing disturbance to wintering bird qualifying interests of the Thames Estuary and Marshes Special Protection Area (SPA)/Ramsar the Joint Nature Conservation Committee's 'Scheme to reduce disturbance to waterfowl during severe winter weather' (https://jncc.gov.uk/our-work/severe-weather-scheme/) will be adopted.'* • REAC commitment HR012*: 'The construction of the permanent outfall for the operational tunnel drainage will be carried out in April, May, June and July only. This is to avoid disturbance of birds in the passage and winter period.'*
Paragraph 13.33 to 13.35 **Page 59**	**Biodiversity Impact J: Outline Landscape and Ecology Management Plan (OLEMP) APP-490** KCC is concerned with how the proposed LEMPs will be developed. The OLEMP (**APP-490**) states: *"The LEMP shall be further developed by the Contractor for each section of the development, and future iterations of the document will include details of management regimes, management expectations and monitoring requirements for each part of the authorised development, not just those outlined in this document"* Currently the OLEMP (**APP-490**) is not very detailed and therefore there is risk the individual LEMPS will be disjointed and there will be no continuity between areas. Concerned that the management required in the short, medium and long term will not be carried out and there is a need to ensure that there is ongoing funding to implement it.
Applicant's Response	Details of long-term management of these sites will be set out in the Landscape and Ecology Management Plan (LEMP). An outline LEMP [**REP1-173**] was submitted with the DCO application. The LEMP will be further developed by the Contractor for approval by the Secretary of State in consultation with relevant stakeholders. The final version of the LEMP created by the Contractor will provide more detail as the detailed design emerges and will inform the detailed establishment, management, and maintenance regimes. The Applicant acknowledges that securing the long-term management and maintenance is a responsibility that lies with them.

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Paragraph 13.36 and 13.37 **Page 59**	**Biodiversity Impact K: Lighting APP-199** We have outstanding concerns regarding the limited information provided and potential impacts of lighting on existing and proposed habitats, mitigation areas and connectivity routes. We advise that there is significant potential for negative impacts of lighting on the behaviour of bats, invertebrates, badger and hazel dormouse in the long term. The submitted information details that Lux levels from roadside lighting drops to < 0.5 Lux at 30m, which is "standard use for Highways". Due to the location adjacent to SSSI and AW and within 100m of the SPA/Ramsar/SSSI we would expect the lighting design to go above and beyond standard use for highways.
Applicant's Response	The Applicant's position regarding this matter is detailed within the SoCG [REP1-103] at item 2.1.129 (DL-1): '*The Applicant notes that the location of operational lighting is shown on the General Arrangement Plans (Volume B) and (Volume C).* *As described in ES Chapter 2: Project Description [APP-140], proposed lighting has been designed with consideration of associated environmental impacts including the use of luminaires that emit no light above the horizontal to reduce skyglow, directing lighting to reduce light spill, and the use of warm white LEDs to reduce the impact of light spill. ES Appendix 8.15: Construction and Operational Light Spill Calculations [APP-407] provides details on changes in light levels during the operational phase.* *These measures are reinforced in principle LST.02 and principle LST.03 of the Design Principles to preserve the nocturnal character of the landscape.*' The effect of light spill on European sites is assessed in paragraphs 6.2.107 to 6.2.115 in the Habitats Regulations Assessment - Screening Report and Statement to Inform an Appropriate Assessment [APP-487]. The calculations that support the assessment of the effects of light spill on ecological receptors are reported in ES Appendix 8.15: Construction and Operational Light Spill Calculations [APP-407]. The effect of light spill on ecological receptors including bats, invertebrates, badgers and dormice is reported in ES Chapter 8: Terrestrial Biodiversity [APP-146], paragraphs 8.6.451 to 8.6.482, and concludes permanent impacts on some receptors which would not adversely affect the integrity or key characteristics of those receptors and would therefore not be significant effects. In ES Appendix 8.15: Construction and Operational Light Spill Calculations [APP-407], paragraph 3.5.2 states that lighting technologies and standards are reviewed and updated regularly and would be assessed as part of detailed design to minimise light spill into adjacent habitats as far as practicable. Commitment TB024 in ES Appendix 2.2: CoCP [REP1-157] commits to complying with industry best practice around lighting and light spill, and to consulting with an Ecological Clerk of Works on lighting around any sensitive ecological features such as retained badger setts.

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Paragraph 13.38 to 13.41 **Page 59 and 60**	**Biodiversity Impact L: Biodiversity Net Gain APP-417** Document 7.1 Need for the Project (**APP-494**) acknowledges unavoidable significant adverse impacts on a SSSI and irreplaceable habitats, such as veteran trees and ancient woodland. This loss should be compensated through an overall Biodiversity Net Gain (BNG) through the Project's legacy of creating new green infrastructure (new parks) and Road Investment Strategy 2 (RIS2) aims to achieve BNG with its schemes. However, the LTC Project's anticipated Biodiversity Net Gain (BNG) will be lower than 3% for Kent. KCC is also concerned that trading rules have not been satisfied and thus the positive net gain scores south of the Thames will be invalid. We are also concerned that condition assessment information may be inaccurate – a limitation the Applicant's ecologists acknowledge. BNG has been discussed since the original DCO submission, there has therefore been adequate time for this information to be collated. There is no mention in the BNG report about how additionality has been dealt with, with regards to protected species. For example, receptor sites for Great Crested Newts (GCN)/reptiles should only be allowed within the calculations up to no net loss and it is not clear within the submission if this point has been addressed.
Applicant's Response	In the context of this statement, it should be noted that the Project is applying the Natural England Biodiversity Metric several years ahead of this being a mandatory requirement. For Nationally Significant Infrastructure Projects, mandatory BNG requirements are likely to commence in November 2025 and (subject to further announcements from government) are expected to apply to applications accepted for Examination after that date, which would not include the A122 Lower Thames Crossing. The Project's biodiversity metric forecasts, reported in ES Appendix 8.21: Biodiversity Metric Calculations [**APP-417**], are based on the preliminary design and a number of limitations and assumptions (as detailed in Section 5 of ES Appendix 8.21) that have had to be made to allow a quantitative forecast of biodiversity unit change. It is considered that this assessment provides a realistic worst-case scenario of the likely performance of the Project in terms of net biodiversity, given the necessarily precautionary nature of the assumptions made. As stated within paragraph 1.1.10 of ES Appendix 8.21, the Applicant recognises that the Project would result in the loss of irreplaceable habitats such as ancient woodland, and that this would prevent any overall claim of Biodiversity Net Gain for the Project. As discussed in ES Appendix 8.21, there are a number of opportunities for refining the forecast and for improving the outcomes for biodiversity as the Project progresses. It is expected that the forecast Metric performance would improve during detailed design as design refinements would seek to further reduce habitat loss during construction, minimise lags between habitat loss and creation and to maximise the condition and distinctiveness of habitats created. The Project would seek to maximise biodiversity performance over the full project lifecycle.

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	The Applicant provided information in a technical note shared on 26 June 2023 which included a detailed position statement on trading rules, accuracy of assessment information, and additionality with regard to protected species. This is provided below: **Trading:** The results of the calculations reported in 6.3 Environmental Statement - Appendix 8.21 - Biodiversity Metric Calculations [APP-417], have been derived following Natural England's published User Guide for Metric 3.1. Where guidance on issues such as compensation for ancient woodland loss doesn't comprehensively inform an approach to follow within the metric calculator, assumptions have been made which apply the precautionary principle and these assumptions are detailed within the Biodiversity Metric Calculations document. The output reported in this document must, therefore, be interpreted within the context of published guidance and associated assumptions (as described below). The trading rules referred to concern the general Biodiversity Metric 3.1 rule (Rule 3) that habitat losses should be compensated for by creating habitats on a like-for-like, or like-for-better basis. The Biodiversity Metric figures for the Project are reported in 6.3 Environmental Statement Appendices - Appendix 8.21 - Biodiversity Metric Calculations [APP-417]. For Kent, the trading rule is reported as not being met in Metric 3.1 for woodland due to the loss of 5.46ha of the high distinctiveness habitat lowland mixed deciduous woodland (excluding ancient woodland loss). This is shown as offset in the Metric by medium distinctiveness woodland, proposed as a precautionary approach to achieving target habitat type at this stage of the Project. Whilst there is a net increase in woodland extent in the BNG assessment for Kent of 18ha post-development (this figure excludes all woodland planting proposed for ancient woodland compensation and nitrogen deposition planting – see below), the classification of the woodland to be created as medium distinctiveness, and the low biodiversity units scores generated by woodland creation in the Metric, results in a trading failure. It should be noted that not all habitat loss and creation activities are included in the BNG calculations and the forecast BNG performance should be considered in the context of these exclusions. The loss of ancient woodland habitat (5.01ha in the Kent area) and the corresponding ancient woodland compensation planting (48.75ha in the Kent area) is excluded from the metric calculation (in accordance with the Metric guidance). In this assessment, the baseline value of the land proposed for ancient woodland compensation planting has been included in the metric calculation (thereby raising the baseline unit value). There is no published guidance around this approach, so it has been adopted on a precautionary basis. The alternative approach would be to exclude the baseline value of the compensation area (which may be considered appropriate) and this would increase the current forecast to an 11% gain. Nitrogen deposition compensation planting is also excluded from the assessment due to specific issues including irreplaceable habitat compensation and additionality (see Section 3.3 of 6.3 Environmental Statement - Appendix 8.21 - Biodiversity Metric Calculations [APP-417] for further details). In Kent, this represents 85 hectares of habitat creation

