TRANSPORT FOR LONDON

LOWER THAMES CROSSING – WRITTEN REPRESENTATION

18 JULY 2023

1. Introduction

1.1 Transport for London (TfL) is the integrated transport authority for Greater London, responsible for delivering the commitments in the Mayor's Transport Strategy (MTS). TfL runs the day-to-day operation of London's public transport network and manages London's main roads, known as the TfL Road Network (TLRN). The A127 immediately west of M25 Junction 29, including the eastbound exit and westbound entry slip roads of the A127, is part of the TLRN and falls within the scope of works of the Lower Thames Crossing (LTC, the Project). Several other roads within London that are forecast to be affected by changes in traffic patterns caused by the Project are also part of the TLRN.

1.2 This document forms TfL's Written Representation to the Examining Authority (ExA) considering the application for a Development Consent Order (DCO) for the Project, promoted by the Applicant, National Highways (NH). For ease of reference, this Written Representation follows the same sets of issues and is structured in the same way as TfL's Relevant Representation dated 24 February 2023. It provides further detail in areas where this is necessary, and reflects progress made with the Applicant on addressing the issues raised in TfL's Relevant Representation since it was submitted.

1.3 TfL has also developed a Statement of Common Ground (SoCG) with the Applicant, and cross references to issues covered in the agreed draft SoCG to also be submitted at Examination Deadline I are included throughout this Written Representation. In conjunction, TfL has developed a Principal Areas of Disagreement Summary Statement (PADSS) tracker, which will also be submitted at Examination Deadline I.

1.4 TfL is discussing a side agreement with the Applicant which is currently in draft form. If agreed during the Examination, this may allow some of TfL's issues described in this Written Representation to be resolved. However, until an agreement is signed, all matters currently of concern to TfL are included in this representation. The Written Representation does not include detailed comments on the drafting of the DCO which TfL will provide at the appropriate stage in advance of the Issue Specific Hearing (ISH) on the draft DCO.

1.5 TfL refers to the National Policy Statement for National Networks (NPSNN) throughout this representation. TfL notes the comment by the ExA at the Preliminary Meeting that the draft revised NPSNN is likely to become policy during the examination. In places and where relevant, TfL has therefore also referenced the draft NPSNN as this indicates the direction of travel for national policy.

1.6 TfL welcomes further liaison with the Examining Authority on the issues set out in our Written Representation if any clarification is required.

2. Summary of TfL's position

2.1 TfL has no objection to the Project in principle, subject to being satisfied that it will not result in an increase in the overall number of car or goods vehicle trips in London, and subject to any adverse impacts on London's road network and environment being adequately mitigated. However, TfL has two principal areas of concern with the Project

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which it is seeking for the Applicant to address and which we invite the ExA to consider during the examination of the DCO:

a) mitigation of adverse traffic and environmental impacts, and related modelling concerns; and

b) impacts on TfL assets, land, and services.

2.2 The first and most significant area of concern for TfL is the lack of any mechanism being put forward to mitigate adverse impacts resulting from the operational phase of the Project, whether wider traffic network or environmental impacts. Significant concerns also exist about the robustness of the modelling in London undertaken by the Applicant, which further draws into question its reliability for forecasting traffic, air quality and noise impacts and therefore the Applicant's position that no mitigation is required. This is elaborated on further in **Section 3** of this representation.

2.3 The second principal area where TfL has concerns is associated with the direct impact on TfL's assets and operations on the A127 west of M25 Junction 29 and TfL's role in the design and delivery of the Project for that section that affects the TLRN. This is elaborated on further in **Section 4** of this representation.

2.4 The remainder of this Written Representation provides more details on these two principal areas of concern and related matters.

3. Assessment and mitigation of adverse impacts

3.1 This section explains TfL's concerns related to the traffic and environmental impacts of the Project. The section starts with a discussion on the lack of an adequate approach to mitigating the traffic and environmental impacts of the scheme, which is critical and necessary to make the Project acceptable in planning terms given shortcomings in the modelling that TfL has identified. This is followed by a proposed mitigation approach based on that included in the DCO for the Silvertown Tunnel. TfL's concerns about the traffic modelling undertaken by the Applicant, which is a key reason why a meaningful approach to mitigating the impacts of the Project is essential, are then set out. This section includes TfL's own assessment of operational traffic impacts caused by the Project on the TLRN. The section concludes with detailed points concering environmental issues including air quality, carbon emissions, and noise associated with the Project.

Lack of any mechanism for mitigating adverse impacts

3.2 A principal concern of TfL is that the Wider Network Impacts Monitoring and Management Plan (WNIMMP, examination reference APP-545) fails to set out any credible mechanism for mitigating adverse impacts on local and strategic road networks identified through monitoring during the operation of the Project (SoCG 2.1.27, 2.1.28). Monitoring may demonstrate traffic impacts of the Project which were not forecast, and thus require unforeseen mitigation measures which could include, but not be limited to, traffic signal timing changes or junction improvements on the road network in London. TfL considers it entirely unacceptable that the Applicant will only provide data to support other local highway authorities bidding for funds to mitigate the adverse impacts caused by the Applicant's Project, as set out in paragraph 5.7.2 of the WNIMMP.

3.3 From a local policy standpoint, TfL considers that the Project does not comply with London Plan Policy T4 (assessing and mitigating transport impacts) in the absence of any commitment of the Applicant to mitigate adverse traffic impacts of the scheme. TfL submits that the London Plan is an important and relevant matter for the purposes of

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section 104 of the Planning Act 2008. Regard to policies in local plans is an expectation in paragraph 5.203 of the current NPSNN.

3.4 TfL notes that other local authorities share this concern regarding the lack of means for mitigation, as evidenced by their Relevant Representations, including the London Borough of Havering, Kent County Council, and Medway Council.

3.5 TfL requires the Applicant to commit to delivering mitigation and has set out a potential approach in paragraphs 3.9 to 3.17 below, based on the precedented approach adopted in the Silvertown Tunnel DCO. Without a means of mitigating impacts that may emerge once the Project becomes operational, the Project will be unable to fully achieve its objectives and could have a long-term detrimental impact on the highway network, local environment and public health. TfL further queries how not committing to mitigate any impacts of the Project on the wider network beyond the core scope of the scheme is consistent with paragraphs 5.17 to 5.19 of the Applicant's licence from the Department for Transport (DfT)[1]. This requires the Applicant to co-operate with other highway authorities to secure the smooth running of the wider network not only day-to-day, but for the long term. In particular, TfL considers that the Applicant is not complying with paragraph 5.19 (c) to work "with others to align national and local plans and investments, balance national and local needs and support better end-to-end journeys for road users."

3.6 TfL has multiple locations of concern in relation to network impacts from the operational phase of the Project. The specific locations of greatest interest include the A127 west of M25 Junction 29, various junctions along this section of the A127, various junctions along the A12 west of M25 Junction 28, and the A13 west of M25 Junction 30. Paragraphs 3.23 to 3.29 below highlight some of the significant traffic impacts of the Project on the TLRN that have been identified by TfL but for which no mitigation is currently proposed by the Applicant.

3.7 Moreover, there is a reasonable likelihood that congestion on strategic roads will spill onto local roads as traffic builds up at junctions and is exacerbated as drivers seek alternative routes on local roads that are ill-equipped for the increase in traffic. For example the Combined Modelling and Appraisal Report Appendix C – Transport Forecasting Package (APP-522) shows that the northbound M25 is forecast to almost reach capacity in the 2037 AM peak as a result of the Project, with volume / capacity increasing substantially from 0.83 in the Do Minimum to 0.97 in the Do Something scenario (Table 8.34). By 2045 and 2051 this figure increases to 0.99 (Tables 8.55 and 8.76 respectively). TfL observes that the Applicant's forecasts show that the northbound M25 between Junctions 28 and 27 is similarly forecast to be almost at capacity by 2037 as a result of the Project. TfL is concerned that the Project will create a capacity issue on the M25 further north, and this substantial increase in traffic flows between M25 Junctions 29 and 27 on the M25 north of the Project may result in strategic traffic diverting onto the local road network in north east London. In the absence of any approach to mitigate such impacts should they arise, TfL queries how this fits with the draft NPSNN paragraph 5.274, which states "the applicant should provide evidence that the development improves the operation of the network and assists with capacity issues".

3.8 Managing uncertainty with regard to the Project's detailed traffic impacts in local areas and across the wider road network should primarily be the responsibility of the Applicant, working with local planning authorities and highway authorites on any required mitigation

[1] Highways England License – Secretary of State for Transport statutory directions and guidance to the strategic highways company, dated 1 April 2015, accessed 30 June 2023: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/431389/strategic-highways-licence.pdf

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such as junction improvements. One mechanism to enable this would be a specific requirement within the DCO for the Applicant to work with affected local authorities and highway authorites to secure mitigation for wider network impacts. This would be in line with paragraph 5.280 of the draft NPSNN which states that "where the proposed mitigation measures are insufficient to reduce the impact on the transport infrastructure to cceptable levels, the Secretary of State should expect applicants to accept requirements and/or obligations to fund infrastructure or mitigate adverse impacts on transport networks."

Proposed approach to mitigating adverse impacts

3.9 There are approaches to joint working on mitigation and monitoring between the Applicant and highway authorities adopted for other Nationally Significant Infrastructure Projects such as the Silvertown Tunnel that could be employed for this Project, in order to address the concerns noted in paragraphs 3.2 to 3.8 above. TfL recommends that the ExA considers whether such an approach would be appropriate to include as a requirement in the DCO for the Project.

3.10 The approach adopted for the Silvertown Tunnel is set out in Requirement 7 of the DCO for that project. TfL considers that a very similar approach needs to be adopted for the Project, and would be appropriate, reasonable and proportionate.

3.11 The principal reason why a strategy that includes mitigation is required is that it is not realistic to expect the modelling undertaken for the Project in advance of submitting the DCO application to accurately forecast the impacts of the scheme when it becomes operational approximately ten years later, based on the current programme for the Project. Inevitably, there will be changes to traffic flows and congestion in the intervening period that could not have been foreseen, whether due to changes in population or economic trends, propensity to use different modes of transport, or other projects or developments coming forward.

3.12 The Silvertown Tunnel DCO requires that TfL "must carry out an updated assessment of the likely impacts of the authorised development on the performance of the highway network" before the scheme opens for public use (Requirement 7 (4)). This will inform a proposed scheme of mitigation that identifies:

a) "the locations on the highway network where the assessment demonstrates there is likely to be a material worsening of traffic conditions as a result of the operation of the authorised development;

b) the measures which TfL proposes to mitigate the impacts of such a worsening of traffic conditions; and

c) the proposed programme for implementation of those measures."

3.13 TfL proposes that a similar approach is required for the Project. This would require a consultative body of local highway authorities to be established for the Project (the equivalent of the Silvertown Tunnel Implementation Group). Article 66 of the Silvertown Tunnel DCO sets out the membership and remit of that group. In the case of the Project which has traffic impacts over a large geographical area, such a body would need to be sufficiently tightly defined so that it can operate practically. TfL notes that the number of highway authorities that would need to be involved for the Project is likely to be fewer than that for the Silvertown Tunnel Implementation Group. The scheme of mitigation would be submitted to the Secretary of State for approval following consultation with the relevant local highway authorities that are part of the consultative body.

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3.14 The Project would not be permitted to open until the scheme of mitigation has been agreed by the Secretary of State. The Applicant would be required to secure the funding and implementation of the measures approved by the Secretary of State in accordance with the approved programme.

3.15 The forecasts of impacts would be supported by traffic monitoring. TfL considers that the timing, period and frequency of traffic monitoring currently set out in the WNIMMP (APP-545) is insufficient because monitoring from only one year before opening will overlap with construction activity. Monitoring should be undertaken for a longer period and begin prior to commencement of construction of the Project to establish a more reliable baseline. It should also run more frequently than on an annual basis, to better inform mitigation that may emerge as being necessary.

3.16 TfL proposes that monitoring and a requirement for mitigation of impacts would continue into the operational phase of the Project, at sufficient frequency, as it is also possible that the impacts of the Project that emerge may differ from those forecast even if the forecasting is updated shortly before the Project becomes operational. Similar requirements on the Applicant must be put in place to fund and secure the mitigation of any adverse impacts of the Project on the highway network that emerge. TfL accepts that this requirement on the Applicant cannot continue indefinitely and that it will become increasingly difficult to identify whether it is the Project or other causes that lead to adverse traffic impacts as the time since the Project became operational increases. TfL therefore proposes that this period is time limited to a minimum of three years after scheme opening, as this is a widely recognised period after which the impacts of a transport project become established. If the monitoring identifies unexpected scheme impacts then it may need to be extended beyond three years to allow monitoring to continue. The consultative body should agree the ending or extension of the monitoring period, as is envisaged as part of the Silvertown Tunnel Monitoring and Mitigation Strategy.

3.17 An approach of this nature is necessary to provide TfL with sufficient assurance that any adverse impacts of the Project that emerge will be mitigated. TfL considers that it is reasonable and proportionate for the Applicant to take responsibility for the direct impacts of the Project provided there are sufficient safeguards in place to ensure the Applicant does not become liable for impacts that cannot be directly attributed to the Project. TfL will welcome the opportunity to expand on this approach during Issue Specific Hearings and will propose the drafting of a requirement for the DCO should this be helpful to the ExA.

Traffic modelling undertaken by the Applicant

3.18 The modelling approach taken by the Applicant is to rely entirely on traffic modelling undertaken approximately ten years in advance of delivery of the project. Yet beyond the 'in principle' reservations about such reliance, there are practical concerns about the modelling undertaken by the Applicant, both in terms of its findings and its methodology.

