

Lower Thames Crossing
Statutory Consultation
Appraisal of Consultation Material
December 2018

1. Introduction

- 1.1. On 10 October 2018 Highways England launched its statutory public consultation on the proposed Lower Thames Crossing. This is now designed to be a 3 lane 70 mph motorway running from the M2 Junction 1 to M25 Junction J29 (A127) with a total length of 31km (23km new roads), with an intermediate junction onto the A13 and the provision of a 'rest' and maintenance area just north of the 4 km twin bore tunnel under the Thames. The cost is given as between £5.3 - £6.8 bn.
- 1.2. This is the latest stage in a process that started back in 2009, and is a precursor to the submission of a Development Consent Order (DCO) currently timetabled for the latter part of 2019. An outline of the process is set out in section 4 below. Should permission be granted for the scheme, this is likely to take place at the end of 2020 or early 2021.
- 1.3. This report evaluates the material published in October 2018. Highways England is continuing to evolve the project so details may change both as the scheme develops and as a result of this consultation. They should be carrying out continuous engagement with the relevant local authorities over the life of the project development, not just when public consultation is occurring.
- 1.4. The consultation material is therefore a snapshot in time. It consists in essence of a design for the scheme, a transport assessment based on the new transport model and a Preliminary Environmental Information Report (PEIR). This is not the Environmental Impact Assessment (EIA) but should contain sufficient information that 'is reasonably required to assess the environmental effects of the development'¹.
- 1.5. The following sections explain the background to the project and its development, the statutory process in more detail, together with relevant advice and regulations. There is then an appraisal of the transport model (and related issues) and the various chapters of the PEIR. A set of annexes contain a more detailed appraisal of some of the consultation material.

2. Background to project

- 2.1. The issue of additional Thames crossing capacity east of London has been examined over a number of years. In 2009 the Department for Transport published a report it had commissioned from Parsons Brinkerhoff to look at the options for additional crossing capacity across the Thames. This looked at five possible broad

¹ Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 Reg. 12 (1) (b)

corridors and the Government concluded that three were worthy of further examination. These were A (Dartford Crossing), B (Swanscombe Peninsula) and C (East of Gravesend). Those options further east were rejected.

- 2.2. New consultants, Aecom, were then commissioned to examine the three remaining corridors in more detail. In May 2013 the result of this work was published looking at routes in the three corridors, which were illustrative of what could be done rather than firm proposals. This included reports on traffic, environment, engineering and other matters.
- 2.3. In December 2013 the Government announced that option B (Swanscombe Peninsula) would not be progressed but that the other options would be examined further. At the same time the primary responsibility for the technical work was handed over from the Department for Transport to the Highways Agency, which has become Highways England.
- 2.4. In 2016 Highways England carried out a consultation on a scheme which was 2-lane (with an option for 3-lanes) with a tunnel under the Thames east of Gravesend being the fixed feature. North of the river there were three route options for reaching the M25. South of the river there were two options – the so called southern eastern and western routes, starting from a common tunnel portal at Chalk. The stated preferred option was the eastern route which from the tunnel portal, and a potential A226 junction, turned east between Shorne village and Lower Shorne before turning south east to cut through Shorne Ridgeway to join the M2 at Three Crutches (junction 1).
- 2.5. The alternative was the western route, again with a possible A226 junction, that continued in a southerly direction passing through the narrow gap between Riverview Park and Thong to reach a compact 50 mph junction with the A2 at Cobham South services. The consultation material states that “the junction would need to be of compact design and as such, some connecting roads would be limited to 30 mph. This route would have less impact on the Kent Downs Area of Outstanding Natural Beauty²”.
- 2.6. The 2016 consultation also contained an option 1 at the Dartford Crossing (corridor A). This was dismissed by Highways England mainly on grounds of buildability, but also because it was not considered to fully meet the scheme objectives. However, Government Ministers during the consultation confirmed that it was still on the table, thereby confusing the consultation process.
- 2.7. In April 2017 the Secretary of State announced the selection of a preferred 70 mph route to expressway standards being:
 - Route 3 north the Thames via Orsett to a junction with M25 at North Ockendon between J30 (A13) and J29 (A127)
 - Bored tunnel under the Thames was confirmed (a bridge and submersed tube had been considered at an earlier stage)
 - Western Southern Link in Gravesham with a free-flow junction onto the A2

² Lower Thames Crossing: Route Consultation 2016

- 2.8. At the same time a development boundary (the 'red line') was issued requiring the Local Planning Authorities to consult Highways England on any planning applications within it and also to report the scheme on any land searches. The 'red line' boundary has been amended several times since then, most recently at the start of the current consultation (Annex 1).
- 2.9. The scheme objectives as set out in the consultation documentation are:

Scheme objectives	
Economic	<ol style="list-style-type: none"> 1. To support sustainable local development and regional economic growth in the medium and long term 2. To be affordable to government and users 3. To achieve value for money
Community & environment	<ol style="list-style-type: none"> 4. To minimise adverse impacts on health and the environment
Transport	<ol style="list-style-type: none"> 5. To relieve the congested Dartford Crossing and approach roads and improve their performance by providing free-flowing north-south capacity 6. To improve the resilience of the Thames crossings and the major road network 7. To improve safety

3. Current Proposal

- 3.1. The scheme has undergone significant alterations since April 2017 so it has become both more detailed (as would be expected) and also significantly different in certain aspects. The information below focusses on the scheme in Gravesham but includes some reference to features north of the river to give an overall context. The consultation does not include any other changes to the highway network, for example connections between the M20 and A2/M2 corridors. Due to complexity, the A2 junction is described first in terms of the connections it offers and then what this means physically on the ground. Annex 2 contains the engineering drawings.
- 3.2. Overall the scheme starts at M2 Junction 1 (The Three Crutches) where the A2 (single lane 2-way road coming out of Strood) meets the M2 and A289 (2 lane dual carriageway Wainscott Bypass) to become the A2(T). The M2 climbs up from J2 as 4 lanes and drops/gains a lane to the A289 junction, with a central 3 lane section. The A2(T) then becomes 4 lanes past Gravesend and Northfleet. The M2 and A2(T) currently have hard shoulders. The A2(T) remains an all-purpose road and not a motorway due to its historical evolution from a country lane, the lack of alternative routes and the access rights onto it.

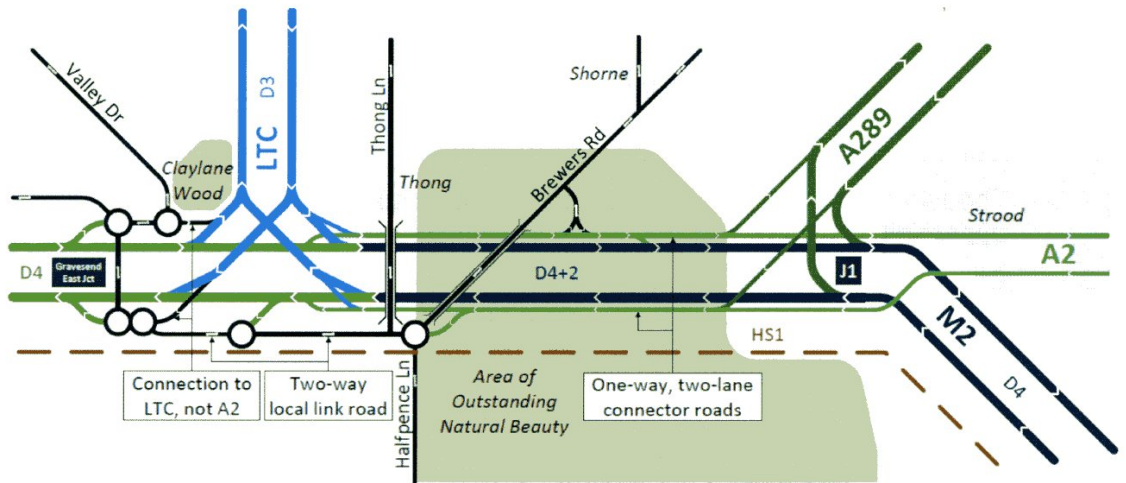


Figure 3.1 Diagrammatic layout of proposed LTC A2 Junction

- 3.3. Figure 3.1 shows the proposed junction arrangements diagrammatically. The M2 will remain as a 4-lane road through this section until just west of the Thong Lane A2 bridge, where the slips diverge for the Lower Thames Crossing. Running in parallel through this area will be 2 lane parallel connector roads on either side, connecting to the A2 into Strood and the A289. Just west of Thong Lane these connect onto the main A2 and the LTC, at which point the M2 becomes A2(T). The current A2 slip roads off Brewers Road connect onto the north side parallel connector, with a link from that to access the M2. On the south side off the parallel connector road a slip exists to the current Brewers Road/Halfpence Lane roundabout (but with no direct connection from the M2 at that point).
- 3.4. From the Brewers Road/Halfpence Lane roundabout there is a parallel 2-way local link road through to Marling Cross (Gravesend East) in the gap between the current A2 and HS1. There is a T junction with Thong Lane running north, a slip off the A2 (and therefore M2) and a connection from the LTC. At Marling Cross (Gravesend East) the west facing slips remain with the existing overbridge. On the north side the current slip road at the top of Valley Drive feeds into the LTC not the A2. On the south side there are links from the A2(T) and LTC, the 2-way local road and Henhurst Road to the south (latter not shown in the diagram above).
- 3.5. HS1 forms a fixed boundary to the south. The physical design of the scheme in the Kent Downs Area of Outstanding Natural Beauty aims to fit between HS1 on the south side and the existing highway boundary on the north (beyond which is Shorne Wood Country Park). Currently the A2 carriageways are split, with a wide central reservation, they are at different levels, whilst HS1 has a series of landscape features and planting between it and the A2. Some of these also serve a safety function to physically prevent vehicles reaching the railway.
- 3.6. East of Thong Lane (which is also the AoNB boundary), with a little encroachment into HS1 land, the scheme moves the existing A2 into the existing central reservation to give space for the parallel slips on the outside. Whereas currently there are 4 lanes in each direction plus the link to Park Pale from Brewers Road on the north side (10 lanes), in future there will 14. Carriageway and HS1 separation

will be by means of concrete barriers. The new road combined with HS1 will mean that the total developed width of the transport corridor will increase to about 175m.

- 3.7. West of Thong Lane the new LTC junction and its flyovers sit on the site of Cobham South services (and the former Cobham North Services). The existing A2 is shifted slightly north with the slip from what will be the extended M2 to LTC passing underneath. The slip from LTC to A2 westbound goes over the top. The 2-way link road fits into, and removes most of, the landscaping between the A2 and HS1, leaving the electricity feeder station untouched. At Thong Lane there will be 14 lanes, including the 2-way link, more to the west as the LTC slip roads merge/diverge.
- 3.8. At Marling Cross the existing junction remains, with the west facing slips as now. As indicated above, the north side east facing slip serves only the LTC. On the south side will be the 2-way local feeder road through to Henhurst Road, Thong Lane and Halfpence Lane, via a convoluted route and a number of roundabouts.
- 3.9. Northwards along the LTC the various slip roads merge together across the land south of Riverview Park so that by Thong Lane bridge (north), adjacent to Riverview Park, it would be 3-lane with no hard shoulder and in a deepening cutting. This extends to the tunnel portal which is about 100m south of the A226. At that point there is a removable section of central reservation so that traffic could be turned around if necessary. There is also a loop road over the portal, with a link onto the A226, for maintenance and emergency access purposes only. From this point the twin 16m bored tunnels descend beneath the marshes and the River Thames to Thurrock.
- 3.10. North of the river there is a full junction to serve maintenance facilities and possibly a service area. There was a link proposed into Tilbury Docks but this has been deleted, although it could still be built by others. Further north there is a complicated junction with the A13 eastbound and the A1089 which serves Tilbury Docks. There are no direct connections to the A13 westbound though this can be reached by going east to the Orsett Cock junction (A128) and coming back along the A13. The LTC route then proceeds north to a junction with the M25 to/from the north (with no turning movement to the south) which merges with J29 (A127) to accommodate the weaving manoeuvres required. The LTC is 3-lane all the way to the M25.