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	comprising a mosaic of grassland and scrub/woodland habitat for which Priority Habitat types would be targeted in line with the information reported within 6.7 Outline Landscape and Ecology Management Plan [**REP1-173**]. **Accuracy of assessment:** Field survey (undertaken between 2017-2020) for the Project started before the first Biodiversity Metric Condition Assessment criteria were released in July 2019. There were two further updates to the Metric and associated condition criteria, prior to DCO submission, Metric 3.0 (July 2021) and Metric 3.1 (April, 2022). Given the scale of the Project (the area representing the Project's baseline is greater than 2,000ha) and the number of different landowners involved, it has not been possible, or considered proportionate, to re-survey the entire site to meet the changing Metric condition criteria requirements. This limitation has been acknowledged in 6.3 Environmental Statement Appendices - Appendix 8.21 - Biodiversity Metric Calculations [**APP-417**]. However, as stated in the assessment, a detailed exercise has been undertaken to review the desk and field survey data available, including consideration of Priority Habitat information, to assign appropriate condition using the Metric 3.1 condition criteria. Where assumptions have been made, these have been based on the information available and have been precautionary to avoid potentially under-valuing the baseline. Likewise other elements of the assessment have been precautionary so that it is considered a realistic worst-case scenario at the preliminary design stage. It is expected that the forecast Metric performance will improve during detailed design as design refinements would seek to: further reduce habitat loss during construction, to minimise lags between habitat loss and creation and to maximise the condition and distinctiveness of habitats created. **Additionality:** Para. 5.3.22 of 6.3 Environmental Statement Appendices - Appendix 8.21 - Biodiversity Metric Calculations [**APP-417**] states the following, *"The assessment of the Project does however include biodiversity units generated by essential ecological mitigation areas included within the Order Limits to mitigate and compensate for effects on protected species. For these areas, the direct impacts they are addressing fall within the Order Limits and do not relate to irreplaceable habitats. Including these areas gives a full assessment of the biodiversity units generated by the current landscape design within the Environmental Masterplan (6.2)"*. The assessment does therefore include assessment of units generated in protected species mitigation/compensation areas. However, at the time of writing the appendix it was not clear what the Government's position was in terms of including protected species mitigation and additionality i.e. what contribution was/was not appropriate. Therefore, the specific contribution these areas make to the BNG assessment was not specified. However, the February 2023 consultation response on the BNG regulations and implementation subsequently clarified this. As per the 2023 Defra consultation response, "*mitigation and compensation for protected species and protected sites can be counted within a development's BNG calculation"*, and it is clarified that this can be up to the point of no net loss in biodiversity. For Kent, the contribution of protected species mitigation and compensation sites comprises only 5% of the post-intervention units

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	generated i.e. of the total reported in 6.3 Environmental Statement Appendices - Appendix 8.21 - Biodiversity Metric Calculations [APP-417]. As only 5% of all the post-intervention units in Kent are generated through these essential mitigation areas, it is considered that the Project aligns with the current approach for protected species mitigation/compensation additionality.
Paragraph 13.42 to 13.44 **Page 60**	**Biodiversity Impact M: Green Bridges APP-159 and APP-160** There is concern that the green bridges offer poor connectivity to other suitable habitats and the inclusion of roads on the green bridges provides additional hazards (including increased lighting) to animals trying to use the bridges to access other areas of suitable habitat. The existing bridges over the A2 will be enhanced to create habitat and there are limits on the space available to create habitat and ensure it will be retained long term. Concern that it will not mitigate for the loss of the vegetation within the central reservation/HS1 planting. The proposed A2 green bridges are expected to have a negative impact to biodiversity, whereas the Thong Lane Green Bridge is likely to have a neutral impact provided it is established, managed and monitored.
Applicant's Response	The Applicant's position regarding this matter is detailed within the SoCG [REP1-103] at item 2.1.128 (DL-1): '*The design of all green bridges proposed as part of the Project is reported in 7.4 Project Design Report – Part D – General Design South of the River [APP-509].* *All three green bridges within Kent are maintaining road connections that already exist in those locations to avoid severance impacts as a result of the Project.* *In respect of the green bridges at Brewers Road and Thong Lane South, these are providing new habitat connections where they are currently absent due to the existing transport corridors of the A2 and HS1. The provision of green bridges in these locations is, therefore, a benefit as a result of the project, and is reported in 6.1 Environmental Statement Chapter 8: Terrestrial Biodiversity [APP-146] paragraph 8.5.8, and 6.7 Outline Landscape and Ecology Management Plan [APP-490] paragraph 5.6.6.* *In respect of Thong Lane North green bridge, this is the widest green bridge proposed by the Project and will connect into the wider habitat connections being provided as a result of the landscape planting and habitat enhancements proposed as part of the Project. Thong Lane North green bridge planting zones shall be maximised. Their width shall vary across the length of the bridge but shall have a 7m minimum width at pinch points to provide habitat connection across the bridge and will also provide new WCH connections to Shorne Woods Country Park where WCH access is currently limited from the west.* *The specific design principles for green bridges are reported in 7.5 Design Principles [APP-516]; notably:* • *Clause STR.08 states that planting would tie in with the broader landscape to ensure connectivity.*

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	• *Clause S1.04 states that detailed design would provide connectivity of habitats for a range of protected species between Shorne Woods and Ashenbank Woods, Jeskyns and Cobham Park. This connectivity is currently absent given the habitat severance caused by the existing A2 and the HS1 railway line, so the provision of new green bridges at Thong Lane South and Brewers Road would help address this existing impact.* • *Clause S2.04 states that Thong Lane North green bridge would be designed to extend the character of the well-vegetated Thong Lane and to connect woodland to the east and west to provide a habitat corridor for mammals. This connectivity between habitats adjacent to and within the green bridges would facilitate movement of a range of species across them*.' The Applicant will ensure the replanting of vegetation where possible to either side of the A2. There is no space for a planted central reserve – it was considered preferable to limit widening and associated impacts on the Area of Outstanding Natural Beauty (AONB) and country parks. The green bridges would provide better flight lines for species to cross the A2, and would strengthen links between either side. The Applicant has considered and incorporated elements suggested by KCC where practicable, alongside advice from the Kent Downs AONB Unit, KCC, Gravesham Borough Council and Natural England. The Applicant continues to engage with all parties to seek a balanced approach through detailed design. The Applicant notes that local authorities would need to be consulted on any modifications to the Project within the parameters of the Environmental Masterplan [**APP-159 to APP-168**] and oLEMP [**REP1-173**], and therefore this provides the appropriate balance of certainty and flexibility.
Paragraph 13.45 **Page 60**	**Biodiversity Impact N: Nitrogen Deposition APP-418** Woodlands are proposed to be created to mitigate for the impact on the areas of Ancient Woodland (AW) along the route of the A2 and surrounding area and there is a need to ensure they can be established, retained and managed in the long term. This is expect to have a neutral impact.
Applicant's Response	As set out within the SoCG [**REP1-103**] at items 2.1.130 (DL-1) and 2.1.131 (DL-1): '*The short and long-term management of mitigation measures is secured within the Outline Landscape and Ecology Management Plan (oLEMP) [**REP1-173**]. The Delivery Partners will be responsible for the establishment of mitigation measures and management for up to five years during the maintenance period. The Applicant will be responsible for the long-term management. Identification of funding mechanisms and procurement of suitably qualified management partners, to act on National Highway's behalf, is ongoing to facilitate the management where the measures lay outside the maintainable highway boundary. The Applicant' operational teams will manage mitigation measures within the maintainable highway boundary.*' (item 2.1.130 (DL-1)) '*The establishment, retention and long-term management of woodlands that are to be created to compensate for the potential impacts of nitrogen deposition is described in the oLEMP. The oLEMP sets out proposals for appropriate long-term adaptive management, which will be informed by long-term monitoring.*

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	*The assessment of impacts of nitrogen deposition (ES Appendix 8.14: Designated Sites Air Quality Assessment) identified a lack of management in a number of the woodland sites that were surveyed. Management intervention would contribute to improving the condition of such habitats. However, Table 6.1 of ES Appendix 5.6: Project Air Quality Action Plan (PAQAP) [**APP-350**] explains that site management measures would not avoid or reduce the nitrogen deposited from the Project itself and are therefore not mitigation but compensation measures.* *In the detailed consideration of potential compensation measures (Section 7.3 of the PAQAP), three options were assessed against a number of criteria:* • *Habitat management measures within affected sites* • *Habitat creation or enhancement measures adjacent or near the affected sites* • *Habitat creation measures at an ecological network scale* *The assessment concluded that habitat creation measures at an ecological network scale, with a small number of larger compensation measures in carefully selected locations associated with identifiable habitat networks would provide the most suitable and certain option for compensation. This would provide permanent, meaningful, landscape-scale habitat creation areas that would be a long-term habitat resource of a comparable area to that affected by degradation in the affected sites.*' (item 2.1.131 (DL-1)).
Paragraph 13.46 to 13.48 **Page 60**	**Biodiversity Impact O: Reptiles and Great Crested Newts (GCNs) APP-395, APP-409 - APP-414 and APP-394** Concerns that insufficient information has been submitted with the DCO demonstrating the proposed receptor sites would be able to support the reptile/GCN populations. Meetings with the Applicant's project team have confirmed that there is sufficient capacity but it is not demonstrated within the submitted documents. GCNs only: Concerns with the potential use of gully pots which are known to trap amphibians. This impact has the potential to be positive if the replacement land for loss of arable/golf course areas are actively managed for reptiles (which includes in the long term chalk park and nitrogen deposition sites).
Applicant's Response	As referred to by KCC, the Applicant has provided further information on the approach to mitigation and receptor sites for reptiles/GCNs and this is detailed within the SoCG [**REP1-103**] at item 2.1.133 (DL-1): '*Thong Open Mosaic Habitat has been identified as a receptor site for reptiles in the oLEMP, Section 5.9) [**REP1-173**]. The relevant habitat typologies for this management area are reported in Sections 8.22 (LE8.1: Open mosaic habitat) and 8.26 (LE8.5: Ecological ponds).* *For all habitat typologies within the oLEMP, their time to target condition has been aligned to that set out within Natural England's biodiversity metric calculator (v3.1). This considers the habitat type and the proposed target condition and provides*