3.19 The modelling by the Applicant overall shows a slight reduction in traffic within London as a result of capacity at the Dartford Crossing being freed up by the Project, allowing some traffic previously routed via London to transfer to the M25. However, the modelling nonetheless forecasts increased traffic on specific sections of the TLRN, the greatest being on the A127 west of M25 Junction 29. Increases in traffic are forecast as high as 700 passenger car units (PCUs) per direction west of M25 Junction 29 in the morning peak hour immediately upon Project opening (the 2030 forecast year), which may result in significant increases to delays at junctions. These increases in traffic rise further to up to an additional 800 PCUs per direction by 2037, with the PM peak similarly affected in future years.

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3.20 Regarding the methodology, the Applicant has substantially aggregated the zones in the Lower Thames Area Model (LTAM) within London compared to the source models. In the context of assessing the impacts of the Project, this issue is most significant in Havering, parts of which are within the DCO boundary and where the number of model zones has been reduced from 146 in the source model to 51 in LTAM (35 per cent). This results in short distance local intra-zonal trips in London being entirely omitted from the model. Consequently, congestion is likely to be underestimated at key junctions, and the cumulative effects of the Project on top of background demand cannot be adequately understood. While TfL recognises that LTAM is a strategic model and cannot be expected to forecast all local trips, TfL is concerned about the level of aggregation in areas so close to the Project where substantial impacts, such as the large increase in flows on the A127, are forecast. This lack of granularity severely undermines confidence in the ability of the model to serve as the exclusive basis for determining the need for mitigation of operational traffic, air quality and noise impacts. TfL questions whether the modelling for the Project is fully compliant with paragraph 4.6 of the current NPSNN, which states that applications should "be supported by a local transport model to provide sufficiently accurate detail of the impacts of a project" and that "modelling should be proportionate to the scale of the scheme and include appropriate sensitivity analysis to consider the impact of uncertainty on project impacts".

3.21 Other local authorities share concerns with the robustness of the traffic modelling undertaken, as evidenced by their Relevant Representations, including the London Borough of Havering and Gravesham Borough Council.

3.22 TfL considers that a more robust strategic modelling approach supported by detailed micro-simulation modelling for the most affected junctions and corridors in the London Borough of Havering is essential to gain a robust understanding of the impacts of the Project and to determine whether there is a need for any mitigation (SoCG item 2.1.32). Were this to be undertaken to a satisfactory level of robustness, outputs of this modelling would need to be reviewed to determine whether TfL is satisfied with the findings and impacts.

Junction assessments undertaken by TfL and the London Borough of Havering

3.23 In response to a request by TfL and the London Borough of Havering, the Applicant undertook some local junction assessments in Havering, although this analysis has not been submitted to the Examination by the Applicant. TfL considers these assessments to lack robustness as the Applicant purely extracted data from the strategic model (LTAM) – with its flaws as set out above – rather than using any survey data to validate the assessments to ensure the models were accurately representing current traffic conditions in the base year. As a result of this concern with the Applicant's local junction assessments, seperate surveys and assessments were jointly commissioned by TfL and LB Havering in Spring 2023 to provide a reliable baseline and to allow a comparison with the Applicant's modelling. Potential issues with road safety, impacts on bus journey times and on pedestrian and cycle flows, as well as other operational complexities were also identified through this commission. A report prepared by the consultant is attached to this Written Representation as **Appendix A**.

3.24 This work assessed 11 junctions of concern and identified that in the majority of cases, the junctions are forecast to operate within capacity both with and without the Project, or have significant congestion issues both with and without the Project. However, the assessment found that additional traffic generated by the LTC would have a signficant impact on three specific local junctions on the TLRN, to the point where mitigation delivered by the Applicant would be justified as the issues are caused as a direct result of the Project. These

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junctions are: A127 / Hall Lane; A127 / Ardleigh Green Road / Squirrels Heath Road, and nearby Wingletye Lane; and A12 / North Street / Havering Road.

3.25 The A127 junction with Hall Lane is forecast to operate well within capacity in 2030 without the Project. However, when the predicted traffic flows associated with the Project are added, the junction encounters a significant increase in queuing and delay on the southbound flow along Hall Lane, and the junction is predicted to exceed capacity. Critically, significantly worsened queuing is predicted to occur on the westbound exit slip from the A127, with the AM peak queue extending almost back to the A127 through carriageway. This potentially dangerous queuing will be generated directly by the Project and therefore warrants further consideration in relation to mitigation. There may be scope to improve this junction through redesign, where there appears to be highway land available for this purpose. A suggestion in the report is to consider replacing the priority junction with a roundabout where the exit slip meets Hall Lane, which would require further feasibility work.

3.26 While the A127 / Ardleigh Green Road / Squirrels Heath Road junction is already operating over capacity in future year Do Minimum scenarios, the Project is forecast to significantly worsen junction performance, with queues lengthening on the A127. The nearby A127 junction with Wingletye Lane operates well within capacity when modelled in isolation. However, as noted in Appendix A, queuing traffic from the Ardleigh Green Road / Squirrels Heath Road junction will extend back to Wingletye Lane, impacting the ability for vehicles to join the A127. This occurs in all the scenarios analysed, but is worsened in the 'Do Something' scenario with the Project because of the substantial additional traffic on the A127.

3.27 Given geometric constraints at the Ardleigh Green Road / Squirrels Heath Road junction, it has not been possible to identify an obvious solution to mitigate the impacts of the additional traffic generated by the Project, so a feasibility study would be required to explore options. Options to provide signalised pedestrian crossings, could help alleviate the impacts of the increased traffic generated by the Project on pedestrian safety but would not reduce the level of queuing traffic.

3.28 It should further be noted that the Applicant's junction assessments did not include the left turn flow from the westbound A127 onto Wingletye Lane, where the Project is predicted to increase this movement by over 200 PCUs in the AM peak. Given the presence of two schools, and a zebra crossing only 75 metres south of the A127 on Wingletye Lane, the report in Appendix A recommends further work examining safety improvements at this junction (and more generally along Wingletye Lane) because of additional traffic generated by the Project. TfL considers that further analysis of the potential impacts arising along Wingletye Lane is required, and options explored for a junction improvement scheme.

3.29 Further west, at the A12 / North Street / Havering Road junction, there are a high volume of bus services operating through the junction (eight scheduled bus routes and 76 bus movements per hour in total during the daytime). Reducing congestion and traffic flows through the A12 / North Street / Havering Road junction is therefore of great importance to TfL. While capacity issues exist here currently, the Project results in an increase in traffic through this junction causing the situation to substantially worsen without intervention. There is already a case to be made for implementing bus priority measures at the A12 / North Street junction, with over 15,000 bus passengers per day passing through the junction. As the Project increases traffic thorugh this critical public transport node, TfL considers that the Project should contribute to junction improvements at this location, not limited to bus priority measures, to help mitigate its impacts.

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Construction and operational traffic management

3.30 Given the concerns over the robustness of the modelling in London, TfL subsequently has concerns with regard to construction traffic impacts on the wider network (SoCG 2.1.14). As discussed above, the relatively coarse zoning system in London used in the Project's strategic model will result in some local traffic missing from the network, with implications for the accuracy of construction-related traffic forecasts on the TLRN.

3.31 TfL is also seeking to understand the strategic diversion routes that would be advised in the event of a closure of the Dartford Crossing once the Lower Thames Crossing is operational (SoCG 2.1.15). This is not specified in the application document on the Need for the Project (APP-494) or in other documents. Measures are needed to secure the resilience of the highway network in the event of an accident, with plans to be agreed between the Applicant and relevant local highway authorities, and to ensure traffic does not spill over onto the road network in London in an uncontrolled way.

Air quality

3.32 TfL also has concerns with regards to the environmental impacts of the Project, most significantly, air quality impacts. TfL is of the view that operational air quality monitoring (SoCG 2.1.17) on the A127 west of M25 Junction 29, where there is forecast to be a large increase in traffic flows, should be included in the scope of the WNIMMP and the Register of Environmental Actions and Commitments (section 7 of the Appendix 2.2 of the Environmental Statement – Code of Construction Practice, First Iteration of Environmental Management Plan (APP-336)). Air quality remains a critical issue for London with many key corridors close to or exceeding legal limits for air pollution – so even a small increase is a source of concern. TfL's concerns about the robustness of the traffic modelling on which the air quality assessment is based means there is considerable scope for air quality impacts in London to vary significantly from those forecast. There is therefore a requirement for monitoring of air quality on sections of road where increases in traffic are forecast.

3.33 In addition to concerns over operational monitoring and modelling, TfL remains concerned about nitrogen dioxide resulting from highway trips. While the analysis in Chapter 5 of the Environmental Statement (APP-143) indicates that air quality will remain within legal limits, modelled NO_2 levels are well above World Health Organisation guidelines which Mayoral policy is seeking to move towards. Further mitigation to reach this aspirational guidance should be adequately considered by the Applicant. This would be in line with the draft NPSNN (paragraph 5.18), which states that "air quality considerations will also be important where substantial changes in air quality levels are expected, even if this does not lead to any breaches of national air quality limits or statutory air quality objectives".

Road user carbon / operational carbon emissions

3.34 TfL notes the exclusion of user carbon from the scope of the carbon quantification and management approach in the Carbon and Energy Management Plan (CEMP, APP-552). The quantification shown in Table 3.1 only includes construction- and maintenance-related emissions, and there is a note in Table B.1 that user carbon has not been included as the Applicant can only influence but not control emissions. Chapter 15 of the Environmental Statement (APP-153 paragraph 15.6.19) acknowledges that there will be an increase in carbon emissions as a result of the Project of 6.6 million tonnes of CO_2 equivalent, reducing to between 2.3 and 2.9 million tonnes depending on the success of the Government's Transport Decarbonisation Plan.

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3.35 While TfL recognises that managing carbon emissions more broadly are not solely the responsibility of the Applicant, any additional carbon generated by users of the Project from increases in traffic flows should be addressed or mitigated (SoCG 2.1.30). Paragraph 5.31 of the draft NPSNN notes that a carbon management plan submitted as part of a DCO application should include "how operational emissions and, where applicable, emissions from maintenance activities, have been reduced as much as possible through the application of best available technology for that type of technology (recognising that in the case of road projects while the developer can estimate the likely emissions from road traffic, it is not solely responsible for controlling them". Furthermore, paragraph 5.36 states that "the Secretary of State should be content that the applicant has taken all reasonable steps to reduce the total greenhouse gas emissions from a whole life carbon perspective". TfL questions whether the Applicant has made sufficient effort to influence the user carbon element of whole life carbon emissions. For example, had a more flexible charging regime been adopted, as discussed in paragraph 3.38 below, the Applicant would have more ability to manage the carbon impacts of the Project.

3.36 Given the concerns noted above, TfL also questions how the Project complies with London carbon policy, specifically London Plan Policy SI2 (minimising greenhouse gas emissions) and Mayor's Transport Strategy Policy 7 (achieving a zero carbon city and good air quality), as the Project is not proposing any measures to seek to reduce operational carbon emissions from road users. At the London level, TfL aims to achieve net zero carbon by 2030 and the Project should play its part in achieving this goal. As noted in paragraph 3.3 above, TfL submits that the London Plan and the Mayor's Transport Strategy are important and relevant matters for the purposes of section 104 of the Planning Act 2008.

3.37 TfL has similar concerns with regard to national carbon policy, including the Government's Transport Decarbonisation Plan (as outlined above) and National Highways' Net Zero Highways Plan[2]. The latter commits to net zero road user emissions by 2050, with various intermediate targets, covering emissions from the vehicles using the strategic road network. If the Project does not demonstrate how user emissions will be reduced to meet this target, TfL questions the Project's alignment with stated policy.

Charging regime

3.38 While TfL does not object to the planned charging regime for the Project, it notes that no comprehensive justification is provided in the Road User Charging Statement (APP-517) for using the same charging regime as the Dartford Crossing, other than an aim for consistency and customer preference. TfL considers that a more flexible charging regime – such as that to be used for the Silvertown Tunnel – would be more effective and could enable the Applicant to manage traffic demand and in turn, air quality and carbon emissions (SoCG 2.1.16, 2.1.19). It is incumbent on the Applicant to outline the advantages and disadvantages of various charging options in detail to provide the evidence to support the decision on the proposed charging regime.

Noise pollution

3.39 Another environmental area of concern for TfL is noise pollution (SoCG 2.1.21). The measures included in the Project design intended to reduce the extent of noise pollution for residential properties are welcomed by TfL. However, it is important that the level of additional noise pollution is reduced as far as possible across the entire Project. This will

[2] Net zero highways: our 2030 / 2040 / 2050 plan, dated 2021, accessed 10 July 2023: https://nationalhighways.co.uk/media/eispcjem/net-zero-highways-our-2030-2040-2050-plan.pdf

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have added benefits and help to ensure that the amenity of green spaces and recreational areas in the east of London and neighbouring communities is not negatively impacted.

3.40 TfL is of the view that noise monitoring on the A127 west of M25 Junction 29, where there is forecast to be a large increase in traffic flows, should be included in the scope of the WNIMMP (APP-545). TfL's concerns about the robustness of the traffic modelling on which the noise assessment is based means there is considerable scope for noise impacts in London to vary significantly from those forecast.

3.41 TfL should also be consulted on the Noise and Vibration Management Plan for works affecting its road network, as the Project may require noise mitigation infrastructure on the TLRN which TfL would be expected to maintain.