4. Process

- 4.1. Given the scale of the project it is being progressed by means of a Development Consent Order (DCO) under the Planning Act 2008. This defines, by means of a set of criteria, Nationally Significant Infrastructure Projects (NSIP) that are required to use this process in seeking consent. A DCO is a Statutory Instrument, so is more akin to an Act of Parliament (e.g. like the Channel Tunnel Rail Link Act 1996) than a planning permission. The application will be accompanied by an Environmental Statement and sufficient information for the Secretary of State to undertake an Appropriate Assessment under the Habitats Regulations, given the potential impact on 'European sites' designated for their nature conservation value.

- 4.2. A DCO is written by the applicant and covers both what is being applied for but also all the permissions that are needed under various pieces of legislation. This includes identifying matters that will require approval at a later stage (the 'requirements') and who will approve them (or not if the relevant legislation has been dis-applied). It also deals with the Compulsory Purchase of Land as well, whether permanent or temporary.
- 4.3. The Planning Inspectorate web site has a series of notes explaining the process³ and some advice notes⁴. The information presented here is a brief summary.
- 4.4. In October 2017 Highways England submitted an Environmental Impact Assessment Scoping Report to PINS, 'as to the scope, and level of detail of the information to be provided in the environmental statement'. This was to determine the approach and topics to be covered, not the actual impacts. PINS then consulted relevant interested parties including local authorities and other statutory bodies. An officer level response was submitted by Gravesham to PINS on issues that needed to be explored and the methodology to be used. In December 2017 PINS issued a scoping opinion which raised a number of issues and recommended that the Environmental Statement should take account of relevant comments made by the consultation bodies.
- 4.5. The Borough Council and other local authorities (including KCC and Thurrock) have been engaged in ongoing discussions with Highways England over the life of the project. These are intended to enable the applicant to provide the latest information and the Authorities to raise concerns, advice and information as relevant. Some of these meetings have been useful and informative, but overall it has to be said that the process has been bitty and incomplete. As examples, Gravesham did receive traffic modelling information on a confidential basis in advance of the statutory consultation (to be welcomed) but did not receive the latest engineering plans. There is supposed to be an iterative process between the statutory consultees and the scheme, as well as between the emerging environmental assessment and the design. The intention behind the process is to identify and deal with as many issues up front as possible, rather than at the Examination. This lack of proper engagement has seriously hampered analysing the consultation information.
- 4.6. The process for NSIP projects is very flexible, in part determined by the scale of the project concerned. Only one Statutory consultation is required, though there have been, as noted above, a number of previous consultations on this project. In March 2018 the Council was informally consulted on the Statement of Community Consultation (SoCC). This was about the mechanics of consultation, rather than what is being consulted about. Informal officer level comments were made, as they were in response to the formal consultation in August 2018. The comments were mainly about venues and target audiences and, for example, ensuring that there was an exhibition venue near Riverview Park.
- 4.7. The next formal stage is the submission of the DCO itself and all the supporting material (Environmental Statement and sufficient material for the Secretary of State to undertake an Appropriate Assessment under the Habitats Regulations etc.). This

³ <https://infrastructure.planninginspectorate.gov.uk/application-process/the-process/>

⁴ <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/>

is currently expected to be in autumn 2019. When submitted PINS has 28 days to determine whether it is a valid application, which includes consulting the relevant Local Authorities, on a 24 day deadline, as to whether adequate consultation has been carried out under the terms of SoCC. If accepted members of the public and others can register an interest and make submissions on the proposal. The host Local Authorities can also prepare a Local Impact Report (LIR) which sets out the implications of the project for the locality. This is a factual document as opposed to any submissions the Council may wish to make to support or object to the application or elements of it.

- 4.8. The next stage is for PINS to appoint an Examination Authority, which in this case can be assumed to be a panel of Inspectors, who will hold a preliminary meeting to discuss the timetable of the examination. They then have 6 months to carry out the Examination, which may include holding public sessions. Once this stage is complete the Examination Authority has three months to prepare a report to the Secretary of State (in this case Transport). The Secretary of State then has 3 months to issue a decision, which can then be subject to a 6 week period to allow for lodging a Judicial Review.
- 4.9. Applications can then be made to discharge any 'requirements' attached to the DCO. The scheme as submitted in the DCO is fixed, though there is a process for amending it, which is not simple. On a scheme of this scale it is reasonable to assume that significant changes may be needed somewhere along the route, particularly in relation to construction.

5. National Policy

- 5.1. As a context for decision on major transport projects within the DCO process the Department of Transport has produced the National Policy Statement for National Networks (NPSNN – December 2014)⁵. The draft was subject to consultation and then approval by Parliament.
- 5.2. It sets out some general objectives for the highway network (para 2.16):
 - Encourage economic activity and growth
 - Provide a good experience for road users
 - Open up job opportunities
 - Quality of life impacts on communities
- 5.3. The NPSNN then goes through the steps that need to be taken with projects (environmental assessment, Habitat Regulation Assessment if required), and specifies in relation to the various topic areas the issues that need to be addressed. It is essentially repeating the advice in the National Planning Policy Framework (NPPF). Reference will be made to these requirements as the various topic areas are discussed below.
- 5.4. Infrastructure Planning (Environmental Assessment) Regulations 2017 provide the legal framework in which the Environmental Assessment should be conducted.

⁵ National Policy Statement for National Networks (December 2014)

- 5.5. It is also necessary for a scheme to be appraised for value for money using a standard methodology which is set out in Transport Analysis Guidance from the Department for Transport (known as WEBTAG). This is out of date in some aspects though is being updated. There is also the Design Manual for Roads and Bridges (DMRB) which provides standards for the design process. Appendix 3 of the Council report contains a glossary of terms and links to various documents.
- 5.6. It is useful to hold in mind the distinction between the various appraisal processes a scheme such as this has to go through and the different requirements that result. For example, for the purpose of justifying the business case for the scheme it is necessary to show that it makes economic sense, which implies using a conservative level of traffic generation to show that the scheme is economically worthwhile in terms of a Treasury 'Green Book' appraisal. However, in undertaking an environmental assessment more realistic levels of traffic generation are required based on the growth aspirations of the area, since this implies a worst case in terms of impact (noise, air quality, scope of scheme), which is needed for the environmental assessment to be sufficiently robust.
- 5.7. An environmental assessment (in addition to the DCO) also has to be based on what the scheme is actually likely to comprise. The maximum parameters of the scheme are therefore set and these are defined as its 'Rochdale envelope' (following a legal case about a site in Rochdale). This means the Environmental Assessment should encompass all the things that might be built or used in construction so that environmental effects of the final outcome fits within it. Put another way a 'reasonable worst' case is evaluated and fed through into the mitigation measures⁶.

6. Content of material

- 6.1. Appendix 2 of the Council report contains a list of the documents in the consultation and links to them. The information is very extensive and it has not been possible to digest it all fully in the time available.

7. Transport modelling and impact

- 7.1. Previous consultation exercises on the Lower Thames Crossing have used updated versions of a transport model original developed from 2009 base data. For the current exercise a completely new model (LTAM – Lower Thames Area Model) has been developed using the most up to date data on flows. It is based in SATURN software and from the output some Vissim models (micro simulation) have been developed, e.g. A2 junction, but the Council has not seen these. The model looks at the am peak (07:00-08:00), the pm peak (17:00-18:00) and the interpeak. It has also been used to examine some of the alternative options, but there is no report to allow the evaluation of this work.

⁶ PINS Advice note 9: Rochdale Envelope 2011

- 7.2. Highways England has emphasised that the transport modelling is an ongoing process which will reflect new data, any significant changes in design, and issues raised by consultees.
- 7.3. The numbers of vehicles on different links of the highway network is simple to count, however discovering what trips are being made from where to where is much more difficult. New data sources have been incorporated, for example in the form a mobile phone data which allows analysis of actual trip patterns where these cross more than one phone cell. What this is not good for therefore is local trips, where people may actually be moving within one phone cell. Other new data sources are becoming available, for example up to date data on lorry flows from Department for Transport, which will be incorporated into the model in the future.
- 7.4. In addition to the published material the Borough Council has had access on a confidential basis to more detailed flows information from the model for 2026 (assumed year of opening in modelling terms though de facto it will be 2027), 2031 and 2041, with and without the crossing as currently being consulted upon. This has not included 2016 base year data which makes it difficult to examine the amount of change over the current position. In the time available, it has not been possible to examine this data in any detail (which is not simple technically), and the information is subject to the caveats outlined below, but it will be very useful further along the process as it helps define the questions that need to be asked of the modelling.
- 7.5. It is important to emphasise that a transport model is only a mathematical representation of the real world, which has to be validated against the 2016 baseline data. As noted below, validation against this data appears to be good when considering the strategic road network. However, when used to forecast trips, introducing a radical change to the highway network (as with LTC) the results need to be treated with a reasonable amount of caution. In current circumstances this is further compounded by the uncertainties over the implications of electric cars and autonomous vehicles, changing working and shopping patterns, and artificial intelligence. Apart from the future not being like the past, there is no clear understanding of what the implications might be or the speed with which they might impact. They have therefore not been modelled.
- 7.6. Forecasting also rests on the assumptions about new development (from 2016), the future growth in traffic and other changes which may be made to the highway network affecting flows and capacity. For local authority areas around the crossing (including Gravesham) this is done by looking at expected future development. For areas further away TEMPRO (Trip End Model Presentation Program) version 7.2 data⁷ has been used. This is a normal approach in such modelling exercises.
- 7.7. PBA have carried out a technical assessment of the model for KCC looking at the model validation and then the forecasting. The model is designed primarily to look at the strategic network and the first question is whether it models 2016 correctly. This then leads into looking at its accuracy on the local roads. The latter is a key issue for Gravesham residents, and KCC as Transport Authority since there could

⁷ TEMPRO v7.2 <https://www.gov.uk/government/publications/tempro-downloads>

significant knock on impacts on the local network which is known to be sensitive to alterations at junctions along the A2.

- 7.8. PBA show that in overall terms the model validates reasonably well against strategic network points, but less well for the local road network, where there are in fact relatively few validation points. Validation points shown as failing in the AM peak in Gravesham are west bound access onto A2 at Marling Cross (that the validation report classes as 'minor') and in The Street, Cobham. In the PM peaks Thames Way and The Street, Cobham again. Generally, the main line flows on the trunk road network validate, but it is the junctions and local roads that have some failures. On local roads part of the issue may be the local road peak in the morning which tends to be between 8-9 am, not 7-8 am as on the A2.
- 7.9. Forecasting starts by inputting development levels for the appropriate dates along with highways schemes that have a more than likely or near certain chance of being implemented. The new development then has trip rates applied to from TRICS⁸ database, using 7-8 am in the mornings which PBA note may underplay the trips generated locally between 8-9 am. The question of development quantities is returned to below.
- 7.10. The broad pattern that emerges for the flows on the network with and without LTC is that for Gravesham A2 west of the crossing junction has a decline in flows, along with M20 west of J6 (A229), M26 and M25/A282. M2 between J4 and J1, the A2 to LTC junction, plus the A228 and A229 Bluebell Hill show an increase. This pattern repeats for 2026 and 2041, though increase in overall numbers of vehicles with time would be expected. Note that the figures show flows in network, not how particular junctions are operating.