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	an establishment period to meet the criteria set out for that habitat within the metric. In the case of open mosaic habitat, this establishment period to meet the metric criteria is 10 years. *For the site to offer valuable reptile habitat it needs to provide the following (Edgar et al., 2010):* • *Warmth (to facilitate temperature regulation)* • *Structural complexity (to offer shelter, foraging, hibernation opportunities)* • *Habitat connectivity (to provide links into the wider landscape and facilitate genetic interchange and offer resilience to challenges* such as climate change) *The Thong Open Mosaic Habitat management area is positioned immediately adjacent to Shorne Woods Country Park on its northern, eastern and southern sides. These links would be maintained throughout Project construction. The Project landscape design in Environmental Masterplan Sections 1 & 1A, 2, 3, 4 and 9 details how this area would then connect into Thong Lane green bridge north, linking this site with habitats west of the Project such as Open space north of Claylane Wood, and Chalk Park and environs as detailed in Sections 5.7 and 5.12 of the oLEMP [**REP1-173**]; both management areas would provide high quality reptile habitat.* *The Thong Open Mosaic Habitat management area is currently horse-grazed pasture which would develop structural diversity within 12–18 months of removing this grazing pressure. Its structure would be further enhanced by the creation of areas of sparsely-vegetated nutrient-poor substrate, refuge habitats and hibernacula which would offer opportunity for thermoregulation, shelter and hibernation. Ecological ponds would provide additional habitat structural diversity.* *The Thong Open Mosaic Habitat management area is therefore considered an appropriate site for reptile translocation within 12–18 months of habitat creation, but that, to align with the biodiversity metric criteria for open mosaic habitat, the metric calculator presents a 10 year establishment period.* *Recent discussions between Kent County Council and the Applicant have covered the additional provision of potential reptile translocation sites. Two offsite receptor areas are proposed for reptiles, both situated north of the River Thames in Essex. In Kent, habitat creation within areas identified for nitrogen deposition compensation would provide additional suitable habitat for reptile translocation. The woodland and grassland habitat proposals for these areas would offer suitable reptile habitat in the grassland and woodland edge areas. With habitat creation being split on a roughly 70% woodland and 30% grassland basis, there would be approximately 13ha of suitable receptor area for reptiles. These areas would be used to release reptiles in preference over the offsite receptors north of the River Thames, which would only be used as a last resort.*' The long-term management of Thong Open Mosaic Habitat, the nitrogen deposition compensation sites and Chalk Park as habitats which would support reptiles is reported in the oLEMP [**REP1-173**], in Sections 5.5, 5.9, 5.12, 5.14 and 5.15. Clause LSP.28 of the Design Principles [**APP-516**] states that '*the use of gully pots shall be avoided where a viable alternative is available*'. The SoCG [**REP1-103**] sets out, at item 2.1.148 (DL-1), the Applicant's position:

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	'*The use of gully pots is sought to be avoided where possible to reduce risks of amphibians and small mammals becoming trapped. Within catchment EFR-1, based on the preliminary drainage design, proposed edge of pavement detail includes a mixture of surface water channels and kerb and gully systems. These details would be confirmed during detailed design.*'
Paragraph 14.8 to 14.9 **Page 61**	**Climate Change Impact A: Construction and Operation Emissions** KCC is committed to playing its part in helping the Government meet the UK's Net Zero target and to meeting the legally binding ambitions of the Paris Agreement (see Section 5: Relevant Kent County Council Policy Documents). At a local level, Kent County Council has set targets relating to climate change and has been clear that the Lower Thames Crossing should not disbenefit these. The proposals in their current form do not adequately address these concerns. A significant proportion of both the construction and operational emissions from LTC will take place within our boundaries. In addition, increased traffic volumes on Kent's roads resulting from LTC will also negatively affect our ability to meet these targets. The proposals do not set out how National Highways will mitigate the impacts of the LTC on Kent's climate ambitions, and obvious opportunities to do so have been missed.
Applicant's Response	The Applicant does not consider it likely that the Project will have any impact on KCC being able to achieve its carbon target, as the emissions from the strategic road network are not allocated by the Government to local authority budgets. There are no statutory duties for local authorities to take account of the UK's net zero targets, although it is acknowledged that voluntary targets do exist. IEMA has recently published guidance for local authorities to decarbonise through local development plans, recognising that this is the best way for them make an impact at scale on local emissions (IEMA, 2023, Practical steps for decarbonising local development plans). The Project is a Nationally Significant Infrastructure Project and not part of a local plan.
Paragraph 14.9 to 14.10 **Page 61**	**Climate Change Impact A: Construction and Operation Emissions** National Highways is reliant on DfT's Transport Decarbonisation Plan, which is ambitious, and it is missing opportunities to support the DfT's plan by providing Electric Vehicle charging along the route and prioritising the use of public transport. The DfT has recently updated Circular 02/2013 to Circular 01/2022 *"Strategic road network and the delivery of sustainable development".* The missed opportunities identified in the above paragraph demonstrate how the LTC, arguably a flagship project for the SRN, does not comply with a number of sustainability requirements stated in the updated document, such as: *"In particular, the company [National Highways] will prepare and plan for the delivery of future transport technology on the network, such as the installation of high-powered charge points for electric vehicles."* A service area which could provide facilities such as electric charging points has been removed from the LTC proposals.
Applicant's Response	In relation to reliance on the DfT's (2021) Transport Decarbonisation Plan, it is appropriate for the Applicant to respect and give weight to government policy set out in the Transport Decarbonisation Plan, particularly because achieving net zero is a

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	legal obligation under the Climate Change Act 2008 and the Government is obliged and clearly committed to bring forward policies to achieve it. More information on how the Project aligns with the Transport Decarbonisation Plan is included within the Planning Statement [**APP-495**] and Carbon and Energy Management Plan [**APP-552**]. The Project's compliance and alignment with legislation, policy and plans relevant to climate are presented in ES Appendix 15.1: Climate Legislation and Policy [**APP-480**]; and Planning Statement Appendix I: Carbon Strategy and Policy Alignment [**APP-504**]. In relation to DfT's (2022) Circular 01/2022 and the '*delivery of future transport technology to the network such as the installation of high-powered charge points for electric vehicles*', the Applicant notes that the DCO is being developed in accordance with national guidance and latest policy in road user emissions. As a consequence, the DCO submission is not linked to any further additional initiatives by the Applicant generally or the Project locally relating to road user emissions. Through 'Project Rapid', National Highways is committed to increasing the number of rapid charging points at existing Motorway Service Areas on the strategic road network. This will not be delivered at a Project level and would be delivered at a strategic regional/national level to ensure the most effective rollout to meet growing demand for EV infrastructure. As set out within the SoCG [**REP1-103**] at item 2.1.17, the Applicant's position is that: '*The Applicant does not agree that the lack of a service area on Lower Thames Crossing means that it does not comply with Circular 01/22. The Circular notes that 'in most cases it is for the private sector to promote roadside facilities'. Furthermore, a roadside facility does not necessarily need to be on Lower Thames Crossing for the Project to operate safely.* *The Applicant has established a Roadside Facilities Working Group to encourage suitable new developments in areas of the network where there is a need, and Working Group strategy would potentially bring forward suitable facilities faster than if included within Lower Thames Crossing.* *This is a wider issue occurring on roads within and outside of the Project area, and will be considered by National Highways Operational Directorate across the SRN.* *The Applicant is improving the power infrastructure to provide rapid charging at roadside facilities in the proximity of Lower Thames Crossing, namely Maidstone and Clacket Lane West and East.*' In addition, as set out within the SoCG [**REP1-103**] at item 2.1.16, the Applicant's position is that: '*National Highways' Operational Directorate will be setting out its position across the SRN through its Route Strategies and in considerations for Road Investment Strategies 3 (RIS3) (see Vision for Route Strategies (National Highways, 2021)). This will be informed by a consultation exercise looking into why there has not been more roadside facilities developed in the north-east quadrant of the M25.* *As such, it is not agreed that additional provision should be considered as part of the Project, but will be considered by National Highways Operational Directorate across the SRN.*

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	National Highways recently conducted a consultation exercise looking into why there has not been more roadside facilities and lorry parks developed in the north-east quadrant of the M25. The findings were fed into the Route Strategies.'
Paragraph 14.11 **Page 61**	**Climate Change Impact A: Construction and Operation Emissions** Furthermore, no such provisions have been made for cross-Thames active travel movements in the planning of the LTC, despite the DfT's *"Strategic road network and the delivery of sustainable development"* policy stating: *"It will support initiatives that reduce the need to travel by private car and enable the necessary behavioural change to make public transport, cycling and walking the natural first choice for all who can take it."*
Applicant's Response	The Applicant's position on this matter is set out within the SoCG [**REP1-103**] at item 2.1.57: '*The Applicant has considered various options during the development of the Project to provide improved river crossings for walkers and cyclists. The options investigated included using the tunnel, upgrading the existing ferry, relocating the ferry, building a separate bridge or cable car, and providing a shuttle service through the tunnel.* *All of these options have been rejected for reasons including lack of technical feasibility, operational issues, lack of commercial viability, cost and poor safety.* *Latent demand for walking and cycling across the River Thames at the Project crossing point is low and therefore unlikely to unlock enough trips to make the required infrastructure for a shuttle service economically viable. In addition, journey times and distances for a shuttle would be excessive because the most suitable collection and drop-off points would be at the proposed M2/A2 junction and as far north as the proposed A13/A1089 junction. For more information about the proposed walking, cycling and horse riding routes, see the Project Design Report: Part E* [**APP-512**]. *The WCH provision in the scheme is set out in application documents, specifically the Rights of Way and Access Plans and Schedule 5 of the draft DCO.* *Further information on the provision is set out in the Project Design Report Part E* [**APP-512**].' The Applicant's position relating to public transport provision within the Project is set out within the SoCG [**REP1-103**] at item 2.1.58: '*The Applicant has considered the approach to public transport within the Project.* *A number of constraints prevent segregated public transport access to the crossing, notably using the emergency accesses. The emergency access roads/merges/diverges have been specifically designed to optimise emergency service accessibility and response times. However, the emergency access roads and Lower Thames Crossing merges/diverges have not been designed to a DMRB standard for public use. The operation of the emergency access (as designed) is to be supported by the Applicant Regional Operations Centre and appropriate interventions. This introduces incompatibility between emergency service operation and bus operations. The principles apply to the access points at the North and South Portals.*