4. Impacts of the Project on TfL land, assets and services

4.1 The second principal area of concern for TfL is that the impacts of the Project on existing and future TfL assets needs to be accounted for, to ensure that TfL's interests as a highway authority and landowner are protected (SoCG 2.1.8). Work on the TLRN is subject to article 10 of the draft DCO, which provides that any highway or works to the highway should be constructed to the reasonable satisfaction of the local highway authority, and unless otherwise agreed with the local highway authority, it will be maintained by and at the expense of the local highway authority from its completion. TfL's position is that for any new or altered assets that it will be required to manage and maintain, arrangements need to be made to address any additional expense that it will incur in respect of the same, by way of a commuted sum from the Applicant (discussed further in paragraphs 4.9 to 4.15 below).

4.2 If there are any new assets outside the existing highway boundary that TfL is required to take responsibility for as part of the DCO, for example drainage infrastructure or environmental mitigation, then a clear understanding of the maintenance boundary, liabilities and division of responsibilities will be essential (SoCG 2.1.9).

4.3 TfL is willing to consider its requirements on these matters being included in a side agreement with the Applicant, but as things stand a side agreement has not been agreed, nor is the Applicant currently seeking to fully address all of the concerns of TfL in such an agreement.

4.4 The main impact on TfL assets is associated with the A127 west of M25 Junction 29, where a new walking, cycling and horse-riding (WCH) bridge is proposed as part of the Project, plus a new direct link between the northbound M25 and westbound A127 which connects to the existing A127 westbound on slip road (part of the TLRN) at Junction 29 itself. TfL supports the provision of the bridge to address severance issues, but has some outstanding concerns related to the design, construction, and maintenance of this structure, which TfL will be required to operate and maintain (SoCG 2.1.23). TfL is seeking more information on the proposed bridge design as early as possible prior to the detailed design stage and continued dialogue must occur during detailed design to ensure it can be efficiently maintained and meets safety best practice.

4.5 TfL has reviewed and discussed with the Applicant whether sufficient land is included within the DCO boundary to allow efficient maintenance of the new bridge (with the area available shown in Sheet 76 of the Structures Plans, APP-044). The Applicant has confirmed that 3 metres has been provided for maintenance, although TfL notes that this is not the case for part of the staircase on the north side of the A127. However, TfL requests that the Applicant seeks to provide a 5-metre buffer zone to provide greater assurance and flexibility for all future maintenance activities, given that the design and therefore

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maintenance requirements for the bridge are not yet developed. This would primarily affect the south side of the A127 where the maintenance buffer is only approximately 3 metres on the current design. A 5-metre buffer will provide sufficient space for access for maintenance vehicles that may be necessary depending on the final design.

Acquisition of land

4.6 Where TfL will retain responsibility as highway authority, any TfL land that the Applicant acquires for construction should be returned to TfL ownership as soon as practicable at the Applicant's cost. This would be consistent with TfL's understanding of the Applicant's overall aim of minimising permanent acquisition of land owned by TfL where not required for the operational phase of the Project and the draft DCO should be amended accordingly.

4.7 TfL considers that the draft DCO needs to address issues associated with the impacts of the Project on the TLRN. The Applicant should be obliged to transfer such land and rights as TfL requires to operate and maintain the WCH bridge to TfL. The draft Order does not at present provide for the extension of the TLRN where the bridge footprints are being installed.

4.8 TfL also notes the wide ranging powers, including powers to compulsorily acquire land, that could be transferred to other bodies under Article 8 of the draft Order. TfL considers that the power to transfer the benefit of the Order should be limited to such articles as the listed bodies reasonably require to undertake works as part of the delivery of the Project.

Commuted sum and covering of costs

4.9 TfL is seeking to recover its costs associated with delivery of the Project (including for the detailed design stage) from the Applicant. TfL is also seeking a commuted sum to cover the substantial increase in its ongoing management and maintenance costs that directly results from the new and modified assets for which TfL is required to take responsibility for in the DCO (SoCG 2.1.11).

4.10 The Applicant's stated position on a commuted sum, set out in matter 2.1.11 of the draft SoCG with TfL submitted at Deadline 1, is that: "the maintenance of both local highways and the strategic road network is funded by the Department for Transport. Local highway funding is mainly based on a formula linked to the total mileage of A roads, B and C roads, and unclassified roads in each area, together with the numbers of bridges, lighting columns, cycleways and footways. This funding is refreshed every few years to take account of changes in road length and number of highway structures. Accordingly, as local highway works are carried out under the DCO, the amount of funding that each local highway authority receives will be amended to recognise these additional responsibilities. Given that this process already exists, it is not appropriate to require National Highways to provide funding for the maintenance of parts of the local network out of the money given to it to maintain the strategic road network".

4.11 The Applicant continues in the SoCG to state: "The Applicant recognises that TfL may have different funding arrangements than those highways authorities outside London. However, the Applicant's position is that it does not on principle provide commuted sums to Local Highway Authorities for any assets it provides as part of its major projects programme."

4.12 TfL disputes this position, as unlike local highway authorities outside London, TfL does not receive highway funding from the Department for Transport (DfT) for the operation of the

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TLRN. This is clearly set out on the DfT website[3], which states that: "London Boroughs and Transport for London (TfL) do not receive these funding streams for the maintenance of their local highways". TfL therefore has to fund from its existing operating budget the future maintenance of any highway assets not previously forming part of the TLRN that are to be transferred to TfL under the draft Order. There is no 'double counting' if TfL receives a commuted sum from the Applicant.

4.13 The long term maintenance cost of a structure of the size of the proposed walking, cycling and horse riding bridge, which has an approximately 70 metre span over the A127 dual carriageway and its slip roads, is expected to be substantial. TfL is already operating under a heavily constrained budget, with no financial support from the Government for its operations, so TfL cannot guarantee that it will have the financial resources to adequately maintain the infrastructure delivered by the Project, that TfL will become responsible for. TfL is proceeding on the basis that it would take ownership of the bridge and that a commuted sum would be provided to cover ongoing maintenance costs. In the event that a commuted sum was not provided, TfL will need the question of the ownership of the bridge to be revisited.

4.14 TfL requests that the precedent from the M25 Junction 28 Improvements DCO is followed, where the Secretary of State included protective provisions for TfL that the Applicant must pay TfL's costs and a commuted sum (see paragraphs 71 to 73 in Schedule 9, Part 7 of that DCO. To assist the ExA, the protective provisions for TfL in the M25 Junction 28 improvements DCO are included in Appendix B of this representation. TfL does not propose any changes to the substantive wording or matters included in the protective provisions should these be adopted for the Project.

4.15 TfL also notes that there is also precedent from the East Midlands Gateway Rail Freight Interchange and Highway Order of 2016. This Order included protective provisions in favour of Highways England (the predecessor to the Applicant) for payments of costs and expenses, including commuted sums to cover the maintenance costs of highway bridge structures (see paragraphs 5 and 10 in Schedule 19 of that Order). While TfL recognises that there will be some variations in the situation between any two schemes, it demonstrates further precedent, in this case that the Applicant has previously successfully pursued the principle that affected highway authorities should receive sufficient funds from the infrastructure project undertaker to cover future maintenance costs of infrastructure it will assume responsibility for.

Consultation in its capacity as a highway authority

4.16 TfL, as highway authority for sections of the highway network directly affected by the Project, should be consulted on matters relevant to its functions for those sections of network, in addition to the local planning authorities (SoCG 2.1.2). The draft DCO only refers to the local planning authorities ("relevant planning authority" or similar) and not relevant highway authorities for Requirement 3 (detailed design), Requirement 5 (landscaping and ecology), Requirement 6 (contaminated land and groundwater), Requirement 8 (surface and foul water drainage), and Requirement 12 (fencing). Consulting with relevant highway authorities on impacts on transport networks is an expectation in paragraph 5.204 of the current NPSNN.

[3] Highways maintenance and ITB funding formula allocations, 2022-2025 (3 years), dated 15 March 2023, accessed 30 June 2023: https://www.gov.uk/government/publications/highways-maintenance-funding-allocations/highways-maintenance-and-itb-funding-formula-allocations-2022-to-2025#:~:text=2022%2Dto%2D2025-,Funding%20allocations%20summary,the%208%20largest%20city%20regions.

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4.17 If any major utility diversions or works are required under the TLRN for the Project, then TfL will need to be closely involved in reviewing and approving the design and construction of such diversions or works, including any future management and maintenance arrangements (SoCG 2.1.10).

Construction impacts – replacement planting

4.18 TfL seeks confirmation that any replacement planting required by the Project will be of adequate quality and will occur outside diverted utility areas, to avoid conflicts when maintenance of utilities is required (SoCG 2.1.20). TfL seeks assurances from the Applicant about the appropriateness of this planting from a biodiversity perspective, which could be addressed through detailed design and/or TfL inclusion as a consultee for the Outline Landscape and Ecology Management Plan (oLEMP) advisory group. As requested in paragraph 4.16, TfL needs to be consulted on detailed design for this matter, as this affects the green estate that TfL is responsible for maintaining as highway authority. As noted in paragraph 5.187 of the draft NPSNN, "the long-term management and maintenance of newly planted trees should be secured".

Construction vehicle safety standards

4.19 TfL requests that the Applicant sets out how its construction vehicle safety standards will support TfL's commitment to achieving its 'Vision Zero' safety goal that by 2041, all deaths and serious injuries will be eliminated from London's transport network (SoCG 2.1.12).

4.20 Specific measures to address this goal include HGV Safety Permits and the Direct Vision Standard. Any vehicle used for construction of the Project over 12 tonnes gross vehicle weight and entering or operating in Greater London must legally hold a valid HGV Safety Permit. From October 2024, such vehicles will need to be Direct Vision Standard rated 3 star or above or fit a Progressive Safe System to be able to operate in Greater London.

4.21 While the above requirements are only legally required within Greater London, TfL would submit that the same standards should be applied across the entire LTC project area to protect the safety of all road users. Section 6.1 of the Code of Construction Practice (APP-336) could be amended to include this.

Public transport services

4.22 TfL is seeking for measures to support the public transport network to be considered further as part of the Project (SoCG 2.1.22). In particular, the Applicant should consider impacts on journey times for the bus network resulting from the Project, and what targeted interventions it might make to improve bus performance and reliability and so help shift some trips away from cars. This is not currently part of the Applicant's plans, which reduces the potential overall sustainability of the Project, not least with regard to decarbonisation. TfL also questions the alignment with paragraph 5.272 of the draft NPSNN, which notes scheme mitigation measures should focus "on facilitating journeys by active travel, public transport, and cleaner fuels". The A12 junction with North Street is a particular example of where mitigation may be required to protect bus journey times (see paragraph 3.29 above).

5. Conclusion

5.1 TfL requests that the ExA considers the points raised in this representation and investigates these during the DCO examination process. TfL will welcome the opportunity to expand on these points at appropriate ISHs.

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6. Appendices

A – Local Junction Impact Assessment Modelling Report

B – Protective Provisions for Transport for London from M25 Junction 28 Improvements DCO

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Appendix A - Local Junction Impact Assessment Modelling Report

The appendices to the Local Junction Impact Assessment Modelling Report have not been appended to this Written Representation for brevity but are available on request.

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Cole Easdon

TRANSPORT APPRAISAL

Lower Thames Crossing – Local Junction Impact Assessment Modelling Report on Behalf of the London Borough of Havering

Date: July 2023
Issue No. 3

DOCUMENT ISSUE RECORD

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CE Plan 9190/201 Junction Locations

Appendix 2 – Junction Modelling Results

EXECUTIVE SUMMARY

This Report was prepared on behalf of both the London Borough of Havering (LBH) and Transport for London to understand the impacts of the proposed Lower Thames Crossing (LTC) on eleven junctions within LBH. The Report also assessed each junction in relation to Transport for London's Healthy Streets criteria to identify opportunities for interventions with regard to public transport, walking and cycling. Accident data for all eleven junctions was also analysed.

The Healthy Streets assessment identified that most of the junctions would benefit from improved pedestrian/cycle crossing points whilst in others in addition would also benefit from the banning of U-turn manoeuvres, provision of bus priority measures, and Advanced Stop Lines for cyclists.

The accident data analysis found that the A12/North Street and A12/Pettits Lane had relatively high numbers of accidents in the 5 year period analysed (some 38 and 25 accidents respectively), whilst the A12/Gubbins Lane, A127/Squirrels Heath Road and A127/Hall Lane junctions had experienced 19 accidents. All five junctions are recommended for further investigation with regard to road safety.

With respect to the junction modelling, this was informed by new traffic surveys carried out at each junction in May 2023. The changes in flows caused by the LTC are taken from the National Highways 2030 LTAM. These flows were incorporated into the local models to create a 2030 "with LTC" scenario at each of the 11 modelled junctions. The findings of the modelling were as follows:

The following junctions operate within capacity and will continue to do so in the year 2030 with or without the Lower Thames Crossing scheme:

- A12 Colchester Road/Harold Court Road;
- A127 Southend Arterial Road/Wingletye Lane; *
- A13/Marsh Way;
- A127/Front Lane;
- A13/A1306 Wennington Road (Wennington Interchange); and
- A124 St Mary's Lane/Station Road/B1421 Corbetts Tey Road (Bell Corner).

The following junction will operate over capacity in 2030, with or without the LTC, however, there may be scope to improve this junction:

- A12 Colchester Road/Gubbins Lane/Gooshays Drive.

The LTC causes the following junctions to operate over capacity (i.e. without the LTC, these junctions would operate with reserve capacity in 2030):

- A127 Southend Arterial Road/Hall Lane; and
- A12 Eastern Avenue/Pettits Lane/Pettits Lane North;

The following junctions are severely over-capacity, both now and in the 2030 Do Something scenario. As such these junctions will likely require amendments to the strategic network to alleviate the strain on these junctions:

- A12/North Street/B175 Havering Road;
- A127 Southend Arterial Road/Ardleigh Green Road/Squirrels Heath Road.