⁸ Trip Rate Information Computer System <http://www.trics.org/>

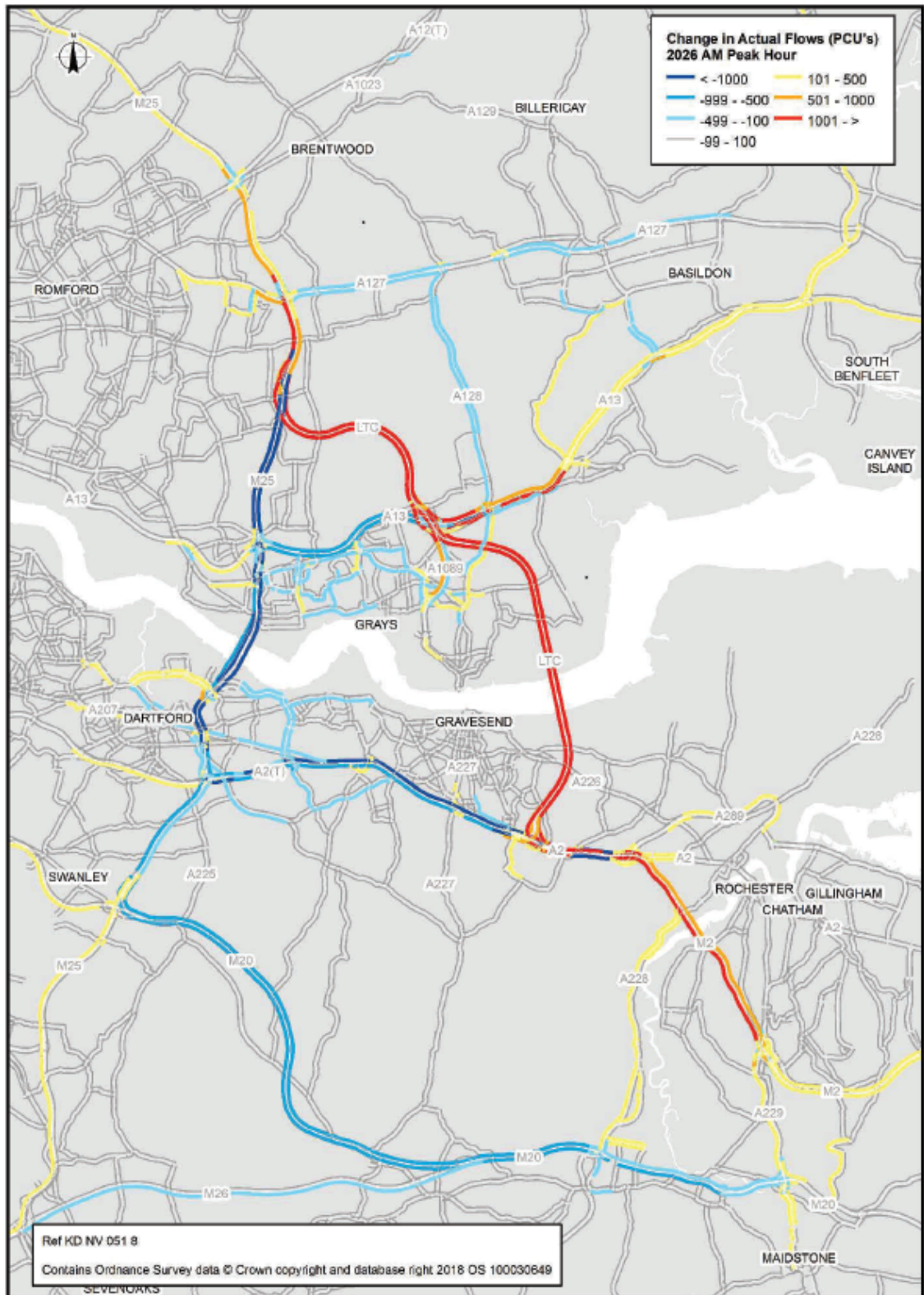


Figure 7.1 2026 changes in traffic flow with LTC

7.11. The figure above, from Highway England non-technical summary shows the broad pattern of change as a result of the LTC for the am peak. Yellow or red roads indicate an increase in traffic (though the LTC comes out red because it is not present in the no scheme world).

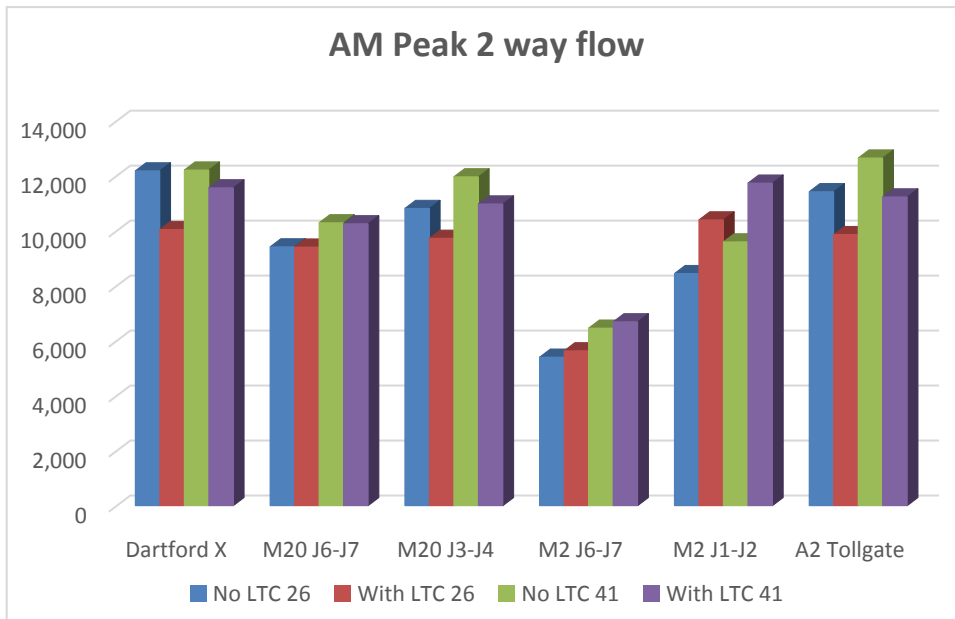


Figure 7.2 Selected AM peak 2-way flows

7.12. Figure 7.2 shows the volume of the 2-way flows for all vehicles at certain key points on the network to illustrate what the model is predicting for 2026 and 2041. At the Dartford Crossing there is predicted to be a drop-in flow in the order of 2,000 vehicles when the crossing opens, but by 2041 the flow is nearly back to current levels which are in effect road capacity limited. M20 at Maidstone J6–J7 (Junctions for Bluebell Hill and Detling Hill) shows broad stability, with a decline further to the west as might be expected (J3-J4). M2 at its eastern end (J6-J7) shows higher levels of growth with LTC. Between M2 J1-J2 LTC causes very significant increase in flow in the order of 2,000 vehicles.

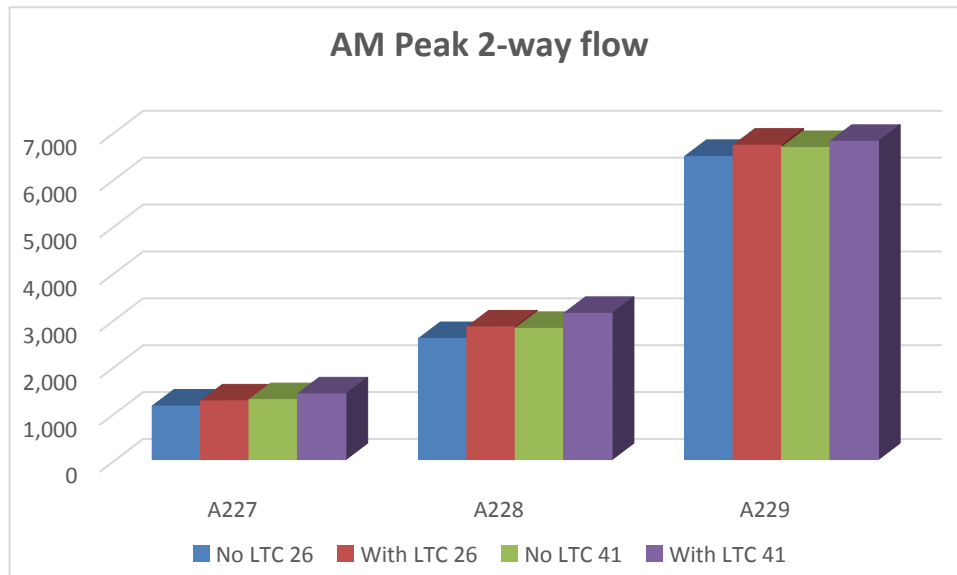


Figure 7.3 A road AM peak 2-way flows

7.13. Figure 7.3 shows what is happening on A227 (just south of A2), A228 (at Halling) and A229 at Bluebell Hill. A227 is showing very limited effects (but note this is in normal traffic conditions), whilst the A228 and A229 also show small increases overall from LTC. These may be related to a lack of road capacity at junctions.

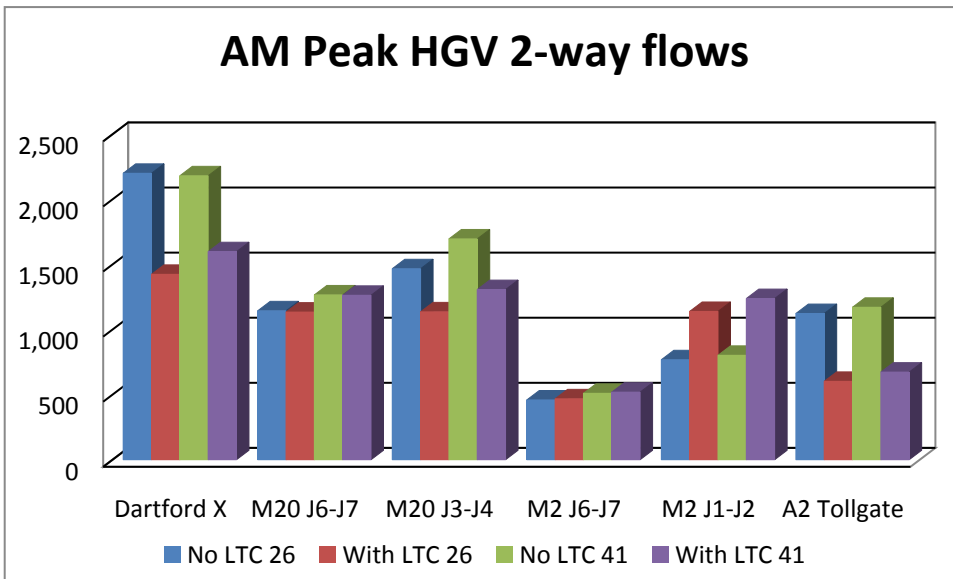


Figure 7.4 Selected AM peak HGV 2-way flows

7.14. The next two graphs look at just HGV flows, which numerically are much smaller in volume but tend to have a disproportionate impact on the operation of the network. Figure 7.4 shows the Dartford Crossing has a significant improvement with 770 less vehicles 2026 but by 2041 this is 580. The other road links show similar patterns as the overall flows with and the other locations broadly follow the pattern outlined above.

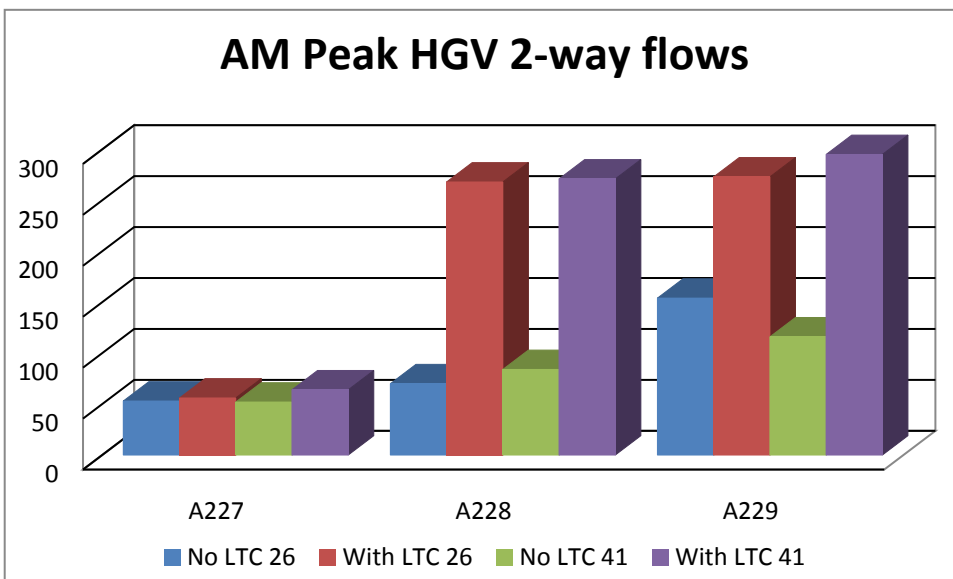


Figure 7.5 A road AM peak HGV 2-way flows

7.15. As figure 7.5 shows the A227 remains stable within the accuracy of the model. The A228 show in 2026 an 280% increase in HGV's and 77% on A229. The effects on the A229 will be disproportionate to the pure numbers involved due to the gradients and general complexity of the junctions with M20 (J6) and M2 (J3). The A228 is severely constrained through Cuxton, being single track 2-way with some steep gradients, though the road is better further south round Snodland.