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	As such, while it is agreed that public transport use can help to reduce congestion and air quality effects, and unlock economic growth, the Applicant considers that it has assessed options for inclusion within the Project appropriately and concluded that this will not be possible, and has provided alternative means that facilitate and support public transport schemes outside of the DCO application (via the Sustainable Transport Working Group).' The Applicant recognises the opportunity to, and importance of, improving sustainable transport provision across and along the river. The Applicant notes that the Project will provide the infrastructure improvements that may facilitate this. By providing the north–south connection and junction improvements, the whole of the Project route will be accessible to local and longer distance public transport routes, if operators choose to make use of it, including operators supporting, e.g., cross-river WCH transit (by bus). The Applicant considers that local authorities are best placed to lead on the development and appraisal of future public transport projects including ferry and bus services across the river. The Applicant has set up a Sustainable Transport Working Group involving local authority stakeholders to investigate sustainable travel and cross-river connectivity enhancements that could be delivered in future to complement the Project. The Group has proposed several local priorities and opportunities for feasibility studies for future funding applications for Designated Funds. Designated Funds are very much considered the appropriate mechanism for providing these measures, which fall outside of the remit of the DCO, but may be facilitated by it to lead to improvements in sustainable modes and forms of transport across the river.
Paragraph 15.11 **Page 62**	This LIR summarises KCC's understanding of the historic environment (cultural heritage and archaeological interest) and the likely impacts of the scheme. The impacts, as set out in the DCO documents, will be either negative or neutral. No positive benefits from the project for the historic environment, south of the Thames are considered likely. The accompanying Written Representations (WR) document sets out KCC's recommendations for mitigation, which in most parts confirm the proposals put forward by the applicant
Applicant's Response	The Applicant notes this comment.
Paragraph 15.12 **Page 62**	Whilst much work has been carried out to understand the archaeological resource of the project area, and the likely impacts on this resource, and to define mitigation, there is uncertainty about the nature of the below-ground archaeological resource in specific areas and therefore about the impacts in those areas. However, KCC officers are working closely with the Applicant on these matters and we have included reference to them in this LIR and in the accompanying WR
Applicant's Response	In item 2.1.113 (DL-1) of the SoCG [**REP1-103**] records that at, KCC stated '*Kent County Council notes that certain areas of the scheme have not been subject to archaeological field evaluation [**APP-194**] and there is a risk of unexpected archaeological discoveries, which may be of national importance. This is a particular concern in respect of the tunnel boring and development in the wetland areas of the scheme. Clarification is needed on how this issue is to be satisfactorily*

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	addressed'. Following discussion between the Applicant and KCC in May 2023, this Matter has been resolved and is recorded as "Matter Agreed" in the SoCG. The Applicant has carried out an extensive programme of archaeological evaluation including geophysical survey and archaeological trial trench evaluation in order to identify unknown archaeological assets. Over 4,000 trial trenches have been excavated across the Project, approximately 1,064 of which were excavated within Kent. It is acknowledged that the presence of currently unknown archaeological sites cannot be ruled out in areas which have not been trial trenched. However, following several years of extensive desk-based assessment and field evaluation including trial trench evaluation and geophysical survey, the character of the archaeological resource that would be affected by the Project in Kent is now very well understood. While the Applicant recognises the need for additional evaluation to inform detailed mitigation plans, the Applicant is clear that sufficient evaluation has been carried out to inform determination of the DCO. The procedure for mitigating impacts to currently unknown archaeological remains is set out within ES Appendix 6.9: draft Archaeological Mitigation Strategy and Outline Written Scheme of Investigation (draft AMS-OWSI) [**APP-367**]. The detail for any required investigation and recording of previously unidentified archaeological remains would be developed on a site-specific basis in collaboration with the relevant planning authority. The draft DCO [**REP1-042**] contains the following requirements: • Any archaeological remains not previously identified which are revealed when carrying out the authorised development must be retained in situ and reported to the relevant planning authority as soon as reasonably practicable from the date they are identified. • No construction operations are to take place within 10 metres of such archaeological remains for a period of 14 days from the date of any such notice served unless otherwise agreed in writing by the Secretary of State. • If the relevant planning authority determines in writing that the archaeological remains require further investigation, no construction operations are to take place within 10 metres of the remains until provision has been made for the further investigation and recording of the remains in accordance with details to be submitted in writing to, and, unless otherwise agreed by the Secretary of State, approved in writing by, the relevant planning authority. This allows for stakeholders to be directly involved in the mitigation process for previously unidentified archaeology.

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Paragraph 15.14 **Page 63**	**Heritage Conservation Impact A: Conservation Areas** The LTC project in Kent would have a negative impact on an area of important historic rural settlement between Gravesend, Thong and Cobham. This is acknowledged within DCO document 6.3 Environmental Statement Appendices – Appendix 6.10 – Assessment Tables (**AS-052**). Table 1.1 – Conservation areas assessment table identifies the following five Conservation areas that would experience impacts: • Queen's Farm, Shorne (ES CA8) is assessed in the Environmental Statement (ES) as likely to experience limited, neutral construction and operation setting impacts. • Shorne Village (ES CA9) is assessed in the ES as likely to experience negative (minor adverse) construction and operational impacts because of the presence of the construction infrastructure and, subsequently, the new road, though no mitigation is proposed. • Thong Village (ES CA10) is assessed as likely to have a temporary negative (moderate) construction impact and a permanent negative (minor) impact, following mitigation by screening of construction compounds. The operational impact to the Thong Village Conservation Area is recognised as likely to be negative (moderate adverse) even after mitigation by use of earthworks and woodland planting. • Cobham Village Conservation Area (ES CA11) and Gravesend Riverside Conservation Area (CA14) are both recognised as likely to receive negative (minor adverse) temporary construction impacts resulting from increased noise, dust and traffic, but operational impacts are considered to be neutral and no mitigation is proposed.
Applicant's Response	Four, rather than five, Conservation Areas would receive effects as a result of the construction and operation of the Project in Kent. Queen's Farm, Shorne (ES ref. CA8) would not receive any impacts and the effect on it is therefore assessed as "neutral". Regarding the fourth bullet point: these temporary construction impacts do not include dust and noise. The impact to Cobham Village (ES ref. CA11) would be due to temporary utility works which would alter the rural character of the area. The impact to Gravesend Riverside Conservation Area (CA14) would result from a temporary increase in traffic to and from the Milton compound, in an existing urban area. It should be noted that Gravesend is a historic urban settlement, not a rural settlement. The remainder of KCC's comments in paragraph 15.14 of the LIR paraphrase the information presented in ES Chapter 6: Cultural Heritage [**AS-044**] and ES Appendix 6.10: Assessment Tables [**AS-052**].
Paragraph 15.15 to 15.19 **Page 63 to 65**	**Heritage Conservation Impact B: Designated built heritage (Listed Buildings)** The richness of the cultural heritage of the LTC project area is also illustrated by the hundreds of Listed Buildings within the Order Limits 1km study area. These are described in the DCO document 6.1 Environmental Statement – Chapter 6 – Cultural

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	Heritage (Version 2) (AS-044) and DCO document 6.3 Environmental Statement Appendices – Appendix 6.10 – Assessment Tables (AS-052) - Table 1.12: Listed Buildings Assessment Table: South of the River Thames. The following listed buildings are located south of the Thames, near or within the Project's Order Limits: Grade 1 listed buildings outside but close to the Order Limits • Cobham Hall (LB122), which is located within Cobham Hall Grade II* Registered Park and Garden (RPG1), 'partly designed by Humphry Repton, which lies south of the A2 and east of the village of Cobham, and forms the setting for a group of seven high-value listed buildings. The designation includes approximately 22ha of formal gardens and pleasure grounds, surrounded by 316ha of parkland, 120ha of which are wooded. Two scheduled monuments are located within the western half of the park (SM8) and (SM10). • Cobham College (LB196) which is located within Cobham Village Conservation Area (CA11) • Gad's Hill Place (LB241) which is located immediately to the south of the A226 and the Order Limits in Higham. (AS-044 Section 6.4.110). Grade 2 listed buildings within the Order Limits • The medium value Grade II listed Parish Boundary Stone (LB105) is located within the Registered Park and Garden (RPG1), along with several high value listed buildings comprising: a. LB122 Grade I listed Cobham Hall (including Kitchen and Stable Court) b. LB189 Grade I listed The Mausoleum c. LB176 Grade II* listed The Dairy, Cobham Hall d. LB79 Grade II listed The Engine House, Cobham Hall e. LB123 Grade II listed The Temple, Cobham Hall f. LB31 Grade II listed The Mount, Cobham Hall g. LB175 Grade II listed The Aviary, Cobham Hall' (AS-044, ES 6.4.113). Listed buildings outside the Order Limits • Outside the Order Limits and within the 1km landscape Kent study area 105 listed buildings of high value have been defined based on their individual aesthetic, historic, evidential and communal values and the contribution of their settings (ES 6.4.112). The LTC will have a significant, negative impact on the setting of a number of these listed buildings, through the introduction of physical construction elements into their rural settings during construction, and as a result of the presence of the road during its operation. This is recognised and described in DCO document 6.1 Environmental Statement – Chapter 6 – Cultural Heritage (Version 2) (AS-044) (Sections 6.6.19 – 6.6.22). Listed Buildings which will be subject to negative impacts include Filborough Farmhouse and associated buildings, Baynards Cottage and White Horse Cottage. It is acknowledged in DCO document 6.1 Environmental Statement – Chapter 6 – Cultural Heritage (Version 2) (AS-044) that in many cases it will not be possible to mitigate the significant construction impacts to these listed buildings.

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	In addition, it is recognised that there will be temporary negative impacts resulting from increased noise, dust and traffic associated with the proposed development and that these impacts would affect many heritage assets (including listed buildings as well as non-designated buildings). These are described in DCO document 6.1 Environmental Statement – Chapter 6 – Cultural Heritage (Version 2) (**AS-044**) (Section 6.6).
Applicant's Response	KCC's comments in paragraphs 15.15 to 15.19 of the LIR paraphrase the information presented in ES Chapter 6: Cultural Heritage [**AS-044**] and ES Appendix 6.10: Assessment Tables [**AS-052**]. The significant construction effects to listed buildings in Kent will be non-physical and the majority of these significant effects would be temporary. Only one permanent significant effect has been assessed on a listed building in Kent as a result of the operation of the Project: the Grade II listed White Horse Cottage (ES ref. LB22), which would receive a permanent moderate adverse effect as a result of the changes to elements of its setting that contribute to its value, and less than substantial harm in policy terms.
Paragraph 15.20 to 15.22 **Page 65 and 66**	**Heritage Conservation Impact C: Non-designated built heritage south of the Thames** Negative impacts to the non-designated built heritage will mostly result from changes to the setting of buildings. These are recognised in DCO document 6.1 Environmental Statement – Chapter 6 – Cultural Heritage (Version 2) (**APP-044**) and are listed in **AS-052** Table 1.13: Non-designated built heritage Assessment Table: South of the River Thames). For example, a 'Moderate' adverse permanent impact resulting from the operation of the scheme is recorded for the non-designated Cheney's Farm and White Horse Cottage Farmstead and a 'Moderate' adverse temporary impact is also predicted for five other non-designated buildings. Mitigating the negative impacts to these heritage assets will be difficult because of the change to their rural setting that will result from the introduction of the road and associated changes to the landscape. Two built heritage assets are identified which would have to be physically removed to make way for construction. These are: • Caves that were converted to air raid shelters in Thong Lane, Shorne (Asset 1562), which would be removed for the establishment of a construction haul road, utility works and multi-utility networks and. • A WW2 Air raid shelter (Asset 1875) which would be removed to make way for utility groundworks (gas) and establishment of Native Woodland LE2.1. The DCO documentation states that these structures would be subject to historic building recording (Historic England Level 3) before their loss (AS052) and in the dAMS-OWSI (**APP-367**). It would be preferable if these heritage assets could be recorded and conserved. KCC welcome the fact that mitigation through design changes has saved the non-designated early 20th century Homes for Heroes, at the northern end of Thong village (Asset 1561) from being demolished. However, it is noted that part of the original plot would be reduced in size because of the realignment of Thong Lane. It would be preferable if the original plot size, which forms the setting of the buildings, could be maintained.