1.0 INTRODUCTION

1.1 Cole Easdon (CE) has been instructed jointly by the London Borough of Havering (LBH) and Transport for London (TfL) to prepare a Report to consider the impacts of the proposed Lower Thames Crossing (LTC) on the operation of 11 junctions within the borough.

1.2 The LTC is a proposed new road scheme being promoted by National Highways that will deliver a new river crossing east of the existing Queen Elizabeth Bridge. The scheme will provide a new connection between the A2/M2 in Kent via a twin-bored tunnel underneath the Thames to the A13. A new three lane northbound and two-lane southbound road will then connect through to the M25 between junctions 29 and 30 within Havering.

1.3 The road would be approximately 23km long, 4.25km of which would be in tunnel. The tunnel entrances would be located to the east of the village of Chalk on the south of the River Thames and to the west of East Tilbury on the north side. A Plan indicating the proposed scheme is shown within Figure 1.1 below.

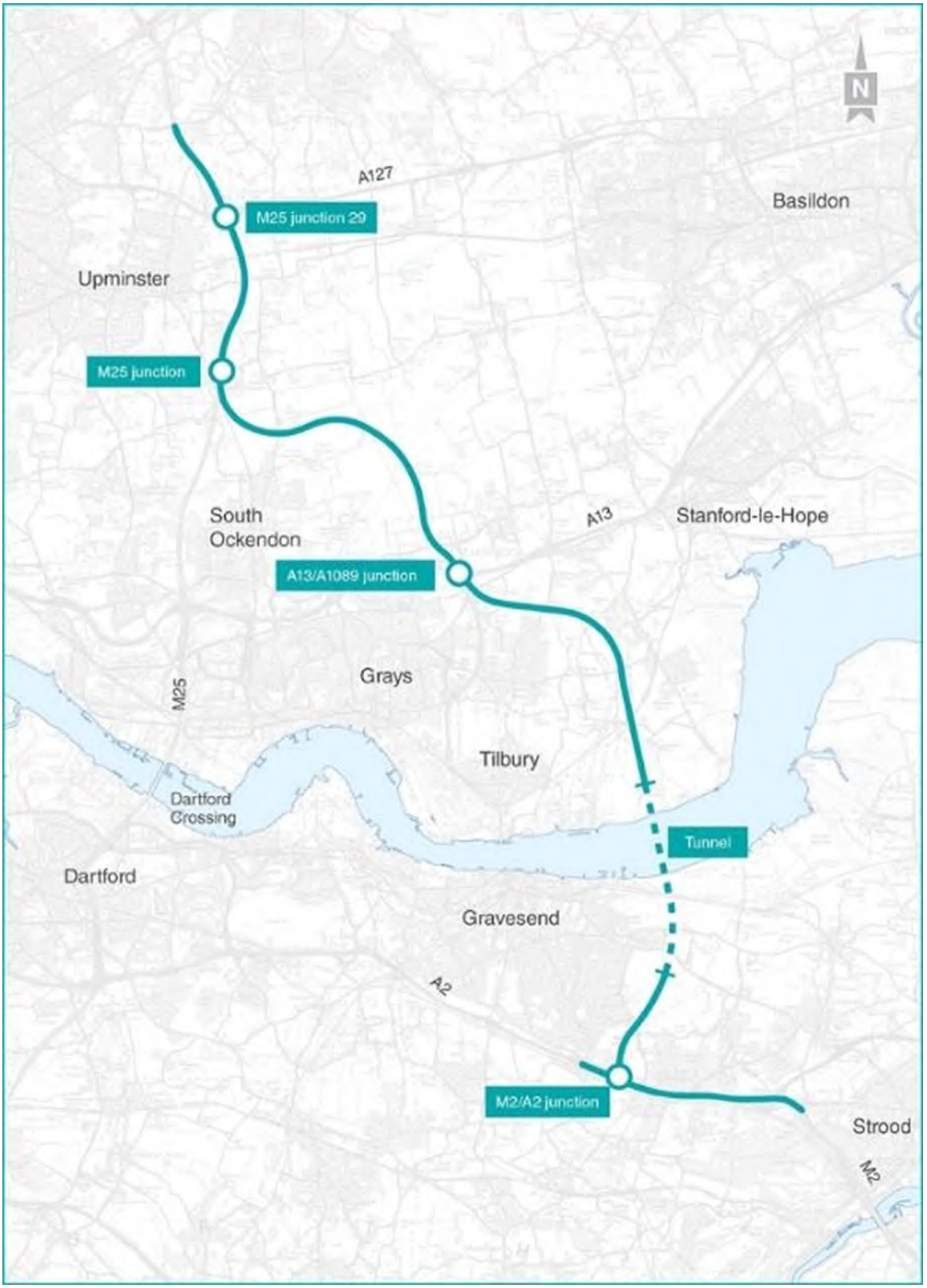


Figure 1.1: Route of the Lower Thames Crossing

1.4 The scheme is classified as a Nationally Significant Infrastructure Project ("NSIP") under Part 5 of the Planning Act 2008 as amended by the Localism Act 2011.

1.5 LB Havering has responded to several public consultations on the Lower Thames Crossing scheme in recent years. A statutory (section 42) consultation took place towards the end of 2018. A Supplementary Consultation was undertaken in early 2020 and a further Design Refinement Consultation took place during the early summer 2020. The last public consultation that LB Havering responded to was the Local Refinement Consultation in June 2022.

1.6 To obtain consent, the scheme promoter is required to progress the scheme through the Planning Act 2008 Development Consent Order (DCO) process.

1.7 At the end of October 2022, National Highways submitted their application to the Planning Inspectorate (PINS). PINS decided to formally accept the application for Examination on 28th November. The project has now entered the pre-Examination period, and this is expected to last between 3 – 5 months. This will then be followed by a six month Examination by the Planning Inspectorate.

1.8 As part of their planning submission, National Highways has undertaken a review of potential impacts on twelve of Havering's local junctions but has not undertaken local junction surveys that would provide a reliable baseline. Instead, their modelling has been based on a wide area strategic SATURN model covering large parts of the South East of England.

1.9 This study has been commissioned to enable the LB Havering to understand the impact on 11 key junctions within Havering of the additional traffic forecast to be generated by the LTC scheme. The following junctions have been considered:

- A12/North Street/B175 Havering Road;
- A12 Eastern Avenue/Pettits Lane/Pettits Lane North;
- A12 Colchester Road/Harold Court Road;
- A12 Colchester Road/Gubbins Lane/Gooshays Drive;
- A127 Southend Arterial Road/Ardleigh Green Road/Squirrels Heath Road;
- A127 Southend Arterial Road/Wingletye Lane;
- A127 Southend Arterial Road/Hall Lane;
- A127 Southend Arterial Road/Front Lane;
- A13/Marsh Way;
- A13/A1306 Wennington Road (Wennington Interchange); and
- A124 St Mary's Lane/Station Road/B1421 Corbetts Tey Road (Bell Corner)

1.10 The location of the above junctions is shown on CE Plan 9190/201 [*Junction Locations*] included within Appendix 1.

1.11 In order to obtain up-to-date baseline survey data, traffic surveys at these junctions were carried out by Advanced Transport Research between 0700-1900 on 10th, 11th and 12th May 2023 via CCTV. Each of the junctions has been analysed using either Linsig V3 or Junctions 10 as appropriate. Further detail regarding the scope of the junction modelling and methodology, together with the modelling results is provided within Section 4 of this Report.

1.12 In addition to capacity considerations, LB Havering also wishes to consider the implications for pedestrians, cyclists and public transport. In this regard, CE have conducted an assessment of each junction in its existing layout against a number of the Mayor's 'Healthy Streets' criteria so as to highlight any deficiencies and potential areas for improvement with regard to pedestrians, cyclists and public transport. This analysis is presented within Section 2 of this Report.

Report Structure

1.13 The Report is structured as follows:

- Section 2.0 considers each of the junctions in relation to certain of the Healthy Streets criteria;
- Section 3.0 provides analysis of the most recent 5 year period of personal injury accident data for each junction;
- Section 4.0 sets out the results of the junction modelling at each of the 11 junctions; and
- Section 5.0 summarises and concludes the Report.

2.0 HEALTHY STREETS ASSESSMENT

2.1 In order to provide an assessment of each junction in terms of its current facilities/suitability for pedestrians, cyclists and public transport, CE has had regard to TfL's Healthy Streets indicators. These are used to assess how well a street performs in terms of its attractiveness for pedestrians, cyclists and public transport users.

2.2 Owing to this study's particular focus on individual junctions rather than streets per se, we have considered 5 of the Healthy Streets indicators as follows:

- easy to cross;
- not too noisy;
- people choose to walk, cycle and use public transport;
- people feel safe; and
- people feel relaxed.

2.3 Each of the junctions is assessed in the following Tables.

Table 2.1 Junction 1 - A12/A125 North Street/B175 Havering Road

Healthy Street Indicator	Comments / Observations	Suggested Areas for Improvement
Easy to cross	Lack of controlled pedestrian crossing facilities on the A12 (West), North Street and Havering Road. A high number of U-turn manoeuvres were observed with traffic travelling westbound on the A12. This is a particular concern owing to potential for conflict with pedestrian crossings. There is also a primary school located to the north of the junction on Havering Road and pupils are likely to cross this junction.	Consider installation of controlled pedestrian crossing facilities. Consider implementing a camera enforced U-turn ban
Not too noisy	The junction is heavily trafficked and therefore noisy.	Limited/no scope to improve this. Additional tree planting and landscaping would however provide a degree of noise mitigation.
People choose to walk, cycle and use public transport	The junction has limited pedestrian crossing facilities and only one cycle lane and one Advance Stop Line for cyclists, located on North Street. Footways on each arm of the junction are generally of a good width however. Bus services operate along all arms of the junction and there are 5 bus stops within 300m. There are however no bus priority measures through the junction although a northbound bus	Consider redesign of junction to accommodate controlled pedestrian / cycle crossing facilities on all arms of the junction. Consider implementing a camera enforced U-turn ban. Consider opportunities for bus priority measures to encourage modal shift.

Healthy Street Indicator	Comments / Observations	Suggested Areas for Improvement
	lane is provided on North Street, terminating approximately 100m south of the junction.	
People feel safe	The lack of controlled crossing facilities means that many people will not feel safe crossing this junction. The high number of U-turning vehicles is also a safety concern.	As above.
People feel relaxed	The traffic noise combined with the lack of controlled crossing points means that many people will not feel relaxed.	As above.

Table 2.2 Junction 2 - A12/Pettits Lane

Healthy Street Indicator	Comments / Observations	Suggested Areas for Improvement
Easy to cross	No controlled pedestrian crossing facilities provided on any arm. A high number of U-turn manoeuvres were observed with traffic travelling westbound on the A12. This is a particular concern owing to potential for conflict with pedestrian crossings. The traffic islands for pedestrians to wait on to cross Pettits Lane are narrow with limited space, especially for larger groups. There is also no tactile paving present on any of the pedestrian crossing points. Pedestrians crossing the Eastern Avenue (east) arm of the A12 must also negotiate crossing 7 lanes of traffic in total. A footbridge is provided on Eastern Avenue (west) allowing pedestrians to cross on the west side of the junction, however It is a lengthy detour to use the bridge and not a convenient or direct route.	Consider installation of controlled pedestrian crossing facilities on all arms. Consider implementing a camera enforced U-turn ban. Install tactile paving where required. Consider a more compact junction layout that is easier for pedestrians and cyclists to negotiate.
Not too noisy	The junction is heavily trafficked and therefore noisy.	Limited/no scope to improve this. Additional tree planting and landscaping would however provide a degree of noise mitigation.
People choose to walk cycle, and use public transport	The junction has no pedestrian crossing facilities and no facilities for cyclists (such as cycle lanes and Advanced Stop Lines). The junction is large/sprawling and not particularly conducive to safe/convenient pedestrian movement. Bus stops are located in close proximity to the junction on the A12	Consider redesign of junction to accommodate controlled pedestrian / cycle crossing facilities on all arms of the junction. Consider implementing a camera enforced U-turn ban. Consider opportunities for bus priority measures to encourage modal shift.

Healthy Street Indicator	Comments / Observations	Suggested Areas for Improvement
	Eastern Avenue and on Pettits Lane (N and S). These can be accessed via good width footways/paths. There are no bus priority facilities at the junction	
People feel safe	The lack of controlled crossing facilities means that many people will not feel safe crossing this junction. The high number of U-turning vehicles is also a safety concern.	As above.
People feel relaxed	The traffic noise combined with the lack of controlled crossing points means that many people will not feel relaxed.	As above.

Table 2.3 Junction 3 - A12/Harold Court Road

Healthy Street Indicator	Comments / Observations	Suggested Areas for Improvement
Easy to cross	No controlled pedestrian crossing facilities on any arm. The pedestrian refuge island on Harold Court Road is narrow with limited space for pedestrians to wait, particular with pushchairs. A subway is however provided to the west of the junction to allow pedestrians across the A12.	Consider installation of controlled pedestrian crossing on Harold Court Road.
Not too noisy	The A12 is heavily trafficked and therefore noisy.	Limited/no scope to improve this. Additional tree planting and landscaping would however provide a degree of noise mitigation.
People choose to walk, cycle, and use public transport	The junction has no controlled pedestrian crossing facilities and no facilities for cyclists (such as cycle lanes and Advanced Stop Lines). An offroad cycle route provided on the south side of the A12. Access to it requires the crossing Harold Court Road for which there is no formal means to do so. There are bus stops situated in close proximity to the junction on the A12 and on Harold Court Road albeit there are no bus priority facilities provided. However, the frequency of the bus service along these roads is only 3-4 per hour therefore such measures may not be justified.	Consider provision of a controlled crossing facility on Harold Court Road as part of the junction layout.