- 7.16. This is only an initial look at the traffic modelling data but even at this broad-brush level it is illustrating matters of concern that need more detailed analysis. AM peak has been used as this tends to be the most congested. The patterns shown for the PM peak are similar. Overall the pattern is clear that the impact of LTC is to relieve the M20 (and M26) west of Maidstone and A2 west of the crossing. Flows on M20 at Maidstone remain at their current levels, but there is evidence of increase on the M2 overall, but especially towards J1. Whilst the increase in flows on A228 and A229 is not large the proportions of HGV's rises which raises issues of junction capacity. The A227 does not change much in the context of overall traffic growth.
- 7.17. The projected flows as indicated above all depend on the levels of development growth that have been put into the model. The WEBTAG methodology focusses on development (and transport schemes) that have a reasonable likelihood of delivery. For a scheme to be delivered in 5 years' time this is a sensible approach, and makes for a robust financial case. However, the LTC scheme will not be delivered before 2027 and this is well beyond life of most current planning permissions. The Gravesham Local Plan Core Strategy only goes 2028. The Ministry of Housing Communities and Local Government (MHCLG) has produced a formula for calculation future housing need (OAN – Objectively Assessed Need), which gives a guide to the numbers of new homes (to which needs to be added employment and other uses) that should be expected. All sorts of caveats need to be applied to such figures but they do at least give an order of magnitude.
- 7.18. Annex 3 contains an analysis of the figures, given all the caveats that go with that, including testing through the Local Plan process. These are for the Local Authorities that are directly modelled, north and south of the River Thames. Further afield is dealt with via growth factors derived from TEMPRO 7.2, which would need further analysis to discover whether they are appropriate or not.
- 7.19. The overall result on housing alone looking to 2041 is that there is a gap of some 178,000 dwellings south of the river, and 98,000 to the north. There are also significant deficiencies even on existing permissions and allocations. Since these numbers are a result of Government policy and first objective for the project is 'to support sustainable local development and regional economic growth in the medium and long term' this is a matter of concern. This feeds through into the Environmental Impact Assessment process and the need to have a reasonable worst case on which this should be based. As DMRB guidance says (Vol 11 Section 2 para.5.2), 'in particular there are important legal and process differences between environmental impact assessment and transport appraisal.' Transport appraisal is 'the determination of whether a project is acceptable and worthy of funding', whereas the 'environmental impact assessment process looks at the effects of a project on the environment in consultation with external bodies to inform the design and decision making process'.
- 7.20. In summary the new transport model validates well on the strategic network but is less reliable on the local road network, in part due to lack of validation points and the omission of some links in the local road network. Examples would be Thames Way across Imperial Business Estate, future roads accessing Eastern Quarry and the recently opened Peters Bridge over the Medway at Halling. On the strategic network there are gains (A282, M20 west of Maidstone, A2 west of LTC), but

implications for the M2 (especially J1-J2), A228 and A229. The shift in lorry flows will have particular impacts on the operation of some of these routes, especially in cases like M20 J6 and M2 J3 which are already failing at peak times. At the Dartford crossing (where the objective is 'to relieve the congested Dartford Crossing and approach roads and improve their performance by providing free-flowing north-south capacity') in the short term there are gains (especially from reducing HGV flow) but traffic growth soon returns matters towards capacity.

- 7.21. A more worrying concern is the lack of development in the traffic forecasting which seriously underestimate committed development, let alone the sorts of housing development levels Government is seeking. LTC is not being promoted or viewed as an answer to all those issues, but it does illustrate the need for significant investment in the Kent transport network to both realise any benefits from additional crossing capacity or indeed allow such levels of development at all.

8. Business case and justification

- 8.1. There is a document with general statements about the advantages of the scheme and the process it has been through (previous consultations) and going to go through (DCO process). It also provides an expanded version of the scheme objectives. At this stage there is no full business case, though there is material available from previous consultations.
- 8.2. The Borough Council has always accepted the need for additional crossing capacity, though argued that it should be at Dartford, where the bulk of the demand is. This is well illustrated by a graph showing the flows at the Dartford Crossing by day and time. This is well illustrated by a graph showing the flows at the Dartford Crossing by day and time.

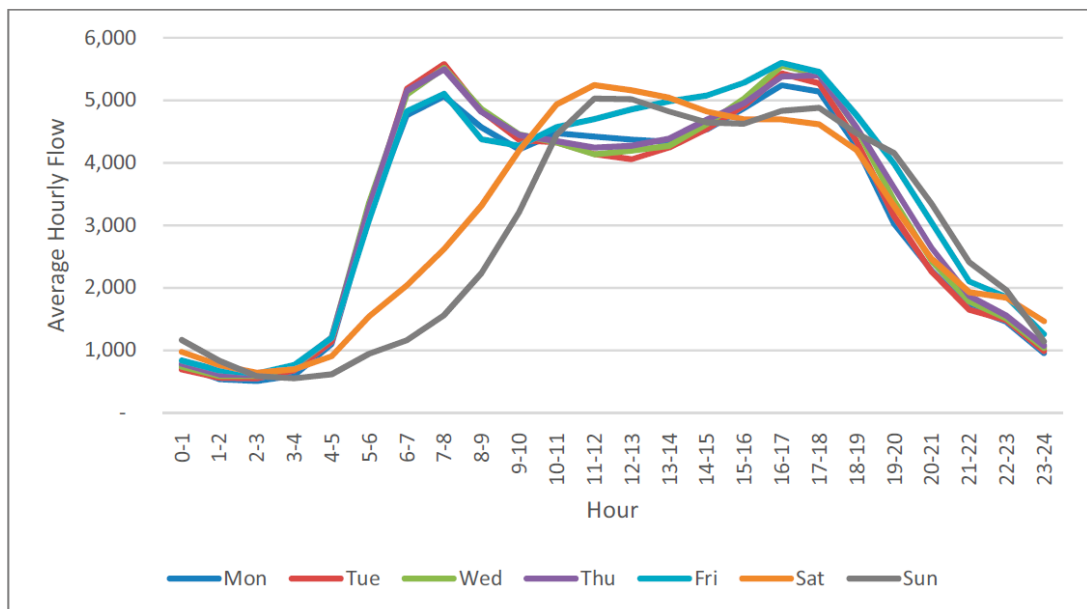


Figure 8.1 Dartford Crossing flows (Fig 6.1 from Case for the Project)

- 8.3. As can be seen weekdays have morning and afternoon peaks up towards 5,500 vph, with the average flow remaining over 4,000 vph all day. Saturday and Sunday

have later peaks close to 5,000 vph but otherwise follow the same basic pattern. This does illustrate why the Crossing is so prone to delays if an incident occurs.

- 8.4. The point is also made that economic benefits frequently come from time savings in journeys. If these are substantive then there is clear benefit, but aggregating large amounts of small time savings does not constitute a practical gain, especially if they are easily lost elsewhere on the congested highway network

9. PEIR (Preliminary Environmental Information Report)

- 9.1. The objective of the PIER is (repeating the quote given above) to give information that 'is reasonably required to assess the environmental effects of the development'⁹. The fundamental issue is whether the consultation document meets that objective within the context that it is preliminary, and the scheme is still evolving. Given that mitigation measures, in some topic areas at least, are being proposed, there would be an expectation of an explanation of what these would achieve in that context – i.e. what impacts are they designed to mitigate and how are they justified?
- 9.2. In this regard, in looking at each section of the document a same set of questions was asked, namely:
- Whether issues raised at the EIA scoping have been (or are going to be) addressed?
 - Is the methodology being used appropriate to the topic area?
 - Has that methodology been correctly applied?
 - Has the significance of the impact(s) been assessed and is the result reasonable?
 - Is there a clear link between the analysis and the emerging design?
 - What further work needs to be done?
- 9.3. Below are set out the results of appraisal of the various topic areas on the information currently available.

10. Air Quality

- 10.1. The authority has appointed Bureau Veritas to carry out a peer review (Annex 4) of the air quality chapter of the Preliminary Environmental Information Report (PEIR) for the proposed Lower Thames Crossing (LTC) road scheme in order to inform the council around issues that may constitute the need for any further consideration and or any omissions. Various points arise from this set out below under a series of headings
- The impact on local air quality and the A2 Trunk Road Air Quality Management Area (AQMA).*
- 10.2. The authority has serious concerns about the effect of the introduction of a significant new source of pollution on the Borough particularly in areas of good air

⁹ Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 Reg. 12 (1) (b)

quality and also the existing A2 Trunk Road AQMA. The highest predicted NO₂ concentration in the Do Something (DS) scenario at any receptors is 34.7µg/m³ at PEIR0177 (Springhead Road, Northfleet)¹⁰. Whilst 34.7µg/m³ is not an exceedance of the National air Quality Standards for nitrogen dioxide it is close to being within 10% of it. The maximum increase of 5.4µg/m³ from the Do minimum (DM) scenario is at PEIR0244 (M2 just east of Three Crutches). This increase is huge in terms of a worsening of air quality. It is very disappointing that any improvement in air quality along the A2 Trunk Road, a declared Air Quality Management Area, in recent years will be wiped out. The PEIR does not consider the impact of receptors outside of a 200m zone. A full compliance risk assessment taking into account of all receptors must be undertaken for the ES

Particulate matter – PM2.5

- 10.3. The submission does not include any modelling or monitoring of particulate matter (PM2.5). This is a significant omission. Paragraph 6.3.19 states that whilst the PEIR has not specifically modelled the PM2.5 concentration annual mean concentrations are expected to fall below the limit value at all receptors. Therefore, impacts from PM2.5 will be inferred by assuming that PM10 predicted concentrations will remain below PM2.5 objective levels. Given the emerging evidence pointing towards exposure to PM2.5 having no safe threshold a more complete PM2.5 assessment is required.

Any breach of air quality standards

- 10.4. The results of the PEIR assessment indicate that breaches of the annual mean NO₂ air quality objective will occur at 16 receptor locations in the DS scenario. However, all 16 of these receptors are observed to also exceed in the DM scenario. The assessment therefore does not predict that the development will cause and exceedances of air quality objective. However, this also means that any further improvement in air quality that would have been seen with an improvement in the fleet will be negated by the development. This is a very disappointing matter.

Use of Defra Background Level Mapping

- 10.5. It is noted that the concerns with regards to the use of Defra (Department for Environment, Food and Rural Affairs) background maps, which are known to have levels lower than is actually monitored in the borough by some degree were used with a factor of 1.45 to take into account the under reporting of Defra's mapping.
- 10.6. Whilst it is not common practice to assess the levels of exposure of drivers to air pollution during an incident there is significant concern that due to the very deep cutting drivers will be exposed to high levels of a various number of pollutants during an incident which may last several hours. This however has been ignored by the PEIR as it is not included in LAQM.TG(16). It is therefore necessary for the matter to be considered in another area of the submission e.g. as part of the incident planning for this development as the prevention or reduction of exposure to drivers and their passengers, many of which may be elderly or young and may have a history of respiratory or vascular conditions which can be acutely affected by high

¹⁰ This may be the result of proposed improvements to the Ebbsfleet junction which is a separate scheme

levels of pollutants exacerbated by heat or cold is absolutely essential otherwise deaths could occur.

Provision of buffer zones

- 10.7. The PEIR has no commitment for the provision of a buffer zone to ensure there is adequate space to have air quality mitigation in terms of bundling etc.

Continued Monitoring

- 10.8. It is considered that the monitoring of the air quality impact on the locality be monitored on an ongoing basis so as to understand the actual impact of the development at each stage. However, there is no commitment to continue monitoring. A Code of Construction Practice (CoCP) will be prepared as part of the ES, which will set out mitigation measures to be implemented during the construction phase. It is possible that air quality monitoring will be included within the CoCP, although this is not explicitly stated.

Baseline conditions

- 10.9. The baseline conditions have been established using 2016 data with background levels being calculated by undertaking a comparison of monitored data and Defra background maps, with the Defra mapped concentrations being uplifted by a factor of 1.45 for all modelled scenarios.
- 10.10. It is assumed that 2016 will remain the base year of assessment in the revised air quality assessment to be presented in the ES. It is not clear how the revised assessment will therefore take into account any changes in monitored concentrations between 2016 and 2018. Additionally, it is not clear if the revised assessment will consider the use of any of monitoring sites commissioned after 2016 such as sites GR137, GR138, GR141 and GR142 commissioned by GBC in 2017. It may therefore be appropriate for the revised version of the modelling assessment presented in the ES to consider a later base year of 2017 or 2018.