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Applicant's Response	Five non-designated built heritage assets in Kent would experience moderate impacts from the construction of the Project that would result in temporary moderate adverse effects, which are significant (Assets 1132, 1133, 1134, 1147, 1449 in ES Chapter 6: Cultural Heritage [**AS-044**]). Two of these five assets, Cheney's Farm (1133) and White Horse Cottage Farmstead (1134), would receive permanent moderate adverse effects (which are significant) as a result of the operation of the Project. The remainder of the assets would receive operational effects which are assessed as neutral or permanent slight adverse, which are not significant. Assets 1455 and 1561 would receive temporary moderate construction impacts but differing levels of non-significant effects – counting these two appears to produce the total number of seven assets referred to by KCC in LIR paragraph 15.22. Assets 1562 and 1875 are assessed as low value and their removal would result in permanent slight adverse effects which are not significant. The exact location of the caves (Asset 1562) is uncertain, and their removal is assessed as a worst-case scenario – it is possible that they may not be affected by the Project. The removal of Asset 1875 (an air raid shelter within the remains of a WWII accommodation camp, Asset 1331) is unavoidable due to key utility diversions along the A2 corridor. However, it should be noted that, the over the course of the Project, the Applicant has amended the utility working areas to preserve in situ the nearby air raid shelter (Asset 1874), remnants of WWII toilet block (Asset 1873) and another structure (Asset 1845). The diversion of utilities, including below-ground gas mains, has meant that it has not been possible to rule out a slight temporary encroachment into the rear garden plot associated with the Homes for Heroes (Asset 1561) in Thong. However, while utility Work No. G3 has a provision that means part of the rear garden plot could be utilised for the pipeline diversion, the garden would be considered as part of the detailed design and avoided unless absolutely necessary to facilitate the diversion. Once the diversions have been completed, the land would be returned to the landowner and the original rear garden plot would be reinstated. Regarding the front garden plot of Asset 1561: the impact of utility Work No. MU18 on the front garden depends wholly on the alignment of Thong Lane Bridge (Work No. 3B), but impacts would be considered and reasonably reduced at the detailed design stage. In summary, the assessment of both of these impacts on Asset 1561, which are provided in the ES Chapter 6: Cultural Heritage, are based upon worst-case scenarios which the Applicant will aim to avoid if possible at the detailed design stage.
Paragraph 15.24 and 15.25 **Page 66**	**Heritage Conservation Impact D – Archaeology: Scheduled Monuments** 6.1 Environmental Statement – Chapter 6 – Cultural Heritage (Version 2) (AS044) notes that *'In the 1km study area south of the River Thames (including the landscape study area and specifically included assets beyond 1km) there are 9 scheduled monuments which are all of high value (SM8, SM10, SM20, SM21, SM22, SM23, SM24, SM26, SM27). No scheduled monuments are located within the Order Limits. Three further high-value scheduled monuments located outside the 1km study area, landscape study area and the Order Limits have been included within this assessment (SM15, SM16, SM17)… The high value scheduled monuments of the Romano-British villa and 19th century reservoir in Cobham Park (SM10), New Tavern Fort*

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	(SM17), the Roman Town of Vagniacae (SM21) and the Springhead Roman Site (SM22) are predicted to experience a change to their setting during construction which would result in a temporary impact of negligible adverse magnitude and a slight adverse effect, which is assessed as not significant.' The construction impacts of the scheme are assessed as being negative (adverse) but not significant. The operational impacts of the scheme on the setting of Scheduled Monuments, including the possible Bronze Age barrow in Ashenbank Wood, are considered to be neutral due to their locations outside the Order Limits and their screening.
Applicant's Response	KCC's comments at paragraphs 15.24 and 15.25 of the LIR quotes and paraphrases information provided in ES Chapter 6: Cultural Heritage [**AS-044**] and ES Appendix 6.10: Assessment Tables [**AS-052**]. The Applicant agrees with KCC that there would be no adverse operational impacts to Scheduled Monuments in Kent.
Paragraph 15.31 to 15.33 **Page 72**	**Heritage Conservation Impact E – Archaeology: Geoarchaeology and Palaeolithic/Early Holocene** DCO document (APP–358) states that 'Relatively little detailed work has yet been undertaken on Pleistocene or Holocene deposits in the area of scheme impact. However, as-yet-undiscovered sites of similar high importance to those already known are likely to be present in the LTC impact footprint in the areas identified as of high importance in this report'. Table 5 below provides a summary of the zones in Kent with a brief description of their character and potential with related recommendations for further investigations. The latter are also set out in KCC's accompanying Written Representation. The scheme construction process result in a negative impact on Palaeolithic deposits of archaeological interest in zones PQ3-9 and 29) and this is reflected in the ES Section 6.6.119 (**AS-044**). The Applicant acknowledges the need for archaeological investigation (as set out above) and that large extents of geological deposits may contain 'sites' of archaeological significance, and that in Kent, some of the geo-archaeological deposits are of relatively limited extent, and therefore negative project impacts could be relatively significant.
Applicant's Response	ES Appendix 6.5: Lower Thames Crossing - Palaeolithic and Quaternary Deposit Model (PQDM) and Desk-based Assessment of Palaeolithic Potential [**APP-358**] contains important context that has been omitted from LIR paragraph 15.31: '*Many well-known and important archaeological sites with both artefactual and palaeoenvironmental remains are documented in the lower Thames. These are mostly in the better investigated deposits to the west of the project route corridor. Relatively little detailed work has yet been undertaken on Pleistocene or Holocene deposits in the area of scheme impact. However, as-yet-undiscovered sites of similar high importance to those already known are likely to be present in the LTC impact footprint in the areas identified as of high importance in this report.*' The Applicant agrees with the following wording from LIR paragraph 15.33: '*The Applicant acknowledges the need for archaeological investigation*'. The draft AMS-OWSI [**APP-367**] sets out a programme of Palaeolithic and Holocene investigations at Table 3.1, paragraphs 6.1.6, 6.3.4, 6.3.19, 6.3.56, 6.3.89, 6.3.110, 6.4.1, 6.4.33 to 6.4.38, and 7.3.118 to 7.3.119. This is secured by Requirement 9 of the draft DCO [**REP1-042**].

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	The Applicant disagrees with the following wording from LIR paragraph 15.33: '*The Applicant acknowledges … that large extents of geological deposits may contain 'sites' of archaeological significance, and that in Kent, some of the geo-archaeological deposits are of relatively limited extent, and therefore negative project impacts could be relatively significant*.' The geo-archaeological deposits being affected by the Project are generally very large, in some cases (e.g. PQ-8) 30m in depth and tens of miles across. The Applicant stands by the assessment provided in ES Chapter 6 [**AS-044**] which assess negligible impacts to PQ-3, PQ-4, PQ-5 and PQ-6 and minor impacts to PQ-7, PQ-8 and PQ-9. Of these, only the impacts to PQ-7 and PQ-8 would result in significant effects (permanent moderate adverse) due to the high value of these assets.
Paragraph 15.36 and 115.38 **Page 72 and 73**	**Heritage Conservation Impact F - Non-designated archaeology (within and outside the order limits)** This Environmental Statement high level summary does not fully capture the complex and interesting narrative that is emerging from the investigations carried out by the Applicant. The summary reflects in part, the Environmental Statement approach to organising the assessment and description of individual heritage assets by their value, rather than by more considered groups of related assets of the same period or by character area, as has been achieved for the Palaeolithic. The work of synthesising the very large amounts of data presented in the present DCO documents is being undertaken by the Applicant and we note in our Written Representation that this new information should be added to the DCO documentation during the Examination process to help inform agreement of mitigation methods.
Applicant's Response	Assets have been considered by period and geographical region in ES Appendix 6.1: Cultural Heritage Desk-based Assessment [**APP-351**, **APP-352**, **APP-353**, **APP-354**]. The important group of Thames forts has been assessed in detail in a dedicated appendix: ES Appendix 6.4: Coastal Fortifications Statements of Significance [**APP-357**]. Assets have been considered in period groups in the ES where relevant. In the ES baseline, non-designated assets are considered on a geographical area and period basis, and this has informed assessment of value (ES Chapter 6: Cultural Heritage [**AS-044**] and ES Appendix 6.10: Assessment Tables [**AS-052**]). It is therefore not correct to say that assets have not been assessed in '*considered groups of related assets of the same period or character area*'. Asset groups have also been taken into consideration in the assessment of likely significant effects (Section 6.6 of ES Chapter 6: Cultural Heritage). For example, the Applicant has considered setting impacts on archaeological assets as a result of the removal of assets of related periods or types within the Order Limits in paragraphs 6.6.185, 6.6.190, 6.6.256, 6.6.257, 6.6.315, 6.6.316 and 6.6.320 of ES Chapter 6 and Asset 703 on page 252, Asset 4608 on page 317, Asset 4610 on page 318, Assets 2300, 2301 and 2302 on page 35 and, Asset 3462 on page 36 of ES Appendix 6.10: Assessment Tables. As referred to by KCC above, the work of synthesising the very large amounts of data presented in the present DCO documents is being undertaken by the Applicant. This includes adding consistent and detailed period and site type categorisations to the large archaeological datasets. The Applicant has had and continues to have informal meetings with