Healthy Street Indicator	Comments / Observations	Suggested Areas for Improvement
People feel safe	The lack of controlled crossing facilities means that many people will not feel safe crossing this junction.	As above.
People feel relaxed	The traffic noise combined with the lack of controlled crossing points means that people may not feel relaxed.	As above.

Table 2.4 Junction 4 - A12/Gubbins Lane

Healthy Street Indicator	Comments / Observations	Suggested Areas for Improvement
Easy to cross	There are no controlled pedestrian crossing facilities on Gooshays Drive or Gubbins Lane, and no crossing at all on the A12(w). A signalised pedestrian crossing facility is provided on the A12 (east).	Consider installation of controlled crossing facilities.
Not too noisy	The A12 is heavily trafficked and therefore the area is noisy.	Limited/no scope to address this. Additional tree planting and landscaping would however provide a degree of noise mitigation.
People choose to walk, cycle and use public transport.	The lack of pedestrian and cycle facilities at this junction and along the A12 generally mean that very few people are likely to choose to walk and cycle. There are bus stops on Gooshays Drive, Gubbins Lane and on the A12 in close proximity to the junction although there are no bus priority facilities.	Consider redesign of junction to incorporate improved pedestrian and cycle crossing facilities. Consider opportunities for bus priority measures to encourage modal shift.
People feel safe	The lack of controlled crossing facilities and high traffic volumes means that few people are likely to feel safe. A high number of U-turn manoeuvres were observed by vehicles heading westbound on the A12 which further compromises the safety of the junction for pedestrians, who may not be expecting U-turning vehicles when making their decision to cross.	As above as well as consider a formal camera enforced U-turn ban.
People feel relaxed	The high traffic volumes, noise and lack of controlled crossing facilities is likely to mean that people do not feel relaxed.	

Table 2.5 Junction 5 - A127/Ardleigh Green Road/Squirrels Heath

Healthy Street Indicator	Comments / Observations	Suggested Areas for Improvement
Easy to cross	There are no controlled pedestrian crossing facilities provided at the junction. There are no pedestrian crossing facilities at all on the A127 (S). A footbridge is provided over the A127(N). There is no tactile paving present on Ardleigh Green Road and the pedestrian 'island' on this road doesn't line up with the dropped kerbs. There is also no tactile paving present at the informal crossing point on Squirrels Heath Road. The pedestrian islands on both Aredleigh Green Road and Squirrels Heath Road are both very narrow and of an inadequate width for people with pushchairs or in wheelchairs.	Consider installation of controlled crossing facilities, together with tactile paving.
Not too noisy	The A12 is heavily trafficked and therefore the area is noisy.	Limited/no scope to address this. Additional tree planting and landscaping would however provide a degree of noise mitigation.
People choose to walk, cycle and use public transport	The lack of pedestrian and cycle facilities at this junction and along the A127 generally mean that very few people are likely to choose to walk and cycle. The footway on Ardleigh Green Road is somewhat narrow and on its northern side its usable width is impacted by trees. There are bus stops in close proximity to the junction on Ardleigh Green Road and Squirrels Heath Road.	Consider redesign of junction to incorporate improved pedestrian and cycle crossing facilities. Consider opportunities to install bus priority measures to encourage modal shift to bus services, thereby helping to alleviate some of the pressure on this junction.
People feel safe	The lack of controlled crossing facilities and high traffic volumes means that few people are likely to feel safe. A high number of U-turn manoeuvres were observed by vehicles heading northbound on the A127 which further compromises the safety of the junction for pedestrians, who may not be expecting U-turning vehicles when making their decision to cross.	As above as well as consider a formal camera enforced U-turn ban.
People feel relaxed	The high traffic volumes, noise and lack of controlled crossing facilities is likely to mean that people do not feel relaxed.	Improved crossing facilities would assist with making people feel more relaxed.

Table 2.6 Junction 6 - A127/Wingletye Lane

Healthy Street Indicator	Comments / Observations	Suggested Areas for Improvement
Easy to cross	There are no pedestrian crossing facilities across Wingletye Lane or the A127 in this location. The A127 constitutes major severance between the development north and south of this road.	Consider feasibility of signalising this junction to introduce pedestrian crossing facilities.
Not too noisy	In the vicinity of the junction, the A127 is heavily trafficked and also subject to a 50mph speed limit and is therefore noisy.	Limited/no scope to improve this. Additional tree planting and landscaping would however provide a degree of noise mitigation.
People choose to walk, cycle and use public transport	In the vicinity of the junction, the A127 is subject to a 50mph speed limit and is heavily trafficked therefore people are unlikely to choose to walk and cycle through this junction. There are no bus stops in the vicinity of the junction	As above, consider feasibility of signalising the junction to introduce pedestrian crossing facilities.
People feel safe	The speed and volume of traffic along the A127 means that people are unlikely to feel safe. The junction is also fairly remote and lacks natural surveillance.	Signalisation of the junction would reduce vehicle speeds and provide an opportunity for pedestrian crossing facilities.
People feel relaxed	For the same reasons as given above for 'people feel safe', people are unlikely to feel relaxed.	As above.

Table 2.7 Junction 7 - A127/Hall Lane

Healthy Street Indicator	Comments / Observations	Suggested Areas for Improvement
Easy to cross	An uncontrolled pedestrian crossing with tactile paving and refuge island is provided where the A127 northbound offslip meets Hall Road, facilitating north-south movement along Hall Lane. There are no east-west crossings across Hall Lane although these are not considered to be necessary owing to the lack of development on either side of Hall Lane.	No interventions considered necessary
Not too noisy	The junctions are relatively lightly trafficked and not too noisy.	No interventions considered necessary
People choose to walk, cycle and use public transport	There is a shared foot/cycle provided along Hall Lane facilitating a traffic-free connection to the northern edge of Upminster to Pages Wood. There are no bus stops in the vicinity of the junction.	No interventions considered necessary

Healthy Street Indicator	Comments / Observations	Suggested Areas for Improvement
People feel safe	Hall Lane is relatively lightly trafficked and does benefit from a shared foot/cycle way, together with street lighting. Most people would likely feel safe using Hall Lane, particularly during the hours of daylight.	No interventions considered necessary
People feel relaxed	For the reasons identified above, it is also considered that most people would feel relaxed in this location.	No interventions considered necessary

Table 2.8 Junction 8 - A127 Front Lane

Healthy Street Indicator	Comments / Observations	Suggested Areas for Improvement
Easy to cross	There are no pedestrian crossing facilities on Front Lane. There is a staggered informal crossing over the A127 however this is not considered to be a safe crossing owing to the speed limit of the road (50mph), absence of tactile paving and the need to cross 4 lanes of traffic. We recommend that a survey is conducted and a Report produced to assess the existing usage of this crossing so as to inform future discussions about its retention, removal, or possible alteration.	There is limited development on the north side of the A127 in this location and therefore the demand for north-south pedestrian movement across this road is likely to be low therefore no interventions are considered necessary, except for the possible removal or alteration of the existing staggered crossing if deemed appropriate following further survey work.
Not too noisy	The speed and volume of traffic along the A127 means that it is noisy.	Limited/no scope to change this.
People choose to walk, cycle and use public transport	The nature of the A127 means that people are unlikely to choose to walk and cycle. The footway provision along both Front Lane and the A127 is also very narrow.	No interventions considered necessary owing to the character of the A127 in this location.
People feel safe	The nature of the A127 means that people are unlikely to feel safe.	No interventions considered necessary owing to the character of the A127 in this location.
People feel relaxed	The nature of the A127 means that people are unlikely to feel relaxed.	No interventions considered necessary owing to the character of the A127 in this location.

Table 2.9 Junction 9 - Marsh Way / A13 Junction

Healthy Street Indicator	Comments / Observations	Suggested Areas for Improvement
Easy to cross	Controlled pedestrian crossing facilities are provided on Marsh Way (North and South arms), the A13 westbound offslip, the A13 eastbound onslip, and Consul Avenue. There are no crossing facilities on the A13 westbound onslip, eastbound offslip, or Courier Road.	Consider provision of pedestrian crossing facilities on those arms without them at present, and also consider provision of a foot/cycleway along the western side of Marsh Way between the two roundabouts.
Not too noisy	Whilst the junction is busy, the relatively low speed of traffic means that the area is not too noisy.	No interventions considered necessary.
People choose to walk, cycle and use public transport	There is a shared foot/cycle way along Marsh Way facilitating north-south movement through this junction. There is also a shared foot/cycle path along Consul Avenue. There are a pair of bus stops on the north side of Marsh Way in close proximity to the junction, served by a 10 minute frequency service and accessed via good width footways.	Consideration implementation of infrastructure as outlined above, as well as installation of Advanced Stop Lines for cyclists.
People feel safe	The area is well lit and generally considered to feel safe.	No interventions considered necessary
People feel relaxed	The generally good pedestrian and cycle provision through the junction means that people are likely to feel reasonably relaxed.	No interventions considered necessary.

Table 2.10 Junction 10 - A13/A1306 Wennington Road (Wennington Interchange)

Healthy Street Indicator	Comments / Observations	Suggested Areas for Improvement
Easy to cross	The junction incorporates uncontrolled crossing facilities for pedestrians and cyclists but due to the volume and speed of traffic it is not considered easy to cross. However, pedestrian movement in the area is low and the installation of controlled crossing facilities is unlikely to be justified.	The crossing points lack tactile paving and this should be remedied to improve safety.
Not too noisy	The volume and speed of traffic means that the junction is noisy.	Little/no scope to improve this. Additional tree planting and landscaping would however provide a degree of noise mitigation.
People choose to walk, cycle and use public transport.	The A3106 incorporates a shared foot/cycle way along both sides of the carriageway and therefore is conducive to encouraging walking and cycling. The foot/cycle way	Consider resurfacing of the foot/cycle ways through the junction and the cutting back of vegetation.

Healthy Street Indicator	Comments / Observations	Suggested Areas for Improvement
	surface is however in a poor state of repair in various locations and the usable width is also impacted by overgrown vegetation in places. There are no bus stops in the vicinity of the junction.	
People feel safe	The junction is lit and does incorporate dedicated pedestrian and cycle facilities. However, the speed and volume of traffic, and lack of controlled crossings may mean that some people do not feel safe.	Consider feasibility of introducing a controlled pedestrian / cycle crossing to enhance safety.
People feel relaxed	The volume and speed of traffic through the junction means that people are unlikely to feel relaxed.	

Table 2.11 Junction 11 - A124/Station Road/B1421 (Bell Corner)

Healthy Street Indicator	Comments / Observations	Suggested Areas for Improvement
Easy to cross	There are signal controlled pedestrian crossing facilities with tactile paving across every arm of the junction.	No improvements considered necessary
Not too noisy	The speed of traffic is relatively low and therefore the junction is not too noisy.	No improvements considered necessary.
People choose to walk, cycle and use public transport	The junction is situated in a high street location and therefore pedestrian activity is fairly high. The footways on all arms of the junction are of a good width to accommodate the pedestrian flow. Cycle parking is also provided at locations close to the junction indicating that people also choose to cycle. There are bus stops located on all 4 approach arms of the junction although there are no bus priority facilities. The bus stops can all be accessed via good width footways and via the abovementioned crossings.	Consider provision of cyclist Advanced Stop Lines. Consider opportunities for bus priority measures to encourage modal shift.
People feel safe	The town centre location with high footfall levels combined with the presence of signal-controlled crossing facilities means that most people will feel safe. Street lighting is also provided.	No improvements considered necessary

Healthy Street Indicator	Comments / Observations	Suggested Areas for Improvement
People feel relaxed	For the same reasons as given for 'people feel safe', people are likely to feel relaxed.	No improvements considered necessary

2.4 Table 2.12 provides a summary of the suggested interventions at each junction based on the Healthy Streets assessment.

Table 2.12 Summary of suggested interventions based on Healthy Streets Assessment

Junction	Suggested Interventions
A12/A125 North Street/B175 Havering Road	Consider installation of controlled pedestrian crossing facilities. Consider implementing a camera enforced U-turn ban. Consider potential for bus priority measures
A12/Pettits Lane	Consider installation of controlled pedestrian crossing facilities on all arms. Consider implementing a camera enforced U-turn ban. Install tactile paving where required. Consider a more compact junction layout that is easier for pedestrians and cyclists to negotiate. Consider potential for bus priority measures.
A12/Harold Court Road	Consider provision of a controlled crossing facility on Harold Court Road as part of the junction layout.
A12/Gubbins Lane	Consider redesign of junction to incorporate improved pedestrian and cycle crossing facilities. Consider incorporating a camera-enforced U-turn ban and opportunities for bus priority measures.
A127/Ardleigh Green Road/Squirrels Heath	Consider installation of controlled crossing facilities, together with tactile paving. Consider opportunities for bus priority measures.
A127/Wingletye Lane	Consider feasibility of signalising this junction and adding pedestrian crossing facilities to reduce the impact of the north-south severance caused by the A127.
A127/Hall Lane	No interventions identified.
A127/Front Lane	No interventions identified
A13/Marsh Way	Consider provision of pedestrian crossing facilities on those arms without them at present, and also consider provision of a foot/cycleway along the western side of Marsh Way between the two roundabouts. Consider installation of Advance Stop Lines for cyclists.
A13/A1306 Wennington Road	The crossing points lack tactile paving and this should be remedied to improve safety. Consider resurfacing of the foot/cycle ways through the junction and the cutting back of vegetation.
A124 St Mary's Lane/Station Road/B1421 (Bell Corner)	Consider provision of cyclist Advanced Stop Lines and opportunities for bus priority measures.