Construction phase

- 10.11. Impacts from the construction phase of the project have not been considered in the PEIR although it is acknowledged that the construction phase of the project has the potential to affect air quality because of emissions of dust, emissions from Non-Road Mobile Machinery (NRMM) and from construction vehicle movements by road, river and rail (para 6.6.3). The impact on particulate matter (PM10) and (PM2.5) is of particular concern as there is no safe level of this pollutant.
- 10.12. A Code of Construction Practice (CoCP) will be prepared as part of the ES, which will set out mitigation measures to be implemented during the construction phase. Air quality impacts from construction will need to be considered as part of the ES submitted with the DCO application and careful consideration needed to ensure no detriment to air quality during construction arises.

Construction Dust Assessment

- 10.13. PEIR Vol 1 para 6.6.3 details that although the project has the potential to affect air quality due to emissions from construction dust, these effects have not been considered in the PEIR. It is further stated that they will be considered as part of the ES to be submitted with the DCO application.

- 10.14. An appropriate assessment of construction dust should be included as part of the ES utilising guidance such as the Institute of Air Quality Management: Guidance on the assessment of dust from demolition and construction (2014). Following the construction dust assessment, appropriate mitigation measures should be outlined to inform the Code of Construction Practice (CoCP) to be submitted as part of the ES. A list of mitigation measures that will be considered is provided following PEIR Vol 1 para 6.6.4, this broadly follows the types of measures outlined in the IAQM guidance and so is considered appropriate subject to the further assessment.

Construction Emissions from Non-Road Mobile Machinery

- 10.15. PEIR Vol 1 para 6.6.3 details that although the project has the potential to affect air quality due to emissions from Non-Road Mobile Machinery (NRMM), these effects have not been considered in the PEIR. It is further stated that they will be considered as part of the ES to be submitted with the DCO application.
- 10.16. An appropriate assessment of NRMM emissions should be included as part of the ES where appropriate taking into account the requirements of the London NRMM standards as outlined in the Mayor of London's The Control of Dust and Emissions during Construction and Demolition SPG.

Construction Emissions from vehicle movements on road, river and rail

- 10.17. PEIR Vol 1 para 6.6.3 details although the project has the potential to affect air quality due to emissions from construction vehicle movements by road, river and rail, that these effects have not been considered in the PEIR, but that they will be considered as part of the ES.
- 10.18. An appropriate assessment of emissions from construction traffic should be undertaken. As no traffic figures or detailed construction phasing have been provided it is not possible to indicate what an appropriate assessment method would be. Gravesham comments provided in the scoping report have indicated that as the construction phase will be 6 years it is not appropriate for construction impacts to be considered as temporary. Additionally, as the construction period will occur before the assessment year of 2026, less of a shift to cleaner vehicles will have occurred and so a greater impact is likely to occur than if construction traffic was assessed for the year of 2026. It may therefore be appropriate for the assessment of emissions from construction road vehicles to consider the earliest possible year of peak construction.
- 10.19. As no details of the required construction vehicle movements for river or rail is provided it is not possible to indicate what an appropriate impact assessment method would be. Where appropriate, however, impacts of emissions from vehicle movements from river and rail should be included in the ES submitted as part of the DCO, or suitable justification provided for their exclusion.

Operational Phase

- 10.20. It is understood that a revised assessment of impacts from emissions from operational road traffic will be presented in the ES. The assessment presented in the PEIR therefore only provides an indication of assessed impacts at key receptors. Due to the fact that all modelled results are likely to change in the ES

assessment submission this review has focused on the proposed assessment methodology, rather than the preliminary results at specific receptors.

- 10.21. The air quality modelling assessment presented in the PEIR has utilised base data for the year 2016 and assumed an operational assessment year of 2026. As pollutant concentrations are in general expected to show a marginal decrease year on year, 2026 is considered an appropriate assessment year in light of the current provisional opening year of 2027.
- 10.22. Key changes to traffic to the South of the River Thames are presented in para 6.6.12. Of particular pertinence to GBC are points d, e and f. Traffic data presented in PEIR Vol 1 chapter 6, presented as Annual Average Daily Traffic (AADT), have been rounded to the nearest 1000 vehicles. AADT traffic flows have only been presented at key receptor locations in the PEIR but it is acknowledged that full traffic data will be made available in the ES submitted with the DCO application. This should be placed in the context of the comments on traffic modelling above.
- 10.23. Although it has not been possible to consider fully traffic data changes at receptors as part of this review there appears to be an error in Table 6.15 in relation to receptor PEIR0023. The tables seem to suggest that an increase in traffic of "<100" results in a decrease in NO₂ concentration from 68µg/m³ to 66.7µg/m³.
- 10.24. GIS traffic data files have been made available for review with the PEIR submission however this data is only for peak hours, and only for future year (2026) scenarios. In order to effectively review the air quality modelling results, and confirm that all appropriate receptor locations have been included, 24 hour AADT data should be made available for both base year (2016) and future year scenarios.
- 10.25. PEIR Vol 1 para 6.3.43 – 6.3.45 provides detail on the road traffic emission factors which the air quality assessment has for NO₂ and PM₁₀. The study has utilised emission factors derived from an update to the speed band emission factors published in the Highways England (HE) Interim Advice Note (IAN) 185/15. These factors were released following the publication of the latest version of the Defra's Emissions Factors Toolkit (EFT). Uncertainty in future year NO₂ projections has been considered by utilising the methodology outlined in HE IAN 170/12 v3. The method outlined in the IAN 170/12 involves undertaking NO₂/NO_x gap analysis, based on the adjustment of modelled NO₂/NO_x for both the 2026 DM and 2026 DS scenarios. Para 6.3.61 states that "*although the IAN 170/12 was released prior to the latest version of Defra's EFT it has still been utilised in the air quality assessment as it provides more pessimistic modelled concentrations than relying solely on Defra modelling tools*". The assessment therefore does not make use of the latest COPERT emissions factors and modelling tools provided by Defra but seeks to provide more pessimistic predictions for future year scenarios through use of the gap analysis. As the Defra modelling tools have been updated a number of times since the release of HE IAN 170/12 further analysis should be presented to verify the statement that its use still represents a more pessimistic approach.
- 10.26. 185 roadside diffusion tube and automatic monitoring sites have been used for the purpose of model verification. Table B4 in PEIR Vol 2 provides model verification factors for 13 zones across the modelled area. These factors range from 0.97 (a

model over prediction) at the A127 Junction to 5.92 (a large model under prediction) at Dartford urban gradient.

- 10.27. Although the table provides the number of receptors and verification points associated with each of the verification zones the data presented in the PEIR does not detail which receptors and verification points are linked to which zones. It has therefore not been possible to undertake a full analysis of model verification using the data presented as part of the PEIR submission, so whilst the method presented is in agreement with that presented in LAQM.TG(16) it cannot presently be tested fully.
- 10.28. Other than the mention of the Dartford urban gradient zone in Table B4 of PEIR Vol 2 the assessment does not make any reference as to how emissions from vehicles on roads of different gradients have been considered in the assessment. LAQM.TG(16) para 7.250 onwards provides a methodology for considering changes in emissions from vehicles on roads of different gradients. The impact of different road gradients on pollutant emissions should be considered in the revised assessment to be presented in the ES.
- 10.29. An indicative Compliance Risk Assessment is detailed in PEIR Vol 1 paras 6.6.43 - 6.6.44, however this only considers the maximum predicted concentrations in the Do Something (DS) scenario and the maximum increase in concentrations predicted by the scheme. The indicative assessment concludes that the project is considered to have a low risk of leading to non-compliance with the EU Directive on Ambient Air Quality. A full compliance risk assessment taking into account of all receptors will be undertaken for the ES.

Summary

- 10.30. Bureau Veritas have undertaken a review of the air quality assessment presented within the PEIR. As the air quality assessment presents only initial results, which are subject to change in submission of the final ES this review has focused mainly on the methodology detailed, rather than results predicted at individual receptors.
- 10.31. As complete traffic data has not been provided it has not been possible replicate results or to test the model verification method applied or to confirm that all appropriate receptor locations have been assessed. Due to the large model domain and complex nature of the zoned verification it is requested that more information around model verification is provided. Although the assessment does not make use of the Defra air quality modelling tools the assessment has been undertaken following the method outlined in the DMRB guidance supplemented by the use of several HE IANs. Further validation of this method is recommended to confirm that future year assessment predictions are not less conservative than if the assessment had utilised the Defra modelling tools which incorporate the latest COPERT emission factors.
- 10.32. The initial assessment provides no consideration to varying of vehicle emissions on roads of different gradients or provides no commentary on how any changes in monitored concentrations from 2016 to 2018 will be captured within the assessment.

- 10.33. The assessment as presented in the PEIR provides no assessment of construction impact although this should be provided in the ES submitted as part of the DCO application. This must include PM10 and PM2.5.
- 10.34. It is understood that a revised assessment of impacts from emissions from operational road traffic will be presented in the ES using revised traffic inputs. All modelled results presented in the PEIR are therefore subject to change in the final assessment presented in the subsequent ES. This must include PM10 and PM2.5.

11. Cultural Heritage

- 11.1. The NPSNN defines the historic environment as the results (para 5.121) of ‘the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora’. The EIA should describe the significant heritage impacts, with reference to the significance of the asset (para’s 5.126-127).
- 11.2. It is also pertinent to point out the significance of the concept of the setting of a heritage asset. It is not just about the physical or visibility connection between assets but also the economic, social and historic connections. Thus, Shorne Woods may not be part of the designated Grade II* Cobham Park but it was an integral part of the Cobham Estate and should therefore be treated as part of the same broad unit.
- 11.3. National guidance (NPSNN & NPPF) distinguishes the degree of harm as ‘substantial’ or ‘less than substantial’, for which precise definitions are not supplied.
- 11.4. The chapter on Cultural Heritage has been appraised by combining internal analysis with input from the Council’s Conservation Architect and KCC Archaeology. There is a considerable overlap with landscape issues due to the settings of Cobham Park and conservation area in the village of Thong. Annex 5a contains the Gravesham assessment along with two documents from KCC Heritage (Annex 5b and 5c). Due to these notes this section is relatively short.
- 11.5. The relevant PEIR chapter covers the relevant designations and likely issues. It does so by reference to Vol. 11, Section 3, Part 2 of the Design Manual for Roads and Bridges. As Gravesham pointed out in EIA scoping this is now out of date and not entirely consistent with the approach set out in the NPSNN. Our response also set out a list of issues that needed to be addressed.
- 11.6. The area within which the LTC would run in Gravesham is particularly historic, with heritage being multi-faceted and multi-layered. Many designated and non-designated heritage assets inter-relate within this context and need to be understood in combination. Cumulative harm to the significance of these assets in terms of how they are understood and appreciated for their historic, archaeological, architectural or artistic interest is therefore an important consideration.
- 11.7. Whilst accepting that this is work in progress the material is very superficial and lacks depth. It also fails to appreciate that some of the mitigation measures proposed (e.g. false cutting at Thong) run entirely counter to the historic setting of

this settlement between Shorne Woods (Cobham Hall Estate) and wider agricultural landscape.

- 11.8. Impact on Cobham Park is given by the PEIR as negative but comparatively small, which is inconsistent with the landscape analysis. There is evidence that Shorne Woods was treated as part of the wider Park, and Thong Lodge was part of the route into Cobham Hall from Gravesend. Watling Street was a small country lane that was progressively widened to 2/3 lane road, then a dual carriageway, which has subsequently been widened. The building of HS1 (Channel Tunnel Rail Link) destroyed most of the remains of Watling Street (and the Park Pale) leaving the small section between Halfpence Lane and southern end of Thong Lane. There has therefore been an incremental deterioration of the overall setting though severance, noise, lighting and other associated activity.
- 11.9. The area within which the LTC would run in Gravesham is particularly historic, with many designated and non- designated assets which interrelate in their context and need to be understood in combination and not as separate entities. From the analysis in the PEIR it is hard to see how the preliminary view on impacts and the effectiveness of mitigation have been reached.
- 11.10. Examples are the setting of the Thong Conservation area and the Grade II* Cobham Hall registered park which are all part of the multi-layered and featured landscape that has evolved over time, including the intrusion of the A2 and HS1.
- 11.11. Taken overall the PEIR significantly underestimates the impact on the historic environment and is inconsistent with the landscape impact which is considered to be **major negative**. The proposed mitigation does not appear appropriate viewed in historic terms. The discussion in section 21 on compensation and mitigation is relevant to the way forward on this topic.