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	KCC to develop this. This information will contribute to the draft AMS-OWSI and will inform detailed mitigation designs to be agreed in collaboration between the Applicant and KCC.
Paragraph 15.39 **Page 73**	It is recognised in the DCO documentation that further archaeological investigations are required to understand the archaeological resource more fully and to define in detail the specific methods of mitigation. For example, in the DCO ES (**AS-044**), it states that 'Thirty-three* medium value non-designated archaeological assets of Prehistoric, Roman or unknown date are recorded within the Order Limits and would be removed or truncated by the Project: through the construction of the main alignment, associated earthworks, landscaping, the Southern Tunnel Entrance compound, temporary storage stockpiles 1 and 2, and utility diversion works. They are located between the A2 west of Thong and the A226 Gravesend Road to the south of Chalk'. These are the known sites. Other, presently unknown sites will be impacted in areas which have not yet been subject to archaeological trial trenching.' [*ES Table 6.7 records that 44 assets of medium value would receive a permanent and significant negative impact]. The need for further investigations is also set out in the dAMS-OWSI (**APP-367**).
Applicant's Response	Regarding currently unknown archaeological sites, please see the Applicant's response to LIR paragraph 15.12, above. For clarity regarding the number of impacts, paragraph 6.6.48 of ES Chapter 6: Cultural Heritage [**AS-044**] states that 33 medium-value non-designated archaeological assets located between the A2 and the A226 would be removed or truncated by construction of the Project. A further 11 medium-value archaeological assets within the Order Limits in Kent would also be truncated or removed by the construction of the Project, as described in paragraphs 6.6.51 to 6.6.57 of ES Chapter 6. This provides the total of 44 medium-value assets in Kent receiving permanent significant effects as set out in Table 6.7 of ES Chapter 6. The procedure for mitigating impacts to archaeological remains is set out within ES Appendix 6.9: Draft AMS-OWSI [**APP-367**]. Archaeological interests will primarily be controlled by means of site-specific written schemes of investigation. The Applicant proposes that the DCO would include a requirement to the effect that no part of the authorised development is to commence until, for that part, a site-specific written scheme for the investigation of areas of archaeological interest, reflecting the relevant mitigation measures set out in the draft AMS-OWSI, has been submitted to and approved in writing by the Secretary of State, following consultation by the undertaker with the relevant planning authority on matters related to its function. This allows for the council to be directly involved in the archaeological mitigation process. The REAC (within ES Appendix 2.2: CoCP [**REP1-157**]) provides further commitments. The draft AMS-OWSI presented in ES Appendix 6.9 includes details of specifically identified measures to mitigate the impact to known heritage assets and a range of generic mitigation measures from which appropriate mitigation would be applied for currently unknown heritage assets that could be physically damaged by construction.

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LIR Reference	Local Impact Report Extract / Applicant's Response
Paragraphs 15.41 to 15.46 **Pages 74 to 75**	**The need for further investigation and recording work** The DCO documentation also recognises that the wider construction and mitigation works for the road project would result in a negative impact on a large number of important non-designated heritage assets with archaeological interest. For example, in (**AS-044** Section 6.6.50) it states that 'The activity associated with these utility works, compound construction works and establishment of landscaping would require at least the removal of or excavation into topsoil, and in some areas deeper excavation exposing any archaeological remains present. Consequently, the works would permanently impact these medium value non-designated archaeological assets. This impact would be mitigated by archaeological excavation and recording (REAC Ref. CH001; AMS-OWSI No. 4). This would result in permanent impacts of moderate adverse magnitude and a moderate adverse effect, which is assessed as significant'. The relevant details are also listed in ES Tables 1.8, 1.14 and 1.15 (**AS-044**) and (**APP-367**). The importance of undertaking field evaluation is illustrated by the evidence for Mesolithic and early Neolithic activity identified by the LTC archaeological trial trenching north of Claylane Woods (e.g. assets 3640 and 3643) where there is evidence for buried land surfaces and an in situ flint scatter below later hill wash. The DCO documentation (**AS-044**) also records evidence for a Mesolithic presence on high ground within Shorne Woods (asset 3545) as well noting that the 'The lower-lying areas of former floodplain to the north of the South Portal within the Order Limits have potential to contain waterlogged organic remains dating from the Mesolithic period onwards'. ES Section 6.4.46 records that an in-situ Mesolithic site campsite (3769) is preserved beneath deeply stratified layers of colluvium present within a dry valley in the Order Limits to the south of the A226 (in the vicinity of Palaeolithic colluvium deposits (3768). The campsite was identified by the presence of burnt clay interpreted as hearths and worked flint artefacts. Due to its evidential value for in-situ Mesolithic occupation, a relatively uncommon site type, asset (3769) is assessed as high value'. ES Section 6.4.86 records that 'An early Mesolithic flint microlith (3737) was recovered from a ditch fill during trial trenching, north of Shorne Ifield Road. Although an isolated find, it contributes to potential for a concentration of early activity within the area, with other Mesolithic finds identified in proximity (1516, 3736). Asset (3737) holds evidential value and is of low value'. ES Section 6.4.102 records that 'Trial trench evaluation to the west of Thong (Appendix 6.8, Trial Trenching of Land Parcels 80 and 81, 6.3) identified a Mesolithic to Neolithic flint assemblage (3642) within a large feature investigated by Trench 11. The assemblage included burnt and worked flints of likely Mesolithic/Neolithic date which were recovered from several layers of the feature. The large feature may have been a prehistoric quarry or shaft or could have been an extensive sinkhole; such features can contain significant horizons of early prehistoric material at depth, and as the feature in Trench 11 was not bottomed, it is possible that early prehistoric horizons exist lower down in the fill. Asset (3667) is of medium value due to its evidential and historical value to potentially yield evidence of Early Prehistoric activity within this area'.

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	The examples given above for the Mesolithic and Neolithic periods are illustrative of similar potential within the Order Limits for the archaeological evidence for Bronze Age and Iron Age rural settlement, the transition of the landscape into the Roman period with important evidence for settlement west of Thong village and south of the A226. There is evidence for early medieval settlement, some of which has been safeguarded from formerly proposed tree planting mitigation near the Ifield Road, as well as evidence for Medieval, Post-Medieval and modern land use. The examples quoted above also illustrate the importance of agreeing further investigations in areas not yet subject to archaeological trial trenching. The additional information will be needed to finalise details of archaeological mitigation for the scheme. The evidence set out in the ES (**AS-044**), whilst presented as similarly value-assessed groups of individual heritage assets, nonetheless demonstrates the rich, multi-period, archaeological potential of the project area. Although in some areas, agricultural cultivation has already had a significant negative impact on below-ground archaeological remains, the LTC project would result in the truncation and removal of a unique and finite resource over a significant area. This significant adverse impact is recognised in the DCO documents. If the project is to proceed, a well-defined and very detailed approach to further investigation and mitigation is required. The applicant recognises this and sets out the overall approach in the dAMS-OWSI (**APP-367**), In addition the Applicant's archaeologists are engaged in ongoing discussions with KCC Heritage Conservation about the detailed scope of further investigations, mitigation excavation and recording, and in the accompanying Written Representation KCC asks that these details are included in an updated dAMSOWSI (and relevant supporting documents) during the DCO Examination process.
Applicant's Response	In item 2.1.113 of the SoCG [**REP1-103**], KCC stated: '*Kent County Council notes that certain areas of the scheme have not been subject to archaeological field evaluation [**APP-194**] and there is a risk of unexpected archaeological discoveries, which may be of national importance. This is a particular concern in respect of the tunnel boring and development in the wetland areas of the scheme. Clarification is needed on how this issue is to be satisfactorily addressed*'. Following discussion between the Applicant and KCC in May 2023, this Matter has been resolved and is recorded as "Matter Agreed" in the SoCG. The Applicant has carried out an extensive programme of archaeological evaluation including geophysical survey and archaeological trial trench evaluation in order to identify unknown archaeological assets. Over 4,000 trial trenches have been excavated across the Project, approximately 1,064 of which were excavated within Kent. It is acknowledged that the presence of currently unknown archaeological sites cannot be ruled out in areas which have not been trial trenched. However, following several years of extensive desk-based assessment and field evaluation the nature of the archaeological resource that would be affected by the Project in Kent is now very well understood. While the Applicant recognises the need for additional evaluation to inform detailed mitigation plans, the Applicant is clear that sufficient evaluation has been carried out to inform determination of the DCO.

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	The approach to the mitigation of known and currently unknown archaeological sites is set out by the Applicant in the responses to LIR paragraphs 15.12 and 15.39, above. The Applicant confirms that the draft AMS-OWSI [**APP-367**] will be updated based on the detailed ongoing discussions with KCC. It should be noted that the footprint of development in the wetland areas of the Project in Kent is limited. The ground protection tunnel at the Milton compound comprises a vertical shaft which would limit the impact to wetland areas.
Paragraph 15.47 to15.50 **Page 76 and 77**	**Heritage Conservation Impact G – Registered Parks and Gardens** The LTC project will have a negative impact on the Grade II* registered Cobham Park and Garden (RPG1) which dates from the late medieval period and is characterised by late 18th and early 19th century ornamental gardens and pleasure grounds and which formed part of the wider estate of Cobham Hall. (see ES Table 1.9: Registered Parks and Gardens Assessment Table (**AS-052**) and ES Section 6.4.186 (**AS-044**)). The DCO documentation recognises that woodland in Shorne Woods Country Park (Asset 1311) was established in the post-medieval period and 'is associated with Cobham Hall Grade II* registered park and garden (RPG1), although it is now separated from it by the A2 dual carriageway and M2 junction 1. Its setting, principally its historic associations with Cobham Hall (RPG1) to the south and with Thong to the west (CA10 make important contributions to its historical legibility and aesthetic value' (**AS-044**, 6.4.128 and see also 6.4.185). However, the Applicant has assessed the impact of the development on RPG1 as less than significant (see ES 6.6.109, **AS-044**) but recognises in Section 6.6.110 that 'The Order Limits extend slightly into the northern edge of the high-value Cobham Hall Grade II* Registered Park and Garden (RPG1). Long-term online main construction routes would be present along the A2 and M3. Construction activity would take place along the A2 and the Brewers Road overbridge would be replaced. The visual impact of construction activity along the A2 would be mitigated by the use of hoarding of a sensitive appearance, such as a plain and dark green style (REAC Ref CH001; AMS-OWSI No. 1, 6.3)'. The description of negative impacts to RPG1 is continued in Section 6.6.111 where it states that *'During the construction phase, a cycleway would be constructed along the northern edge of RPG1 parallel to HS1 and the park boundary (partially along an existing PRoW) (6.2, Figure 6.6, Viewpoint S-(CH)02), which would result in the removal of small areas of trees and vegetation immediately to the south of HS1 and to the east and west of Brewers Road within RPG1. Multiple utility works would take place along Brewers Road and Halfpence Lane within RPG1 but would not cause removal of trees within the park. Other multi-purpose utility works would take place within the park south of the A2, east and west of Park Pale, and a Park Pale-A2 link would be constructed, resulting in the removal of trees in these areas. The removal of trees would take place in a strip of land located between the A2 and HS1, already physically severed from the rest of the park. However, this would still be mitigated by vegetation replanting west of Park Pale to restore the screening of the A2 (Linear Belt Shrubs and Trees LE2.4). Page 77 of 90 Mitigation in the form of archaeological excavation and recording (REAC Ref. CH001; AMS-OWSI No.*