3.0 ACCIDENT ANALYSIS

3.1 Cole Easdon obtained Personal Injury Accident Data for the most recent five-year period available (1st January 2018 and 31st December 2022) from TfL for all 11 junctions within the study area.

Study Area

3.2 The study area for each of the junctions is summarised in Table 3.1. Figures 3.1 to 3.11 show an aerial view[1] of each study area together with the locations of each accident. For each of the Figures below, green dots represent a slight accident whilst blue dots represent a serious accident and red dots represent a fatal accident.

Table 3.1: Personal Injury Accident Study Area

Junction	Study Area
1: A12 / North Street	▪ North Street between Eastern Avenue in the north and Romford bus garage in the south; ▪ Havering Road between Eastern Avenue in the south and Collier Row Lane in the north; and ▪ Eastern Avenue between the access into the Dunelm store in the west and the Texaco petrol station in the east.
2: A12 / Petits Lane	▪ Petits Lane from the junction with Heather Gardens in the north across the A12 junction to Marshalls Academy in the south; and ▪ Eastern Avenue between Heather Avenue in the west and Rise Park Boulevard in the east.
3: A12 / Harold Court Road	▪ Harold Court Road between Colchester Road in the north and Church Road / Ingreway in the south; and ▪ Colchester Road between Geoffrey Avenue in the west and Maylands Way in the east.
4: A12 / Gubbins Lane	▪ Gubbins Lane between Colchester Road in the north and Ridgeway in the south; ▪ Gooshays Drive between Colchester Road in the south and Camborne Avenue in the north; and ▪ Colchester Road between Kersey Gardens / New Hall Drive in the west and Avenue Road in the east.
5: A127 / Ardleigh Green Road	▪ Ardleigh Green Road between Southend Arterial Road in the east and Ardleigh Close in the west; ▪ Squirrels Heath Road between Southend Arterial Road in the west and Redden Court Road in the east; and ▪ Southend Arterial Road between Bryant Avenue in the northwest and Cecil Avenue in the southeast.
6: A127 / Wingletye Lane	▪ Wingletye Lane between Southend Arterial Road in the north and Essex Gardens in the south; and ▪ Southend Arterial Road between Redden Court Road in the northwest and the BP petrol station in the southeast.
7: A127 / Hall Lane	▪ Hall Lane to the north and south of the Southend Arterial Road including slip roads; and ▪ Southend Arterial Road either side of the Hall Lane interchange.

[1] Source: Transport for London

Junction	Study Area
8: A127 / Front Lane	▪ Front Lane between Southend Arterial Road in the north and Oak Royal Nurseries; and ▪ Southend Arterial Road between Wanderers Haven Animal Sanctuary and Cranham Leisuresales.
9: A13 / Marsh Lane	▪ Marsh Way between the C2C Railway line in the north and western access into CEME; and ▪ Slip roads onto the A13 to the east and west of the Marsh Way interchange.
10: A13 / A1306	▪ Aerial Road between Redcorn in the south and the A13/A1306 interchange; ▪ New Road between A13/A1306 interchange in the south and Sandy Lane in the north; and ▪ Slip roads onto the A13 either side of the A13/A1306 interchange.
11: St Mary's Lane / Station Road	▪ Station Road between St Mary's Lane in the south and Upminster Station in the north; ▪ Corbets Tey Road between St Mary's Lane in the north and the southern boundary of Upminster Park in the south; and ▪ St Mary's Lane between Cranbourne Gardens in the west and the Waitrose supermarket in the east.