12. Landscape

- 12.1. Annex 6a contains the advice of our landscape consultant and Annex 6b initial appraisal of the Kent Downs AoNB unit. As with the historic environment this section is relatively short because of these reports.
- 12.2. The NPSNN (para 5.150) says that 'great weight should be given to conserving landscape and scenic beauty in nationally designated areas', which include Areas of Outstanding Natural Beauty. The Secretary of State (para 5.151) should refuse development consent in these areas except in exceptional circumstances where the following need to be assessed:
 - 'the need for the development, including in terms of any national considerations, and the impact of consenting, or not consenting it upon the local economy
 - The cost of, and scope for, developing elsewhere outside the designated area, or meeting the need for it in some other way
 - Any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated'.

- 12.3. The section of route from Three Crutches (M2 J1) to the existing Thong Lane bridge is in the North Downs Area of Outstanding Natural Beauty. The rest of the route on the surface is in the setting of the AoNB. From Thong Lane north the route is in a cutting which at its deepest point is 28m (90ft) deep. Views at 90° to the alignment, depending on height, would be across the cutting and any planting. However, views along it are framed with the long distance views over the North Kent Marshes and down the Estuary. It should be noted that Shorne Wood sits considerably above the surrounding land, which rises gently upwards from both the Thames and along the A2 from the Ebbsfleet. A number of dry valleys exist, including one from Jeskyns, under HS1 and A2, across the land south of Riverview Park towards Valley Drive. Another runs from Thong north east towards the marshes.
- 12.4. The section through the AoNB would result in the current 4 lanes in each direction plus the link road to Park Pale and the remnant of Watling Street becoming much wider. At present (simplifying) there is 4 lanes coastbound plus Park Pale, central reservation (18m to 62 m separation through the AoNB section) and then 4 lanes and HS1. The carriageways are a partly at different levels. At Park Pale bridge the total width would be 100m (14 lanes, now 10) plus HS1. At Repton Ponds 125m (14 lanes now 10 plus HS1). At Thong Lane Bridge 175m (18 lanes plus HS1). The central reservation planting would be lost and large amounts of landscaping planting between HS1 and the A2 towards Marling Cross.
- 12.5. When HS1 was built very careful attention was paid to the design to protect Cobham Park and Ashenbank Wood, where the unstable geology was such that the cutting was made much wider, and given a stepped profile so that the planting could come over the cutting lip and meld it into the landscape. Annex 6c shows a cross section from Highways England engineering plans and from the Schedule 6 application from Union Railways for the landscaping detail. They are different locations but illustrate the scale of the landscape issue that has to be tackled in this highly sensitive location
- 12.6. The report finds the current analysis somewhat unclear and confusing in a methodological sense. There is a need for more consistent analysis and a more comprehensive view of compensation and mitigation measures. As highlighted above there is an entire heritage dimension to this area, as well as nature conservation. Reference is again made to taking a comprehensive view of this area which is referred to in section 21.

13. Terrestrial & Marine Biodiversity

- 13.1. PEIR chapters 9 and 10 deal with the inter-related issues of terrestrial and marine biodiversity, which are here combined as one. These follow a similar format to the other generic chapters of the PEIR by setting out:
- The requirements of the National Policy Statement for National Networks (NPSNN) and other key legislative and policy requirements and how the project intends to respond to them;
 - How information on the existing and future environment has been collected (i.e. through desk-based studies, survey work and consultation);

- A description of the existing and future environment, based on baseline information collected to date;
 - What further information is to be obtained through further consultation, desk-based studies, or surveys; and
 - A description of the potential effects of the project on both terrestrial and marine biodiversity and how these have been assessed for the purposes of the PEIR.
- 13.2. Clearly, this area of work is a highly technical one where Gravesham BC would normally defer to the views of Natural England, the Environment Agency, Kent Wildlife Trust, Royal Society for the Protection of Birds and other bodies with the necessary expertise in this field. However, from reading the material forming this part of the statutory consultation, it is felt useful to make a number of comments.
- 13.3. Whilst it is recognised that the PEIR is not intended to be a complete ES at this stage, its purpose is to provide the evidence that is reasonably required for the consultation bodies to develop an informed view of the likely significant effects of the development and of any associated development. Paragraph 16 of the SoCC confirms that this is the role the PEIR is supposed to perform within the consultation process, inviting comments on its contents.
- 13.4. Unfortunately, whilst these parts of the PEIR provide a great deal of information on the current baseline (albeit with gaps and omissions given survey and other work remains on-going) they don't actually set out what significant environmental effects are anticipated based on what is known at this stage.
- 13.5. For example, whilst tables are provided for each receptor that set out the potential nature of effects; likely duration and potential mitigation measures these are all in a generic form. They don't make clear the potential severity of impact on either particular species or specific areas of habitat and it is not possible for the reader to come to a conclusion on whether these effects are 'significant'.
- 13.6. This is particularly important when considering how the project meets policy tests in terms of the protection of the natural environment and what the applicant will be expected to show at the submission stage. Whilst it is stated that the applicant intends to provide sufficient information for both the purposes of EIA and HRA, it remains completely unclear at this stage as to whether a significant adverse environmental effect on the integrity of European sites has been ruled out or on what basis. A preliminary assessment would have been expected at this stage.
- 13.7. Given a failure to demonstrate this would invoke the precautionary principle and a need to show Imperative Reasons of Overriding Public Interest (IROPI) in support of the project before a DCO can be granted, this is rather disturbing at this very late stage. This is particularly the case as it is now more than 18 months since Government announced its preferred route (April 2017). Apart from noise, disturbance and potential air quality impacts the main factor for the North Kent Marshes is the potential impact on the water tables in the marshes. As a habitat for wading birds this is critical in both construction and operation phases.
- 13.8. Further, the failure to provide a proper assessment of environmental impacts makes it impossible to comment in any meaningful way on proposed mitigation and its adequacy. Whilst Fig 2.4 sheets 1 – 3 (in the figures volume) provide mapping

associated with the preliminary outline environmental masterplan, consultees are not provided with any background on why this is considered to be an optimum solution or what the strategy is supposed to be mitigating. Without any meaningful dialogue on mitigation or compensation, Gravesham BC is not in a position to either agree to what is shown or suggest alternatives.

- 13.9. It is also a matter of concern that there is little reference to the science underpinning the preliminary environmental assessment. Impacts are likely to be species/habitat specific and it is important that the reader is able to understand how this has informed the way in which the EIA has been undertaken, the design of the project itself, and the suggested package of mitigation/compensation. This is extremely unfortunate as LTC provided an opportunity to further understand the environmental impact of major road schemes and thereby aid decision making in the future based on best practice.
- 13.10. This is particularly important when it comes to understanding the potential impact on bird populations where research has shown that there can be an impact at a considerable distance from major road schemes due to noise, light and movement etc. This point was raised in Gravesham BC's comments at the EIA Scoping stage and it is unclear how or even if these comments have been addressed through the work to date.
- 13.11. Whilst the physical presence of the LTC and its construction will clearly impact on the natural environment, during operation a critical factor will be traffic volumes. As noted above, Gravesham BC has serious concerns regarding the development inputs fed into the transport model, given these are likely to understate traffic flows using both the A2 corridor in the vicinity of the woodlands to the east of Thong Lane and the LTC corridor itself. This also has the potential to impact on the natural environment at some distance from the application site where traffic flows are increased on road corridors close to other environmentally sensitive receptors.
- 13.12. It is important that this issue is properly addressed given a failure to do so could mean that any subsequent application fails to meet the requirements of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. This is because the Regulations require the applicant to provide a description of the likely significant effects on the environment and not unlikely ones by understating probable highway loadings.
- 13.13. The issue here is that Highways England is currently relying on modelling of a Core Scenario (together with marginal high and low growth alternatives) based on an Uncertainty Log following WebTAG Unit M4 guidance on Forecasting and Uncertainty (May 2018)¹¹. Whilst this is appropriate when developing a Treasury Green Book compliant business case for the scheme, it is not necessarily sufficient for the purposes of EIA. This is clearly recognized in DMRB Vol 11, Section 2, Part 1 on General Principles and Guidance on Environmental Impact Assessment (2008) at paragraph 5.2.¹²

¹¹ See

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/712788/tag-unit-m4-forecasting-and-uncertainty-may-2018.pdf

¹² See <http://www.standardsforhighways.co.uk/ha/standards/dmr/vol11/section2/ha20108.pdf>

- 13.14. Highways England therefore needs to agree an Alternative Scenario with key stakeholders to feed into the transport model so that it better reflects Government's aspirations for growth in the area and use these outputs to inform the EIA process. It should be noted that this approach is still entirely consistent with guidance issued in WEBTAG Unit M4, which allows for Alternative Scenarios to be modelled (see paras 5.2.1 – 5.2).
- 13.15. The PEIR is also very weak on cumulative effects whereby EIA requires in-combination impacts with other projects to be taken into consideration. Whilst PINS was content with Highways England's approach at the EIA Scoping stage, there is no indication within the PEIR as to how this work has progressed. Consultees have been provided with little information on cumulative impacts, even though the EIA work appears to be currently deficient given the issues with the transport modelling inputs noted above.
- 13.16. Notwithstanding the requirements of EIA and HRA, this will be required in any event to demonstrate 'very special circumstances' under Green Belt policy that clearly outweigh both definitional and actual harm when compared to such alternatives. Highways England will be expected to present sufficiently detailed environmental assessment and business cases for such alternatives to allow the examining authority and Secretary of State to make an informed judgement on whether this policy test is passed.
- 13.17. Turning to specifics, it is noted that the LTC will result in the removal of original planting and areas of habitat replacement that formed part of the scheme permitted under the Channel Tunnel Rail Link Act 1996. The implication of this needs to be fully understood and clearly set out within any submission. A particular concern in this respect is that the previous mitigation involved in part the translocation of ancient woodland soils and these would be affected by the new works. What are the implications of this?
- 13.18. For information, it should also be noted that the schedules of biodiversity plans etc. appear to include some omissions – i.e. the Kent Biodiversity Action Plan and the Environment Agency's Thames River District River Basin Management Plan. Whilst it is primarily concerned with landscape issues, the Kent Downs AoNB Management Plan may also be of relevance, particularly because of the interrelationship between nature conservation, landscape and the historic environment components of the EIA.

14. Geology and Soils

- 14.1. The NPSNN requires (para. 5.118) that a preliminary assessment of ground instability should be undertaken as earliest possible stage before a detailed application is prepared due to the potential implications that may arise for surrounding areas.
- 14.2. The scheme between the A2 and tunnel portal is primarily on or in chalk. The River Thames area is likely to be a mixture of clays, sands, gravels and other materials which will produce its own challenges for tunnel construction. The Ashenbank/Shorne Woods area along the A2 is however a known area of instability and is adjacent to 186 mph railway (HS1) whose stability has to be absolutely

maintained. It is understood that a major reason for the separation of the A2 carriageways was geological, and this area has caused stability issues in the past (which resulted in fill being put between the two carriageways when slippage of the carriageways started to occur).

- 14.3. This section of the PEIR primarily focuses on legislative and policy requirements and provides what is essentially a desk-top study of constraints. It is assumed that the results of the intrusive investigations undertaken to date and planned for the future will be reported in the ES. Impact on agricultural soils and businesses is covered under Chapter 14 of the PEIR on People and Communities. Because of this, it is not considered necessary to make detailed comments on the contents of this section at this stage other than as set out below.
- 14.4. The consultation should have been accompanied by before and after cross sections at a number of points along the A2 corridor showing the proposed A2/LTC feeders/local feeders/ HS1 and adjoining land to provide a proper understanding of context. These will need to be made available to consultees as the design develops, with the final design being sufficiently detailed at submission stage for people to understand what is actually being proposed.
- 14.5. The geology and hydrology of the Shorne/Ashenbank Woods area is extremely complex. Work at the time of the CTRL (HS1) project highlighted the importance of fully understanding this given it has implications for land stability and the nature of the final engineering solution along the A2 corridor. At this stage, it is not clear whether any detailed geological survey work has been undertaken along the A2 corridor to inform the design consulted on. Without this level of detail, it is not possible to understand whether the outline design shown in the engineering drawings is acceptable or even feasible.
- 14.6. It is likely that the LTC works will impact on deposits of geological interest. At the time of the CTRL (HS1) project, the Department of Palaeontology at the Natural History Museum was involved in examining the geology of the area as works progressed. This included an exposure of 50 million years old pebble and sand deposits on the Inn on the Lake site which looking at geological mapping may extend further to the west in the areas covered by the proposed construction camp and other permanent works. This therefore needs to be further investigated.
- 14.7. The CTRL (HS1) studies included work on the hydrology of the ponds at the Inn on the Lake and to the south around Ashenbank Woods. It is suggested that Highways England refer back to these studies to ensure that the findings remain robust and to inform its own understanding of the potential impact of LTC on waterbodies both at the Inn on the Lake and at Repton's Ponds etc. Any DCO should include provisions to undertake post completion monitoring of the waterbodies and a requirement for remedial action should there be unforeseen impacts.