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	4) would also be carried out during groundworks within RPG1 to mitigate the physical impact to below-ground archaeological remains associated with RPG1, such as the park pale. Overall, this would result in a permanent impact of minor adverse magnitude and a slight adverse effect, which is assessed as not significant'
Applicant's Response	The Applicant notes that the assessment paraphrased and quoted above is correct.
Paragraph 15.51 and 15.52 **Page 77**	**Heritage Conservation Impact H – Historic landscapes** The LTC will have a negative impact on the historic landscape between the Thames, Gravesend, Thong and Cobham. A Historic Landscape Characterisation (HLC) study has been undertaken and is presented in the DCO DBA (Appendix 6.1, 6.3) (**APP-352**). It is recognised in ES Section 6.3.50 (**AS-044**) that '…*historic landscapes which would suffer a permanent physical impact from construction and potentially a further permanent impact as a result of the replacement of part of the historic landscape with the Project's landscaping. In order to provide a holistic assessment, impacts on the historic landscape from construction and operation have been considered cumulatively within the operational phase assessment'*
Applicant's Response	This comment is noted.
Paragraph 15.53 to 15.57 **Pages 77 to 79**	The area is divided into seven categories of historic landscape character: • reclaimed land, • woodland, • parkland/common land/recreational land, • farmland, • settlement, • industry/infrastructure • military/defence The attributed values are set out in DCO Table 1.11: Historic Landscape Character Assessment Table: South of the River Thames (**AS-052**). Of these categories reclaimed land, woodland, parkland and settlement are assessed as of being of Medium value. The remaining three; farmland, industry/infrastructure and military/defence, are assessed as being of Low value. However, KCC would recommend that when archaeological evidence is considered, these three categories should also be assessed as being of Medium rather than Low value. The historic landscape category of parkland, commons and recreational land is recognised as particularly important (see ES Section 6.4.184) with Cobham Park (RPG1) as the focus but with evidence existing for the previously related, and much larger

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	Cobham estate, which included the lands north of the A2 and around Thong village, which would be directly impacted by the LTC project. This type of historic landscape is defined as being of Medium value, and not higher, due to the amount of division and modern alteration to the former extent of the Cobham estate. However, it is recognised that the LTC project will have a negative impact on the former estate lands (see ES 6.4.185 (AS044). The LTC project will also result in a negative impact on the historic farmed landscape of the project area, which is assessed by the applicant as being of Low Value, although north of the river the farmed landscape is assessed as being of Medium Value. Paragraph 6.4.188 of the Environmental Statement states 'Farming of the land has been a continuous means of managing the landscape south of the River Thames for centuries. Although evidence as early as the Mesolithic is present within the study area for human interaction with the landscape, an understanding of farming is present from the Medieval period onwards' and 'The farming landscape south of the River Thames has historical value for understanding how the land has been managed in the past. However, its low valuation reflects the lack of time depth evident in changes to field systems'. It is stated in the ES that the historic farmed landscape can only be understood from the medieval period. The archaeological evidence presented in the DCO documents for archaeological monuments, settlements, stock enclosures, field boundaries and routeways, indicates that it may be possible, with more research, to define a greater time-depth stretching back to Romano-British and before that, prehistoric land use. The historic farmed landscape, though much changed over time and fragmented, provides the setting for the surviving historic farmsteads and settlements, such as Thong village, which are the successors to prehistoric, Roman and medieval settlements. In a similar way the archaeological evidence for historic routeways through the landscape and the evidence for past industrial activity (e.g. the presence of quarries) and the militarily strategic location of project area, adjacent to the Thames and approach to London, add to the argument that these categories could also be considered to be of Medium value. The project area has a rich network of historic routeways (some of which have been identified through archaeological evaluation) and some of which form the basis of the present day public rights of way (PROW) which will be subject to negative impacts by the proposed scheme. It will be important that archaeological and historical information is used to ensure that the scheme maintains and delivers a comprehensive and historically relevant public rights of way network.
Applicant's Response	The Applicant does not accept this argument that the presence of archaeological remains should increase the value of the farmland, industry/infrastructure and military/defence landscapes. Historic England guidance sets out a number of principles for Historic Landscape Characterisation (HLC), one of which is that HLC should '*Define historic character first and foremost in the present-day landscape*' (English Heritage (now Historic England) and Somerset County Council, 2003. Historic Landscape Characterisation, Taking Stock of The Method, The National HLC Method Review 2002, p. 40). These areas are valued as "low" due to their relative lack of surviving above-ground historic elements in the present-day landscape which is acknowledged by KCC in their comments above as '*much changed over time and fragmented*'. The Applicant's approach to the design of the proposed PRoW network seeks to balance local needs against historic context.

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Paragraphs 15.58 and 15.59 **Page 79**	Other areas of the historic landscape of the project area that will be negatively impacted include Shorne Woods Country Park, which will be impacted by utilities works along the southern border. These works will need to be mitigated by a programme of archaeological works. At present the Assessment Table (**AS-052**) (Asset 1311) Table 1.13 Non-designated built heritage assessment table: South of the River Thames, notes that Construction Mitigation will be 'best practice'. More detail on the exact approach to mitigation is required in the dAMS-OWSI. Likewise, in the north of the project area more detail is required on the impact and mitigation that will be required for the Thames and Medway Canal (AS052) (Asset 1449) which it is proposed would have a ground protection shaft tunnel excavated in its base. At present it is stated in the ES (**AS-044**) that mitigation of negative impacts will include restoration of the canal and an archaeological watching brief because of the nature of the alluvial deposits in this area. KCC recommends the need for field evaluation in such cases to understand the impacts and to agree the appropriate mitigation.
Applicant's Response	The Applicant will discuss appropriate mitigation measures for the affected areas in Shorne Woods with KCC, for inclusion within the draft AMS-OWSI [**APP-367**]. For the Thames and Medway Canal (Asset 1449), an appropriate evaluation and mitigation strategy will be developed with KCC and reported in the draft AMS-OWSI. Regarding currently unknown archaeological remains, please refer to the response to paragraph 15.12, above.
Paragraph 15.63 to 15.65 **Page 79 and 80**	**Conclusion of Cultural Heritage Impacts** Taking proposed mitigation into account most impacts to the historic environment and heritage assets with archaeological interest will be adverse/negative, a small number of impacts will be neutral, none south of the river, are defined as beneficial/positive. Design refinement means that a limited number of heritage assets with archaeological interest could be preserved in situ. Across much of the scheme, however, the adverse physical impacts would be unavoidable and archaeological remains would have to be recorded in advance of their loss. The detailed approach to such mitigation recording is yet to be agreed. The general processes for achieving this mitigation are, however, set out in (**APP-367**) 6.3 Environmental Statement - Appendix 6.9 - Draft Archaeological Mitigation Strategy and Outline Written Scheme of Investigation (dAMSOWSI). The dAMS-OWSI will be updated during the DCO process with the details of mitigation within each parcel of land within the order limits. This is the subject of ongoing discussions between KCC Heritage Conservation and the Applicant.
Applicant's Response	Please refer to the comments provided in response to paragraphs 15.12 and 15.39, above.
Paragraph 15.66 to 15.72	**Potentially beneficial/positive outcomes of the scheme**

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Page 80 and 81	Despite the overwhelmingly negative effects of the proposed scheme on the cultural heritage and archaeological interest of the area, the scheme is having, and could have, some positive outcomes for cultural heritage, if the results of archaeological investigations are fully reported on and brought to as wide an audience as possible. If the project were to proceed, the mitigation of development impacts, including, but not limited to, archaeological investigations, excavations, public engagement, post-excavation assessment, analysis, interpretation (including art works), reporting and the provision of archive capacity, could all be positive outcomes. There are some limited beneficial effects described in the ES resulting from hedgerow restoration as an essential part of mitigation of adverse effects. However, because of the permanent loss of other heritage assets, these remain as overall adverse effects. In ES Chapter 6: 6.4.429 (**AS-044**) it is noted that buried archaeological remains in cultivated fields would be likely to continue to deteriorate and the recording of remains which would be impacted by this project, would represent a beneficial effect (outcome), though not reducing the overall effect of the impact to a neutral or beneficial one. Being able to record the archaeological remains is not a justification for their loss, even considering the deterioration that might be anticipated from continued agricultural cultivation, or for example, future climate change impacts. However, because of archaeological mitigation, positive outcomes can result. DCO document (**AS-044**) sets out commitment to mitigation. In Section 6.5.3 it states *'Embedded mitigation is included within the Design Principles (Application Document 7.5) or as features presented on ES Figure 2.4: Environmental Masterplan (Application Document 6.2). Design Principles relevant to mitigation of effects on cultural heritage are described below, each with an alpha-numerical reference code (e.g. LSP.XX). Good practice and essential mitigation are included in the Register of Environmental Actions and Commitments (REAC). The REAC forms part of ES Appendix 2.2 the Code of Construction Practice (CoCP) (Application Document 6.3). Each entry in the REAC has an alpha-numerical reference code (e.g. REAC Ref. CH0XX) to provide cross reference to the secured commitment. Relevant good practice and essential mitigation to reduce cultural heritage effects are identified below. The Design Principles (Application Document 7.5), Environmental Masterplan (Application Document 6.2), CoCP and REAC (Application Document 6.3), all form part of the Project control plan. The control plan is the framework for mitigating, monitoring and controlling the effects of the Project. It is made up of a series of 'control documents' which present the mitigation measures identified in the application that must be implemented during design, construction and operation to reduce the adverse effects of the Project. Further explanation of the control plan and the documents which it comprises is provided in the Introduction to the Application (Application Document 1.3)'.* This section (6.5.3 of the ES (DCO ASS-044) provides an important definition of how the commitment to mitigation is embedded in the DCO documentation and which will be the subject of the Requirements. It is important to reiterate, however, that there are areas of the project where we remain uncertain about what level of impact will occur and therefore, we are not able to say with certainty whether the scheme would have a positive, negative or neutral