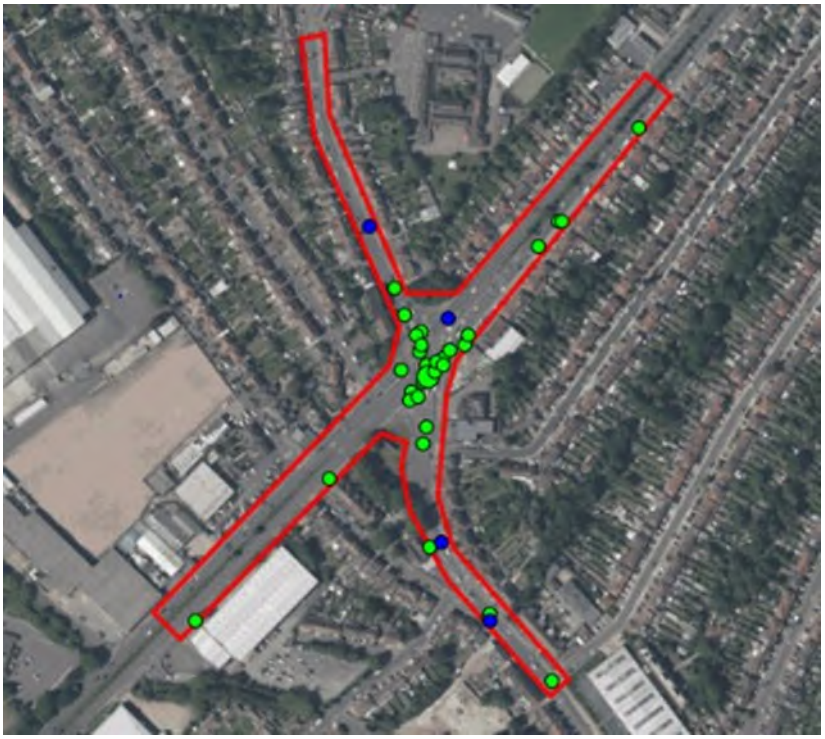


Figure 3.1: Collision Study Area – A12 / North Street

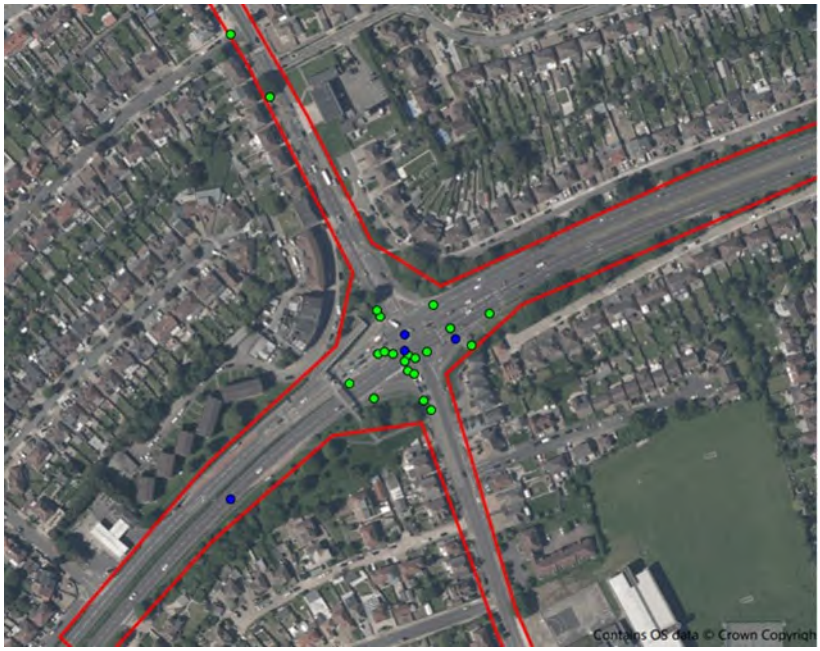


Figure 3.2: Collision Study Area – A12 / Pettits Lane

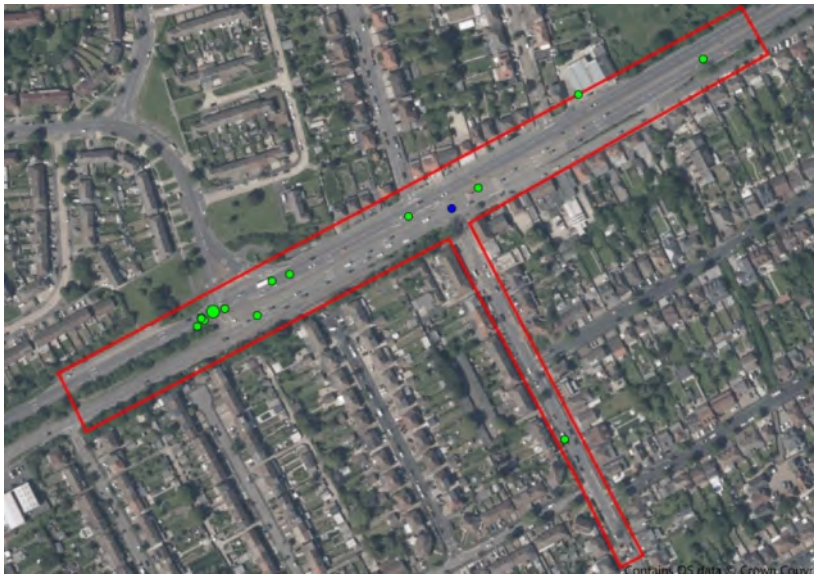


Figure 3.3: Collision Study Area – A12 / Harold Court Road

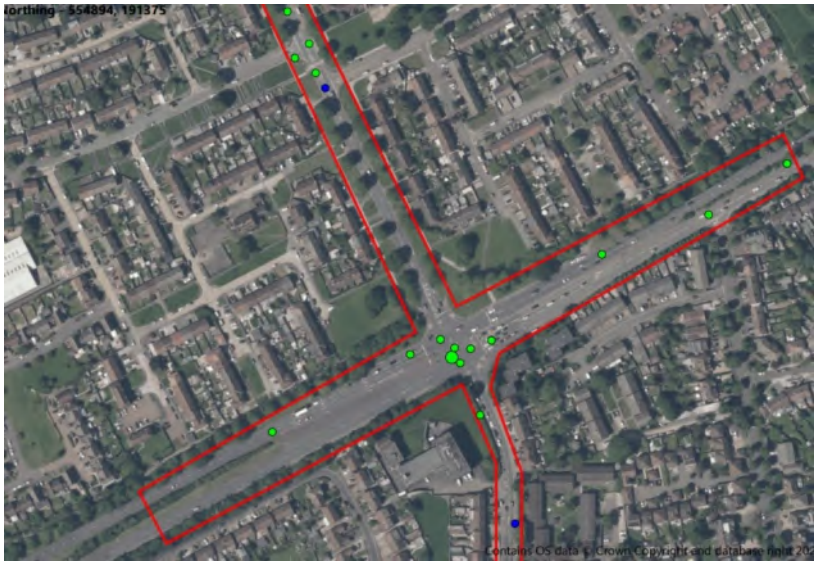


Figure 3.4: Collision Study Area – A12 / Gubbins Lane

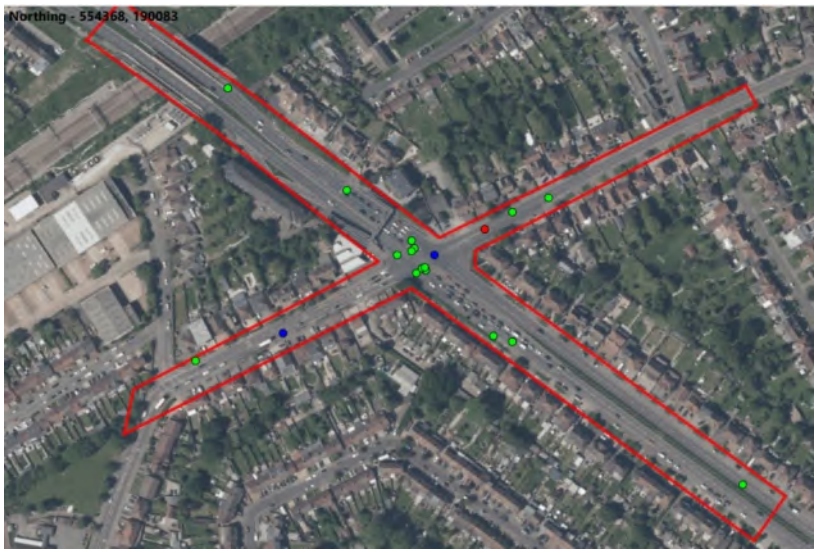


Figure 3.5: Collision Study Area – A127 / Ardleigh Green Road

Figure 3.6: Collision Study Area – A127 / Wingletye Lane

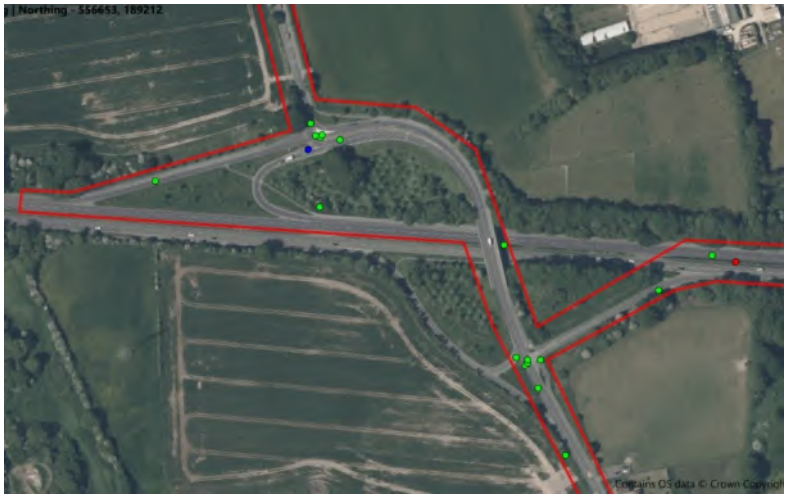


Figure 3.7: Collision Study Area – A127 / Hall Lane

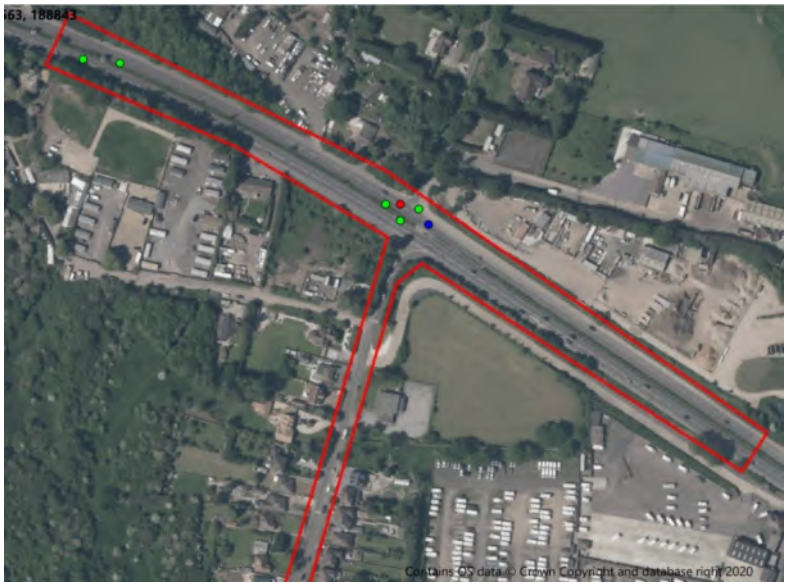


Figure 3.8: Collision Study Area – A127 / Front Lane

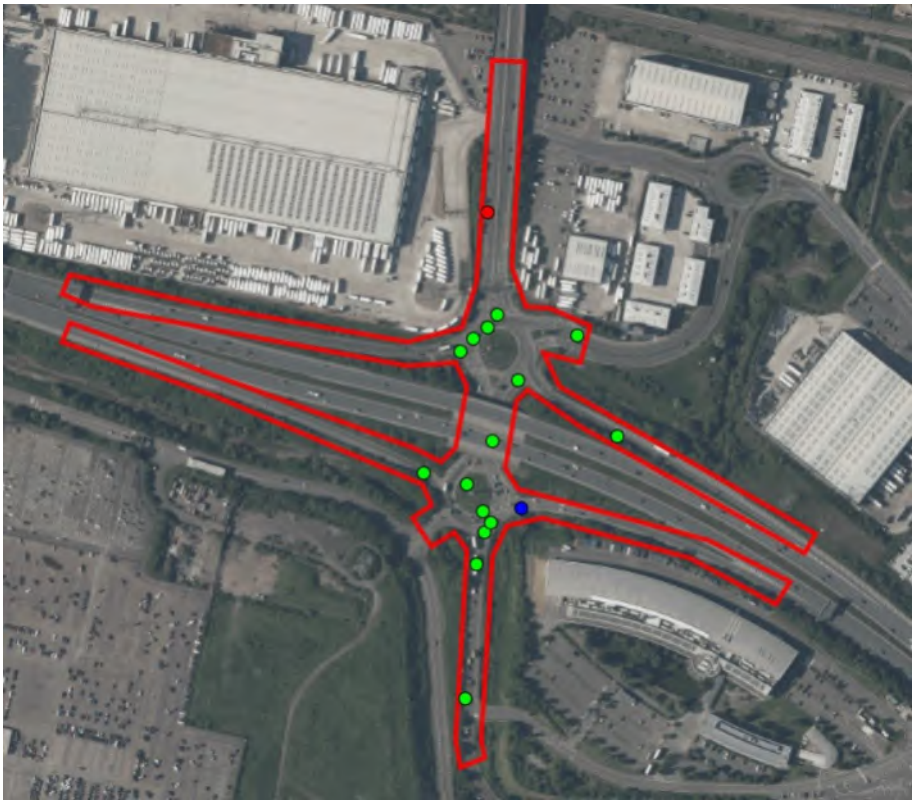


Figure 3.9: Collision Study Area – A13 / Marsh Way

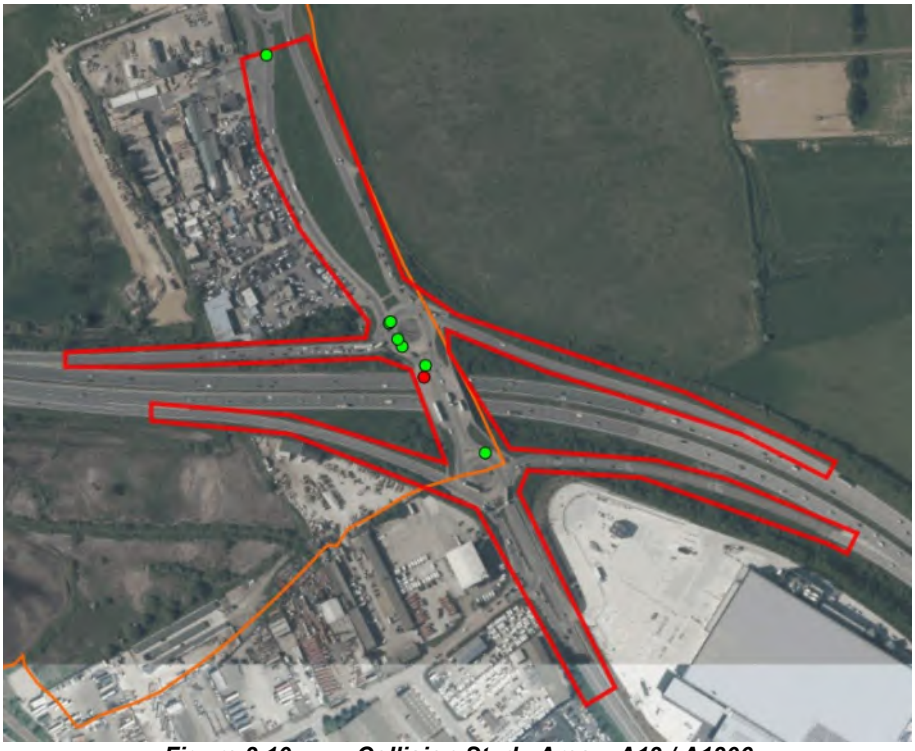


Figure 3.10: Collision Study Area – A13 / A1306

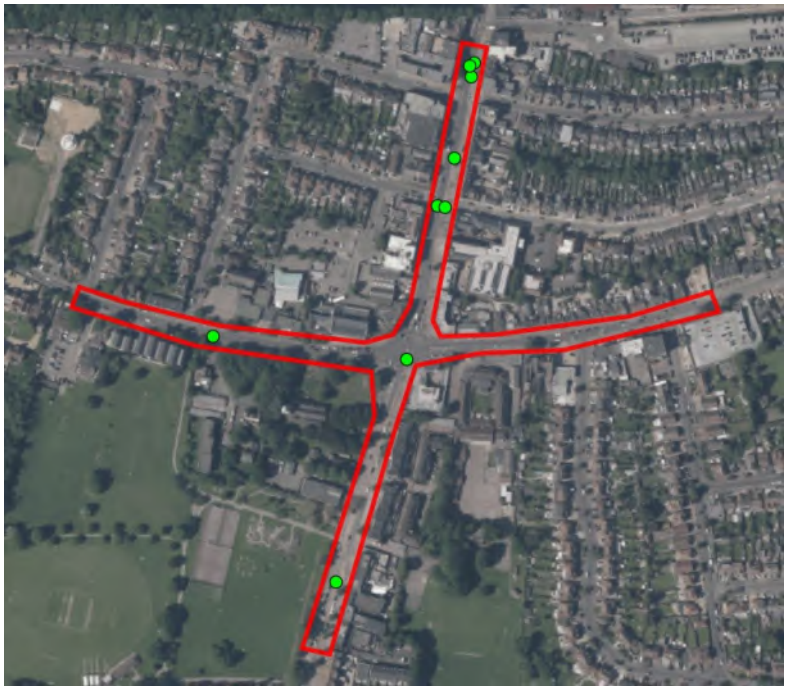


Figure 3.11: Collision Study Area – St Mary's Lane / Station Road

Accidents by Year

3.3 Table 3.2 provides a summary of the number of accidents recorded at each junction by year.

Table 3.2: Personal Injury Accidents by Year

Junction	2018	2019	2020	2021	2022	Total
1: A12 / North Street	8	9	7	6	8	38
2: A12 / Petits Lane	6	5	4	6	4	25
3: A12 / Harold Court Road	5	6	2	1	2	16
4: A12 / Gubbins Lane	7	0	6	0	6	19
5: A127 / Squirrels Heath Road	4	3	3	3	6	19
6: A127 / Wingletye Lane	3	0	2	1	2	8
7: A127 / Hall Lane	5	5	3	2	4	19
8: A127 / Front Lane	1	2	1	1	2	7
9: A13 / Marsh Lane	6	3	1	5	2	17
10: A13 / A1306	1	3	3	0	1	8
11: St Mary's Lane / Station Road	2	5	0	0	2	9
TOTAL	**48**	**41**	**32**	**25**	**39**	**185**

3.4 From Table 3.2 it can be seen that the junction with the highest number of accidents is that of the A12 with North Street, accounting for approximately 20% of the total number of accidents across the 11 junctions analysed, whilst some 13.5% of the total number of accidents occurred at the A12 / Pettits Lane junction. These two junctions combined account for a third of all accidents recorded within the study area. The A12/North Street junction averages greater than 1 accident every 2 months over the study period (38 accidents in 60 months). The junction with the fewest number of accidents is the A127/Front Lane with just 7 over the 5 year period analysed.

3.5 It is recommended that a more detailed review is conducted in particular of the A12 / North Street, A12 / Pettits Lane, A12 Gubbins Lane, A127 Ardleigh Green Road and Hall Lane junctions with regard to possible safety improvements (including the carrying out of Road Safety Audits). This Report has already identified deficiencies with the pedestrian crossing facilities at these junctions (and others), together with the high numbers of U-turn manouevres that occur at these junctions which should also be considered as part of any future mitigation measures. Independent Road Safety Audits of the two junctions with the highest number of accidents may help to identify possible remedial measures.

Accidents by Severity

3.6 Table 3.3 provides a summary of the number of accidents recorded at each junction by severity.

Table 3.3: Personal Injury Accidents by Severity

Junction	Slight		Serious		Fatal	
	Accidents	Casualties	Accidents	Casualties	Accidents	Casualties
1: A12 / North Street	35	59	3	3	0	0
2: A12 / Petits Lane	21	36	4	4	0	0
3: A12 / Harold Court Road	15	29	1	1	0	0
4: A12 / Gubbins Lane	17	26	2	2	0	0
5: A127 / Ardleigh Green Road	16	30	2	4	1	2
6: A127 / Wingletye Lane	8	15	0	0	0	0
7: A127 / Hall Lane	17	30	1	1	1	1
8: A127 / Front Lane	5	7	1	1	1	1
9: A13 / Marsh Lane	15	18	1	1	1	1
10: A13 / A1306	7	8	0	0	1	1
11: St Mary's Lane / Station Road	9	11	0	0	0	0
TOTAL	**165**	**269**	**15**	**17**	**5**	**6**

3.7 Table 3.3 indicates that there have been some 20 serious and fatal accidents within the study area, accounting for approximately 11% of the total number of accidents. The largest concentration of serious accidents occurred at the A12/North Street and A12/Pettits Lane junctions, accounting for 7 out of the 15 accidents. The five fatal accidents were spread amongst 5 different junctions indicating that no one junction is especially problematic in that regard.

Accidents by Type

3.8 Table 3.4 provides a summary of the number of accidents recorded at each junction by vehicles involved.

Table 3.4 Personal Injury Accidents by Type

Type	Junction 1	Junction 2	Junction 3	Junction 4	Junction 5	Junction 6	Junction 7	Junction 8	Junction 9	Junction 10	Junction 11	TOTAL
Car / Pedestrian	3		1								3	7
Car	3				1	1	1	2	2	1		11
Car / Car	13	12	5	9	5	3	12	2	7	6	1	75
X3 Car	3	3	1		3		1					11
X4 Car	1		1		2	1						5
Car / LGV	2	1	4	1	2	1	1	1	1	1		15

Type	Junction 1	Junction 2	Junction 3	Junction 4	Junction 5	Junction 6	Junction 7	Junction 8	Junction 9	Junction 10	Junction 11	TOTAL
Car / HGV			1				1		2			4
Car / Motorcycle	4	2		3		1	1	1	1			13
Car / Taxi	1	1				1						3
Car / Pedal Cycle	4	1		3							1	9
Car / Bus	1								1			2
Car / Minibus		1										1
Car / Other Vehicle											1	1
Bus Passenger	1	1		1							2	5
LGV / HGV	1		1									2
X2 Car / LGV	1		1		1		1					4
X2 Car / Minibus											1	1
X3 Car / LGV				1								1
X3 Car / HGV									1			1
X2 Car / X2 LGV		1										1
LGV / LGV					1							1
X2 LGV / Car			1									1
Motorcycle / LGV		1					1					2
Motorcycle / Taxi		1										1
Motorcycle / Other					1							1
Motorcycle / Ambulance									1			1
Motorcycle					1							1
Taxi / Wildlife				1								1
Minibus / LGV					1							1
X7 Car / LGV / X2 Pedestrian					1							1
2x Car / HGV / Other								1				1
LGV / Pedal Cycle									1			1

3.9 Table 3.4 reveals that there have been relatively few accidents involving pedestrians and cyclists across the 11 junctions, with just 8 involving pedestrians and 9 involving cyclists. A total of 7 of these occurred at the A12 / North Street junction, which also has the highest overall number of accidents. The low number of accidents involving pedestrians and cyclists generally across the study area is likely to be due to the characteristics of the junctions assessed. Pedestrian and cycle activity is likely to be relatively low owing to the high volume and speed of traffic, together with the provision of relatively poor pedestrian and cycle crossing facilities in the majority of locations.