15. Materials

- 15.1. The NPSNN (para 5.42) requires that the project consider the disposal of waste, seeking to minimise it and to handle it in an effective manner (including any hazardous waste. A Site Waste Management Plan will be produced in due course, which will

relate to the Code of Construction Practice CoCP. There is also the source of cement, aggregate etc. needed to construct the project to consider.

- 15.2. To give a scale about 225m tonnes of aggregate it is estimated will be required, 24m tonnes of pavement and 81m tonnes of concrete. The primary waste from Gravesham will be chalk from the cutting. As the design is refined it will be possible to quantify more precisely the quantities needed, or possible sites for spoil disposal and produce more detailed strategies taking into account the Minerals and Waste strategies of Kent, Medway, Thurrock, Essex and anywhere else that may be relevant.

16. Noise and Vibration

- 16.1. Bureau Veritas were appointed to carry out a review of the material in the PEIR, and their report can be found in Annex 7a. The NPSNN sets out (para 5.189) the sort of issues that need to be addressed starting with the background noise climate and how additional noise and vibration will affect receptors. Given the recreation facilities in this area receptors include not only homes, businesses, schools etc. but also those enjoying the countryside on the rights of way. In Shorne Woods Country Park or Jeskyns. This cover both the construction and operation phases of the development. The following paragraphs highlight the key points.
- 16.2. The PEIR identifies this scheme has both short and long term perceptible noise impacts predicted to occur at dwellings and other sensitive receptors located at the eastern extent of Gravesend, within the areas of Chalk, Singlewell, Riverview Park and Thong, along with the other outlying dwellings in this area. This is due to the introduction of the new road through an area of existing lower road traffic noise levels. It provides a number of maps showing potential operational noise effects within the DMRB study area (600m from the carriageway edge) The maps showing the potential long term operational road traffic noise impacts covering Gravesham Borough are reproduced in Annex 7b.
- 16.3. The document advises a number of mitigation measures that will need to be investigated and incorporated into the Project design were required. These include:
- Low-noise road surfaces
 - Environmental barriers – with the use of reflective and absorptive barriers also being possible considerations. The point is made that environmental barriers can provide reductions of 10dB or more for well-screened locations relatively close to the source. But at greater distances, and especially where the barrier provides only a small deflection of the transmitted sound waves, noise reductions may only be 1 or 2dB. Beyond 200-300m from a road traffic source, the effects of barriers are often negligible. There is legislation which deals with compensation payments for when properties are affected by noise impacts when a new road is built
- 16.4. The scheme has not yet reached the point at which detailed predictions can be made for the noise impacts of the operation of the road. It is likely however that there will be long-term perceptible adverse changes of greater than 3dB(A) in road traffic noise at dwellings and other sensitive receptors located at the eastern extent

of Gravesend, within the areas of Chalk, Singlewell, Riverview Park and Thong, along with the other outlying dwellings in this area, even with appropriate noise control. The Council needs to ensure the best noise mitigation works available are incorporated into the scheme.

- 16.5. A particular point of note will be angle of the cutting sides leading down to the tunnel portal, and whether they are covered with vegetation or not, which will impact on noise dispersal. It is also relevant to note that some of the landscaping on HS1 will be removed and this may expose receptors to additional noise from the railway which is currently screened, which will need to be appraised.
- 16.6. The scheme has not yet reached the point at which detailed predictions can be made for the noise impacts of the construction of the road. Key decisions regarding the construction phase will clearly significantly influence the degree of adverse impacts, notably the material excavation strategy and tunnel drive (enabling plant) location. Vibration from the construction of the tunnel or its long term operation will need to be considered.
- 16.7. It would have been useful to have been provided with an initial indication of night time road noise impacts at this stage. The outlined approach however if followed to the full DMRB methodology will provide a robust assessment within the ES. Additional baseline noise monitoring is required to determine existing road noise levels at receptors, and to derive the full day/night pattern for road traffic noise along the strategic road network, which should align with the forecast hourly traffic data. Additional monitoring locations are necessary to be agreed with the Council so that sufficient information is provided to cover the area west of the proposed highway, at residential areas at Singlewell, Riverview Park and Chalk as well as Shorne and Thong.

17. People and Communities

- 17.1. This chapter of the PEIR is intended to assess the impacts of the project on the local and wider economy; residential and commercial property; community infrastructure (including education, healthcare, sports, recreation and community facilities); walking and cycling routes; and human health and wellbeing. The chapter also purports to deal with impacts on agricultural production and soils. NPSNN has reference to such issues in various sections but has a specific section on land use including open space, green infrastructure and Green Belt (para.5.162-172).
- 17.2. The initial parts of the chapter follow the same format as the rest of the PEIR by setting out national and local policy requirements. Because there is no industry standard way of analysing impacts on people and communities, Highways England has relied on its own internal methodology as set out in the Design Manual for Roads and Bridges (DMRB). The remainder of the chapter concerns itself with establishing existing baseline conditions before moving on to consider a range of generic effects, their duration and potential mitigation during the construction and operational phases.

- 17.3. Overall, the analysis is superficial and disappointing given part of the justification made for LTC is its supposed economic benefits. Comments are provided below on the content provided to date, albeit it should be recognised that these themselves are limited given the lack of substance to which the Council can respond.
- 17.4. As an initial point, it should be noted that LTC is supposed to be a nationally significant infrastructure project with a cost of £6.8bn. Highways England should therefore be taking the opportunity to advance best practice in the assessment and subsequent monitoring of impacts on people and communities so that the true benefits/dis-benefits of major public investment can be properly understood.
- 17.5. A critical element in this are the results of the transport modelling exercise, which is covered in much more detail in section 7 above. Local impact on the highways will come from the construction process, the operational scheme when complete and also what happens when disruption occurs. Logically any closure at Dartford will cause traffic to divert with potentially significant consequences.
- 17.6. Current proposals will result in the potential loss of a number of properties and business in the Borough at Marling Cross, Thong, Shorne and Chalk. In some cases, property is impacted by the engineering and in others it is inside the development boundary and it is not clear if it is actually demolished, only needs to be taken for the duration of construction, or will not be directly be affected. 7 residential properties may be at risk, at least 4 caravans (where noise is a major issue) and 4 business sites. As an example, the Inn on the Lake car park is potentially impacted but it is not clear what that does the overall operation of the site.
- 17.7. Properties in the area (unknown extent) were sent letters at the start of the consultation telling them that they would be able to claim compensation for loss of value (if there is some) 1 year and a day after the scheme opens (when its actual impacts can be assessed). Gravesham received letters in respect of some Council houses on Thong Lane.
- 17.8. Cascades Leisure Centre adjoins the development boundary and there may be short term impacts from noise and dust from construction, particularly for outside uses which may impact on its operation. Some of these may persist in the longer term. Southern Valley Golf course is assumed (table 14.15 at page 485) to be 'no longer be in use following construction of the Project'. However, this is different from saying that the golf course has been found to be surplus to recreational requirements and need not be replaced – this will require a proper assessment to be undertaken to justify this stance.
- 17.9. A specific request from the Borough Council that has not been complied with is a report looking at the Green Belt issue. Para 5.170 of the NSPNN says 'Such development should not be approved except in very special circumstances. Applicants should therefore determine whether their proposal, or any part of it, is within established Green Belt and, if so, whether their proposal may be considered inappropriate development.' The scheme in Gravesham is in the Green Belt and this needs full proper consideration, including alternative options. The impression is given in the PEIR that it is simply a landscape designation which is not the case.

Agriculture

- 17.10. Chapter 14 states that the impact on the viability of farm units and not just loss of higher quality agricultural land will be taken into account. However, no preliminary information has been included on this or what farm units would actually be affected. It is stated that there will be no mitigation provided for the loss of agricultural land. Why has this not been considered as part of the overall package of mitigation in that there may be opportunities to bring land back into productive use and/or improve the quality of existing fields to off-set potential productive capacity?
- 17.11. Where fields have been severed by LTC and are considered no longer capable of being farmed economically, could consideration be given to putting at least some of this over to allotments/smallholdings/community orchards etc. whereby they remain in productive use?

Communities

- 17.12. Table 14.7 provides a summary of key features of communities near the project, with Gravesend being looked at generically whilst Cobham, Shorne, Thong and Chalk are dealt with individually. Given proximity of LTC to identifiable communities to the east side of the Gravesend area, these should also be looked at in greater detail given potential impacts. That aside, there are 'cut and paste' errors in the table whereby areas to the north of the river are assigned to the south.

Open space

- 17.13. Paragraph 14.4.74 refers to community open spaces at Shorne Wood Country Park and Jeskyns Community Woodland. However, these need to be considered in the context of the wider area around Shorne/Cobham where the countryside provides a strategic sub-regional resource improved as a result of CTRL mitigation/funding (CAMS project) and subsequent ODPM (now MHCLG) Thames Gateway Parklands funding. LTC has the potential to impact adversely on this previous investment, which may require mitigation/compensation.

Non Motorised Users (NMU)

- 17.14. Paragraph 14.4.84 refers to non-motorised users, including those using the extensive network of PROW and cycle ways in the area. These are well used and there has been significant investment in these over the years, including that running alongside the A2 trunk road. These will be adversely affected by LTC and appropriate high grade mitigation will be required through the final design. Some of the suggested diversions (e.g. NCR177) are highly convoluted. Alternative routes will also need to be provided during the construction period, which is likely to affect them over several years.
- 17.15. Paragraph 14.4.89 mentions the Tilbury to Gravesend Ferry but the potential impact of LTC on this is not mentioned. Neither is the potential to consider a more comprehensive transport package for LTC that also seeks to improve/fund ferry and bus services across the Thames as an alternative to the private car. It is also a means of providing a cycle link as they will not be allowed to use the tunnels.

Utilities

17.16. Table 14.15 at page 483 describes utilities as an affected receptor of LTC impacts, including power lines and gas mains which need to be relocated. Whilst this may be true, the most significantly affected receptors when moving power lines in particular are likely to be local people, landscape and the environment. The impact of such associated works needs to be fully assessed.

Local and wider economic benefits

17.17. Table 14.15 at page 484 of the PIER sets out benefits to the local and wider economy during the construction phase. This lacks the level of detail Gravesham BC would expect to see at the application stage, particularly as there may be in combination impacts with other projects/developments in the sub-regional area. In particular, the following should be covered:

- Workforce profile during construction period + fit with locally available workforce given existing/future labour demands in area
- Accommodation strategy for imported workforce and assessment on local housing market during course of construction
- Skills and Training Strategy – to ensure local people benefit from opportunities
- Economic strategy – to ensure that local firms/suppliers can benefit from procurement via inclusion in the supply chain.
- Assessment of impact of LTC construction on local firms due to disruption on highway network etc.

17.18. Table 14.16 at page 489 states that operational impacts on development land, including strategic allocations, are likely to be beneficial due to improved access. However, given the potential impacts of the design of the Gravesend East junction and whether access is afforded to LTC or the A2 and/or any knock-on effects due to the re-assignment of flows to the A227 Tollgate Junction, this may not be true in the case of Gravesham. This claim should not therefore be assumed but needs to be justified through substantive evidence.

17.19. It is understood that a full Health Impact Assessment will be undertaken to inform the ES and no further comments are made at this stage given only basic background detail has been provided.

17.20. Overall, Gravesham BC would like to see Highways England use LTC as a means of informing best practice in the assessment of impacts of major transport schemes. Given the scale and cost of the project, could consideration be given to working with a major academic institution on developing an independent research programme to look at the project from inception right through to the 2041 design year to see whether assumed benefits/dis-benefits actually come to fruition?