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	impact in certain areas. These are primarily the areas within the Order Limits which have not been subject to archaeological trial trenching. Within our accompanying Written Representation KCC requests that the Applicant undertakes further investigations at the earliest opportunity and well before preliminary construction works would start.
Applicant's Response	Please refer to the response provided to paragraph 15.12, above. Furthermore, the Applicant has stated at item 2.1.41 of the Kent SoCG [**REP1-103**]: '*The Applicant notes that in some areas a phased approach to mitigation will be required which is being developed with Kent County Council's archaeological advisors and the full details will be set out in the Draft Archaeological Mitigation Strategy and Outline Written Scheme of Investigation.* *The vast majority of buried archaeological remains will be accessible at some stage during construction and a programme of archaeological mitigation will ensure a proper record is made in line with policy and best practice.* *There are ongoing discussions to discuss what further initiatives can be developed around archive storage and accessibility to the results of the programme of archaeological mitigation.*'
Paragraph 16.8 to 16.11 **Page 82**	**Workforce Impact A: Increase in employment in Kent** Further economic benefits to Kent will arise from the employment generated by the scheme. Document 7.18 Workers Accommodation Report (**APP-551**) forecasts a peak workforce on the scheme of 4,514 workers. On the southern section of the scheme, within Kent, the workforce is forecast to peak at 885 workers. Both figures cited from paragraph 5.3.2. The Workforce Accommodation Strategy in Table 5.6 and 5.7 has assumed that 35% of workers could be locally sourced; however, it also highlights that other major projects in the country have achieved higher proportions - see paragraph 5.4.4. Nonetheless, if 35% is achieved, this would mean at least 310 workers employed from the Kent labour pool. Assuming an average Gross Value Added (GVA) for Kent workers on the scheme equal to the South East average as reported by ONS in 2021 of £36,174 per head, then at its peak £11.2m of GVA would be generated for the Kent workforce population, benefiting the local economy through the additional earnings and spending that generates. Over the life of the scheme the value could be substantially higher if the 35% proportion is maintained and applied to the total Full Time Equivalent workforce working on the southern section of the scheme. Additionally, a well implemented Skills, Employment and Education strategy will add further to this total through the apprenticeships, skills, graduates and so on delivered by the scheme. Also through the access to opportunities for Kent workers on the northern part of the scheme which will be within realistic travel access times for residents in north and west Kent owing to the presence of the existing Dartford crossing.

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	The workforce required for the scheme and the potential employment from local labour, which should be secured and delivered by an effective Skills, Employment and Education strategy, provides a likely positive impact to Kent.
Applicant Response	The Applicant welcomes the comments made in the Local Impact Report from KCC.
Paragraph 16.12 to 16.15 **Page 82 and 83**	**Community Assets Impact A: Loss of revenue at Shorne Woods Country Park** There are concerns that there will be considerable disruption during construction with significantly increased traffic movements and construction activities leading to significant noise, dust, vibration and particulate pollution. This is likely to deter people from using the Park for a substantial period of time and will impact on the Park resources. The concern follows that there will be a negative impact of the finances of the Park as the substantial disruption caused is likely to lead to reduced Park use and thus revenue as the community go elsewhere to avoid the disruption. At the worst-case scenario, the viability of the Park and the wider park estates is threatened, potentially leading to a devastating wider impact for the Park estates. In addition, the closure of Brewers Road bridge for any period would be significant for the park and have a negative impact on visitor numbers as well as increasing traffic along local country lanes and through Shorne village. Where community assets/facilities are affected throughout the six-year construction period then suitable compensation should be arranged to offset the impact. KCC wishes to see National Highways work with local asset managers and owners, including Shorne Woods Country Park, to agree a sufficient monitoring strategy and mechanism of claiming compensation when there is evidence to prove construction of the Project has had a clear adverse impact on revenue generated.
Applicant's Response	As set out within the SoCG [**REP1-103**] (items 2.1.32 and 2.1.34), the Applicant recognises that Brewers Road will be closed for a period of likely between 16–19 months (based on a reasonable 'worst case'), and this is necessary in order to demolish the existing structure and construct the new green bridge which is considered a positive measure. More information is provided in the oTMPfC [**REP1-175**] on the justification for this closure. The oTMPfC sets out that there would be an increase in journey times (around 6 mins) due to the closure and diversion (via Three Crutches roundabout), but that access would be maintained through illustrative diversion routes, which are subject to refinement on engagement with relevant authorities (as other factors may need to be taken into account, such as other works in the nearby area at the time of closure). The Applicant notes that landowner losses as a result of the Project's temporary occupation will be payable in line with the Compensation Code. Compensation arrangements for affected landowners and businesses are noted in ES Chapter 13 (6.3). As presented in ES Chapter 13: Population and Human Health [**APP-151**], the main access to the Country Park would not be impacted, and direct access to the site from the central car park within the Country Park would be retained. It is considered that the proposals for replacement open space and additional links between isolated parcels of woodland would add benefits

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	to the wider community and Shorne Woods Country Park users, with re-provided land being more accessible by PRoW. Therefore, the assessment concluded a slight adverse effect during construction, which is not significant. The REAC in ES Appendix 2.2: CoCP [REP1-157] outlines the construction noise and dust mitigation measures that will be implemented by the Contractor to ensure that the impacts of construction activities are not significant.
Paragraph 16.16 to16.19 **Page 83 and 84**	**Community Assets Impact B: Tree removal and replanting at Shorne Woods Country Park** The Applicant has indicated to the Council that no land is to be acquired on a permanent basis. It is understood that the applicant instead requires new rights for a land strip for utilities diversions. The Council understands that the applicant has made a commitment to reinstate, re-seed and replant the land to the satisfaction of the Council. This would also need to satisfy the requirements of Natural England as this land is part of the SSSI so the work would require formal consent before it is undertaken. In the event of the maximum extent of the development area needing to be used, this could lead to the need for a diversion of the existing shared user route, also part of the local Darnley Trail wider waymarked route, which would impact on visitors in the park. It will also mean that the road impact moves up to 30m nearer the outdoor classroom space impacting on the suitability of this location for classes. The Council recognise that there may be the loss of some trees and that mitigation planting has been offered. The loss of any parkland, be it woodland, amenity or any other land is detrimental to the fabric, environment and character of this historic park and therefore a negative impact and we will seek to minimise any impacts or land take. The Council understand that the applicant has offered to maintain the mitigation planting for a period of 10 years. The Council welcomes this commitment, however, will require the planting and maintenance of the new woodland to be led by members of the Council Parks team, as experts in their field.
Applicant's Response	The Applicant believes that formal consent to undertake work within a SSSI would be disapplied through the provisions of the DCO should it be granted. The Applicant would seek to minimise the extent of parkland loss during the detailed design process, and protect retained habitats during construction, as secured in ES Appendix 2.2: CoCP [REP1-157], commitments LV001, LV028, LV029, TB002 and TB003. Long-term management requirements for these areas are detailed in Sections 5.2, 5.3 and 5.8 of the outline Landscape and Ecology Management Plan [REP1-173]. Impacts on the Darnley Trail are considered in ES Chapter 13: Population and Human Health [APP-151].
Paragraph 16.20 and 16.21 **Page 84**	**Community Assets Impact C: Proposed Car Park at Thong Lane** The Project proposes to utilise part of the A2 construction compound as an additional car parking facility for Shorne Woods Country Park once construction of the LTC is complete. Whilst this has the potential to leave a positive legacy for the country park and wider area, it must be understood that there have been no discussions with the Applicant around the long term management and maintenance of the proposed car park.

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LIR Reference	Local Impact Report Extract / Applicant's Response
	As it stands, KCC is not committed to taking on the management/ownership of the proposed car park unless the facility has a sustainable business case with sufficient income generation potential to cover its ongoing revenue and capital costs. The business case must be approved by KCC in advance of any agreement to transfer/manage the facility and income generation must include commercial business opportunities in addition to Pay & Display charges. If the car park does not generate enough income to cover the costs of its long term management then the proposed car park would have a negative impact on the County Park and result in a significant financial and resource burden to KCC.
Applicant's Response	As set out within the SoCG [**REP1-103**] (items 2.1.5 and 2.1.6), the Applicant considers that it is agreed that the use of the A2 compound as an operational car park is appropriate, and has been designed to appropriate standards for the benefit of its users, KCC, and Shorne Woods Country Park. Routes for walkers, cyclists and horse riders (WCH) have been connected to and from the car park as far as technically possible (within the site constraints), and a new bridleway leads into the proposed car park from the west and a new direct entrance (bridleway) to Shorne Woods Country Park has been provided via a Pegasus crossing on Thong Lane. The Applicant notes that the outline design of the new car park has been developed in close co-ordination with KCC to ensure it will provide an adequate revenue stream. The Applicant and KCC will continue discussions on the approach to detailed design and future management of the proposed car park.
Paragraph 16.22 **Page 84**	**Community Assets Impact D: Blighted Property Woodlands Cottage, Thong Lane** The Council has concern in relation to a residential dwelling that it owns known as Woodlands Cottage situated in Thong Lane. This property is within close proximity of the development boundary. It is understood that there is a high probability that this property will be blighted.
Applicant's Response	The property mentioned above does not sit within the Order Limits and therefore does not meet the requirements for blight as defined under National Highways' Blight Policy, which follows the statutory framework. Air quality impacts have been predicted at worst-case human receptors on Thong Lane (those closest to the A122 Lower Thames Crossing) and these are presented in ES Chapter 5: Air Quality [**APP-143**]. The annual mean nitrogen dioxide concentrations predicted at these receptors is less than 20µg/m^3 with the operation of the Project, which is well below the annual mean national air quality objective of 40µg/m^3. Noise impacts on noise sensitive receptors on Thong Lane are presented in ES Chapter 12: Noise and Vibration [**APP-150**]. Negligible changes in road traffic noise are predicted at these receptors during the operation of the Project as shown in ES Figure 12.7: Opening Year Noise Change Contour (DSOY minus DMOY) [**APP-315**].

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