18. Road Drainage and Water Environment

18.1. This covers both the requirement to deal with water discharge from the project, aquifer protection, flood risk (either as a by-product of the project or because it is in

part located on the flood plain) and related matters. NPSNN (para 5.90-97) requires that floor risk assessment is carried out where appropriate. NPSNN (para 5.221–23) sets out the issues likely to arise in terms of drainage, water quality, aquifers etc.

18.2. Known and potential issues in the Gravesham section of the route are:

- Ponds, perched water tables in the Cobham Park & Shorne Wood area (with nature conservation and landscape implications)
- Aquifer protection on chalk (avoiding pollution of ground water) for water supply
- Sustainable drainage on chalk – and the disturbance of existing HS1/A2 drainage arrangements and the creation of new drainage lagoons
- Any disruption to the water table from the deep cutting towards the tunnel portal (and impact on adjoining agricultural land)
- Proposed use during construction of the Denton New Cut outfall and in the longer term drainage from the tunnel (both from groundwater and from runoff)
- Flood risk and any implications from the TE2100 plans to build a new flood defence on the east side of Gravesend and no longer maintain the existing flood defences along the Thames east of that
- Impact of drainage/water table (including Thames and Medway Canal) on the North Kent Marshes from tunnel construction and in the long term

18.3. The last issue is of great importance because of the potential implications for the Ramsar/SPA and SSSI which are designated for wading birds. Considerable further study is required of these issues, which is acknowledged in the PEIR. This is a difficult area technically, for example it is known from issues that arose in the Ebbsfleet in building HS1, that with dewatering, unexpected side effects can emerge when construction actually happens. A precautionary approach will therefore be appropriate.

19. Climate

19.1. The NPSNN sets out (para's 4.40-4.47 and elsewhere) requirements to take into account the implications of the project as contributor to climate change (Green House Gas emissions) as well as its vulnerability to climate change (rising sea levels and potential resultant flooding being an example). The capacity of the drainage system to cope with extreme rainfall events is also relevant as the project effectively creates a large drainage channel leading down to a low point beneath the River Thames.

19.2. Currently the PEIR identifies the various risks and issues that will need to be explored, though data and information will come from studies under other chapter headings, for example the water environment. The creation of a 3-lane dual carriageway on this scale implies a considerable amount of CO₂ from both the construction process and the vehicles that will use it over a substantial period of time (with all the uncertainties that brings with changing technologies).

- 19.3. The current PEIR therefore identifies issues but at this stage does not address them.

20. Construction

- 20.1. As will have been noted from the above sections there is not a great deal of information about construction, which is to some extent understandable at this preliminary stage in the design process. The design needs to be fixed, which then defines what is going to be built, which then leads on to how it might be built and the process will be interactive since there is no point in having a project that in practical (as opposed to engineering terms) cannot be built. The other observation is that an actual contractor may have significantly different ideas about how the scheme can be constructed to those assumed at this stage. These may constitute improvements though there is always a risk that value engineering can make a project worse from the local environmental point of view. That said what is allowed for in the DCO is what (if granted) has consent. The Thames Tideway project, for example, has needed to do things differently to that which was expected, and there is a process for amending a DCO¹³.
- 20.2. The current expectation is that the tunnel will be bored southwards from Thurrock, and therefore the spoil will be dealt with north of the river. There are options for rail and/or water use as well as road from the portal location. On the south side there will be a need to excavate the cutting so that the boring machines can arrive and be dismantled, as well as extending it up to Thong Lane. The overall cutting up to Thone Lane could produce a substantial amount of chalk spoil. Apart from that needed elsewhere on the project this will have to be removed along the A226, the precise route depending on where it is going. A number of potential destinations have been identified. The implications of this spoil movement are likely to be considerable on the local highway network, but routing through Gravesend town centre, Thong or any of the local villages would clearly be unacceptable.
- 20.3. The area round the tunnel portal is shown as a major construction site (including some of the land on the north side of A226). Use is also proposed to be made of the drainage channel across the marshes out to Denton New Cut Outfall for water from the tunnelling operation. This channel forms a southern extension of the Ramsar towards Chalk.
- 20.4. The A2/M2 junction itself will require major works in a narrow corridor whilst keeping the A2 operational. In this section there is both the junction to be formed with slip roads over and under the A2, but also the works to shift the main carriageways into the centre and build the connectors and local link roads on the outside. Since this section already experiences major congestion in the am peak any disruption will cause issues with traffic queues and rat running through the villages. The recent experience of 2 lanes on the 4 lane Medway Bridge coupled with the smart motorway works on the M20 (J2-5) illustrated how fragile the strategic road network is in the peaks. Narrow lanes (and loss of) and 50 mph running can be assumed.

¹³ <https://www.gov.uk/government/publications/changes-to-development-consent-orders>

- 20.5. Thong Lane bridge south over the A2 is next to the existing structure so it can be built and then the other demolished. Thong Lane north can be built by diverting the road, excavating the cutting, building the bridge and then diverting back. Brewers Road bridge has to be built on the same alignment because of HS1 to the south and the SSSI to the north, so this is likely to shut for a significant period. HS1 constitutes a major potential constraint due to the need to avoid impacting on its stability or anything falling on the track. A major construction site is proposed south of Thong adjacent to the A2.
- 20.6. The chapter in the PEIR outlines the construction programme which has a 7-year timescale taking the route as a whole. Assuming that DCO consent is given by the end of 2020, enabling works could start in 2021. These will include such things as utility diversions, archaeological investigations, further ecological surveys, setting the main compounds, formation of accesses and haul routes and getting temporary utilities to the construction sites. In Gravesham there are major services running along the A2, as well as the high pressure gas mains and 400Kv overhead line running between Thong and Riverview Park.
- 20.7. Construction of the twin Thames tunnels is likely to last from mid 2021 through to the end of 2026. Highways and Structures would start in the 2nd quarter of 2022 and run through to 2026. Testing and commissioning are expected to last from mid 2025 through to opening at the end of 2027. The tunnel systems and the overall control systems along the route will need to be fully tested before traffic can be allowed to use the route.
- 20.8. In Gravesham the two major construction sites will give rise to noise and disturbance impacts from their operation, as well as the construction operations being run from them. Tunnel boring will be a 24-hour operation but otherwise it is suggested in the documentation that the core hours of work would be 08:00 – 18:00 on weekdays and 08:00 – 16:00 on Saturdays. Specific works, for example concrete pouring for a structure, may need to occur outside these hours.
- 20.9. On CTRL (HS1) there was an agreed Construction Environment Management Plan (CEMP) and a Code of Construction Practice (CoCP) which should be followed here. CTRL also had an independent complaints commissioner who was very successful in dealing with issues. This was replicated on Crossrail and LTC is of sufficient scale to warrant a similar approach.
- 20.10. Construction works and the construction camps are significantly closer to local residents than on CTRL at both Thong and Chalk. As a result of that (and A2 widening) there is a long list of issues from noise nuisance to lighting to access to be explored and agreed. As noted above traffic on the A226 is likely to be a difficult matter since the town roads are already congested and the other direction lies through Higham.
- 20.11. There is therefore relatively little information available at this stage, which is not unexpected, but previous experience provides some ready templates to be discussed.

21. Compensation and Mitigation

- 21.1. Mitigation represents measures within the development boundary to deal with the impacts of the scheme. Examples would be by planting, noise bunds, diverted rights of way etc. Compensation is provided where it is not possible to mitigate the scheme so wider benefits are provided over a larger area for which there are a variety of possible delivery mechanisms.
- 21.2. To provide a directly comparable and relevant example, what happened with CTRL (HS1) in relation to Cobham Park and Ashenbank Wood is instructive. Union Railways as the promoter accepted that there were major issues with the intrusion of the railway (which is only 10m wide) into the historic Cobham Park, Ashenbank Wood SSSI and the Kent Downs AoNB. This was further compounded when geological work showed that the proposed cutting at Ashenbank Wood would have to be significantly wider than first anticipated due to the poor quality of the ground material, meaning that slopes would have to be flatter (and therefore the cutting wider) to provide stability.
- 21.3. This resulted in more detailed work on the engineering of this section of the line and equally importantly a study by consultants of the environmental and historic characteristics, issues and opportunities of the wider area. Combining the two produced a package of mitigation and compensation measures which was subject to a parliamentary undertaking. Some of the potential elements of the mitigation package have already been referred to above.
- 21.4. On compensation the result was a sum of £0.75m (1996 prices about £1.4m now) which was used to create what became CAMS (Cobham Ashenbank Management Scheme) to bid for additional resources and carry out projects across the wider area. This had a steering group made up of national agencies, local bodies and landowners, as well as Union Railways. The major success was the purchase of Cobham Woods from the official receiver, the restoration of the Darnley Mausoleum and its hand over to the National Trust. £0.75m became about £8m at the end of the process, which represents significant leverage through grant aid funding based on the original sum. Highways Agency was involved in the setting up of the scheme because the A2/M2 widening came to Cobham junction.
- 21.5. Looking at the current proposal it will be noted that the overall impact on this area (including the cutting running down to the tunnel portal) will be very significant (not using the term in a precise technical sense). Within the AoNB there is very little scope for mitigation without a potentially serious implications on SSSI, historic park, setting of listed buildings and other historic features. There is also the impact on the land on the east side of Gravesend, and potentially on the North Kent Marshes, where RSPB own a substantial amount of land. KCC own Shorne Wood Country Park and Forest Commission own Jeskyns. Gravesham Borough Council, Cobham Hall School and Gravesham Borough Council are also landowners in the wider area.
- 21.6. There are current mitigation measures proposed in terms of planting, bunding, green bridges etc. proposed in the documentation but it is unclear how these related to the impacts of the project, or their implications in their own right.

21.7. The details of the mitigation measure will need considerable further work and are of course dependent on the design, on which comment is made elsewhere. At this early stage it would be entirely appropriate for Highways England to commission a wider study working with the appropriate partners to build on the considerable body of work that already exists and to mirror what was done that led to the creation of CAMS.

22. Development Consent Order

22.1. To provide some idea of scale the Highways England DCO application for the A303 Stonehenge scheme consists of 302 documents for a 13km long scheme with a 3.3km tunnel. This is broken down into:

- Application information (3 documents)
- Plans /drawings / sections (10 documents)
- Draft DCO and related documents (2 documents)
- CPO information (3 documents)
- Consultation report (14 documents)
- Environmental Statement and related documents (255 documents)
- Other documents (15 documents)

22.2. The DCO itself is 48 pages plus 95 pages for 12 schedules, including the various works being permitted and the requirements. This is very much in the form familiar from Channel Tunnel Rail Link Act 1996.

22.3. The applicant will be expecting to enter into a Statement of Common Ground (SOCG) with Gravesham (and other parties) on matters that can be agreed. The objective is to avoid unnecessary discussion at Examination of issues that are either agreed or where agreement on a way forward has been reached. As an example, if an agreement could be reached on a Code of Construction Practice and how it would operate. Recent experience with the Tilbury 2 port application has shown that whilst it is relatively easy to reach agreement on broad principles, the translation of this into practical steps on the ground (or whatever is appropriate to the topic) is not so easy.

22.4. Almost by definition the SOCG also defines the areas where there is disagreement and may need more detailed attention by the Examination. This whole process requires the applicant to produce sufficient information early enough for the Council to know what is being proposed and whether it is acceptable or not.

22.5. The Council will continue to digest the consultation material, particularly on transport, so that it is prepared for the DCO submission and ongoing engagement with Highways England. The Local Impact Report, which needs to be fairly short, can also be started. All this will have considerable resource implications. The Council is in discussion with Highways England about the resources necessary to enable statutory and non-statutory functions to be performed on behalf of local residents.

List of Annex's

Annex 1	Map of current (October 2018) Development boundary (the "red line")
Annex 2	Current Lower Thames Crossing Scheme Proposals
Annex 3	Housing Development Quantities
Annex 4	Air Quality report from Bureau Veritas
Annex 5a	Heritage issues note
Annex 5b	KCC Heritage Conservation
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Annex 6a	Landscape report from Val Hyland Associates
Annex 6b	Comments by Kent Downs AoNB unit
Annex 6c	CTRL and LTC Cross sections in AoNB (different locations)
Annex 6c	Cross sections in AoNB
Annex 7a	Noise and Vibration report from Bureau Veritas
Annex 7b	Noise Maps