3.10 The most common accident type involved two cars colliding. This is unsurprising given the high number of signalised junctions in particular, where rear shunt type accidents are common, together with accidents resulting from drivers disobeying traffic signals.

Summary

3.11 The analysis in this Section has shown there to be a high number of accidents occurring at two of the junctions within the study area, these being the A12 / North Street and the A12 / Pettits Lane. The Healthy Streets analysis within Section 2.0 of the Report identified a recommendation for improved pedestrian crossing facilities at these junctions as well as consideration being given to the banning of U-turn manouevres, which are considered to be particularly dangerous. Other junctions including the A12 / Gubbins Lane, A127 / Ardleigh Road Green and A127 / Hall Lane also had relatively high numbers of accidents (19 each). We recommend that Road Safety Audits are carried out at the North Street, Pettits Lane, Gubbins Lane, Ardleigh Green Road and Hall Lane junctions to allow possible further remedial measures to be identified.

3.12 With the LTC forecast to increase traffic flows through the Ardleigh Green Road and Hall Lane junctions (as discussed within the next Section) it is recommended that specific consideration is given to safety mitigation measures that could be implemented at these junctions.

3.13 It should also be noted that, as explained within the next Section, that National Highways have not modelled the left turn flow from the A127 onto Wingletye Lane, where the LTC is predicted to increase this movement by 222 PCUs in the AM peak and 117 PCUs in the PM peak. Given the presence of two schools on Wingletye Lane in the vicinity of the A127 junction, we recommend that specific further work is carried out examining the potential requirements for safety improvements at this junction and more generally along Wingletye Lane.

4.0 JUNCTION MODELLING

4.1 This Section sets out the results of the capacity modelling carried out at the 11 junctions with the study area. To inform the modelling, turning counts were undertaken at the junctions between the hours of 0700-1900 on 10th, 11th and 12th May 2023.

4.2 The changes in flows caused by the LTC are taken from the National Highways 2030 LTAM. These flows were incorporated into the local models to create a 2030 "with LTC" scenario at each of the 11 modelled junctions.

4.3 The following junctions have been modelled using Linsig V3.1:

- A12/North Street/B175 Havering Road;
- A12 Eastern Avenue/Pettits Lane/Pettits Lane North;
- A12 Colchester Road/Harold Court Road;
- A12 Colchester Road/Gubbins Lane/Gooshays Drive;
- A127 Southend Arterial Road/Ardleigh Green Road/Squirrels Heath Road;
- A127 Southend Arterial Road/Wingletye Lane;
- A127 Southend Arterial Road/Front Lane;
- A13/Marsh Way;
- A124 St Mary's Lane/Station Road/B1421 Corbetts Tey Road (Bell Corner).

4.4 The following junctions have been modelled using Junctions 10:

- A127 Southend Arterial Road/Hall Lane;
- A13/A1306 Wennington Road (Wennington Interchange).

4.5 The junctions have been modelled for the following scenarios:

- 2023 Base utilising data from CCTV surveys conducted during May 2023;
- 2030 (Do Minimum) through application of a TEMPRO growth factor to the 2023 surveyed flow;
- 2030 Base + Lower Thames Crossing (Do Something).

4.6 In common with the modelling conducted by National Highways in support of their planning application to build the Lower Thames Crossing, the junctions have been modelled for the time periods of 0700-0800 and 1700-1800. It should be noted, however, that only 6% of the peak hours as surveyed at the various junctions matched these two modelled hour peaks. Refer to Table 4.1 below for the surveyed peak hours at the junctions considered.

Table 4.1: Surveyed Peak Hours

	Wednesday 10th May 2023		Thursday 11th May 2023		Friday 12th May 2023	
Junction 1 - A12 / North Street						
	AM	PM	AM	PM	AM	PM
Surveyed peak hours	07:45 to 08:45	17:30 to 18:30	07:30 to 08:30	17:00 to 18:00	07:30 to 08:30	17:15 to 18:15
Junction 2 - A12 / Pettits Lane						
	AM	PM	AM	PM	AM	PM
Surveyed peak hours	07:45 to 08:45	17:15 to 18:15	08:00 to 09:00	17:00 to 18:00	07:30 to 08:30	17:15 to 18:15
Junction 3 - A12/Harold Court Road						
	AM	PM	AM	PM	AM	PM
Surveyed peak hours	07:00 to 08:00	17:15 to 18:15	07:30 to 08:30	17:00 to 18:00	07:45 to 08:45	17:00 to 18:00
Junction 4 - A12/Gubbins Lane						
	AM	PM	AM	PM	AM	PM
Surveyed peak hours	07:30 to 08:30	17:15 to 18:15	07:30 to 08:30	17:00 to 18:00	07:30 to 08:30	17:00 to 18:00
Junction 5 - A127/Ardleigh Green Road						
	AM	PM	AM	PM	AM	PM
Surveyed peak hours	07:15 to 08:15	16:30 to 17:30	07:15 to 08:15	16:15 to 17:15	07:15 to 08:15	17:45 to 18:45
Junction 6 - A127/Wingletye Lane						
	AM	PM	AM	PM	AM	PM
Surveyed peak hours	07:00 to 08:00	17:00 to 18:00	07:15 to 08:15	16:30 to 17:30	07:15 to 08:15	17:15 to 18:15
Junction7A - A127 - Hall Lane						
	AM	PM	AM	PM	AM	PM
Surveyed peak hours	07:30 to 08:30	16:45 to 17:45	07:30 to 08:30	16:30 to 17:30	07:45 to 08:45	16:00 to 17:00
Junction7B - A127 - Hall Lane						
	AM	PM	AM	PM	AM	PM
Surveyed peak hours	07:30 to 08:30	17:30 to 18:30	07:45 to 08:45	16:15 to 17:15	07:45 to 08:45	16:00 to 17:00
Junction 8 - A127/Front Lane						
	AM	PM	AM	PM	AM	PM
Surveyed peak hours	07:00 to 08:00	16:45 to 17:45	07:00 to 08:00	16:30 to 17:30	07:15 to 08:15	16:45 to 17:45
Junction 9A - A13 - Marsh Way						
	AM	PM	AM	PM	AM	PM
Surveyed peak hours	09:30 to 10:30	16:30 to 17:30	07:45 to 08:45	16:15 to 17:15	07:30 to 08:30	16:15 to 17:15
Junction 9B - A13 - Marsh Way						
	AM	PM	AM	PM	AM	PM
Surveyed peak hours	09:00 to 10:00	16:30 to 17:30	07:30 to 08:30	16:15 to 17:15	07:30 to 08:30	16:15 to 17:15
Junction 10A - A13/A1306						
	AM	PM	AM	PM	AM	PM

Junction 10A - A13/A1306						
Surveyed peak hours	08:00 to 09:00	16:45 to 17:45	07:30 to 08:30	16:15 to 17:15	07:30 to 08:30	16:00 to 17:00
Junction 10B - A13/A1306						
	Wednesday 10th May 2023		Thursday 11th May 2023		Friday 12th May 2023	
	AM	PM	AM	PM	AM	PM
Surveyed peak hours	08:00 to 09:00	16:15 to 17:15	07:30 to 08:30	16:15 to 17:15	07:15 to 08:15	16:00 to 17:00
Junction 11 - St Mary's Lane - Station Road						
	Wednesday 10th May 2023		Thursday 11th May 2023		Friday 12th May 2023	
	AM	PM	AM	PM	AM	PM
Surveyed peak hours	07:30 to 08:30	17:15 to 18:15	07:30 to 08:30	17:00 to 18:00	08:00 to 09:00	17:00 to 18:00

4.7 From Table 4.1 it can be seen that the surveyed peak hours at the majority of the junctions considered do not coincide with the peak hours modelled by National Highways. It is noted that the LTAM models the network peaks (0700-0800 and 1700-1800) for the Strategic Road Network (specifically the M25). Naturally, the peak hour at local junctions will vary according to local factors such as the nearby presence of schools and colleges and large employment sites for example. However, in many cases (though not all), the flows modelled by National Highways were higher than the surveyed 2023 0700-0800 and 0800-0900 flows, and therefore the overall difference in modelling outcomes is unlikely to be significantly changed.

4.8 There may be some merit, as part of a future study, in conducting further modelling of the junctions to suit the 2023 surveyed peak hours so that the performance of each of the junctions during the local peak hours can be better understood. Notwithstanding this, the interventions and recommendations identified in this Report are still considered to be valid and representative in light of the fact that the differences in flows between the modelled peaks and the local peaks are unlikely to be particularly significant.

4.9 The following TEMPRO growth factors were derived to obtain the 2030 base flows from the 2023 surveyed flows as set out in Table 4.2.

Table 4.2: 2023 to 2030 Tempro Growth Factors

AM Weekday		**RTF15 (Sc1 Table 1, London)**	**Tempro Weekday AM Peak for Local Area (ORIGIN / DESTINATION)**	**Tempro Average Weekday for London (ORIGIN / DESTINATION)**	**(A*B)/C**
Year From	Year To	A	B	C	D
2023	2030	1.0591	1.0519	1.0645	1.0466
PM Weekday		RTF15 (Sc1 Table 1, London)	Tempro Weekday PM Peak for Local Area (ORIGIN / DESTINATION)	Tempro Average Weekday for London (ORIGIN / DESTINATION)	(A*B)/C

AM Weekday		RTF15 (Sc1 Table 1, London)	Tempro Weekday AM Peak for Local Area (ORIGIN / DESTINATION)	Tempro Average Weekday for London (ORIGIN / DESTINATION)	(A*B)/C
Year From	Year To	A	B	C	D
2023	2030	1.0591	1.0575	1.0645	1.0521

* Tempro Geographical Area - E02000472 : Havering 009 (2011 super output area - middle layer)

4.10 It should be noted that the flows in the LTAM were growthed to 2030 utilising data from known/planned committed developments rather than through application of a TEMPRO growth factor. This is considered to be a conservative approach which may underestimate the flows.

4.11 The following tables set out the results of the junction performance modelling that has been undertaken at each of the 11 junctions, together with the relevant traffic flows. The following definitions apply to the various junction modelling results tables that follow:

- *Do Minimum (DM)* – the baseline case (i.e. without the LTC being built);
- *Do Something (DS)* – with the project i.e. the LTC built and operational;
- *Practical Reserve Capacity (PRC)* – the reserve (spare) capacity at a junction. A negative value indicates that the demand on the junction exceeds 100% of its capacity;
- *Mean Max Queue (MMQ)* - The Mean Maximum Queue is the sum of the Maximum Back of Uniform Queue and the Random & Oversaturation Queue. It represents the maximum queue within a typical cycle averaged over all the cycles within the modelled time period. When a Lane is oversaturated the Maximum Queue within each cycle will grow progressively over the modelled time period. This means that the Mean Maximum Queue will be approximately half the final queue at the end of the modelled time period;
- *Ratio of Flow to Capacity* - The ratio of flow to capacity provides a measure of the utilised capacity of a junction approach arm. Arms exceeding a ratio of 0.85 (i.e. 85% capacity utilised) are considered to be approaching capacity at which point, queueing and delays start to increase;
- *Delay* – the average delay incurred by each vehicle arriving at the junction;
- *Level of Service* (LOS) – This refers to the unsignalised, and equivalent signalised, level of service values for the time segment, based on the Average Delay per Arriving Vehicle. The transportation LOS system uses the letters A through F, with the definitions below being typical: A = Free flow B = Reasonably free flow C = Stable flow D = Approaching unstable flow E = Unstable flow F = Forced or breakdown flow; and
- *Passenger Car Units (PCUs)* - A Passenger Car Unit is a measure used primarily to assess highway capacity, for modelling purposes. Different vehicles are assigned different values,

according to the space they take up. A car has a value of 1; smaller vehicles will have lower values, and larger vehicles will have higher values.

A12/North Street Junction

4.12 The traffic flows associated with each of the modelled scenarios are shown in Table 4.3 whilst the junction performance results are shown in Table 4.4.

Table 4.3: A12 / North Street Traffic Flows

2023 AM

		A	B	C	D	Tot
Havering Road	A	0	60	423	139	622
A12 (N)	B	152	0	168	1314	1634
North Street	C	328	164	0	165	657
A12 (S)	D	66	1128	234	0	1428
	Tot	546	1352	825	1618	4341

2023 PM

	A	B	C	D	Tot
A	0	66	382	123	571
B	241	0	165	1172	1578
C	454	193	0	233	880
D	103	1176	266	0	1545
Tot	798	1435	813	1528	4574

2030 AM

		A	B	C	D	Tot
Havering Road	A	0	63	443	145	651
A12 (N)	B	159	0	176	1375	1710
North Street	C	343	172	0	173	688
A12 (S)	D	69	1181	245	0	1495
	Tot	571	1416	864	1693	4544

2030 PM

	A	B	C	D	Tot
A	0	69	402	129	600
B	254	0	174	1233	1661
C	478	203	0	245	926
D	108	1237	280	0	1625
Tot	840	1509	856	1607	4812

2030 DS AM

		A	B	C	D	Tot
Havering Road	A	0	66	444	151	661
A12 (N)	B	162	0	179	1378	1719
North Street	C	335	168	0	194	697
A12 (S)	D	83	1186	232	0	1501
	Tot	580	1420	855	1723	4578

2030 DS PM

	A	B	C	D	Tot
A	0	69	402	138	609
B	257	0	165	1235	1657
C	477	204	0	244	925
D	101	1251	276	0	1628
Tot	835	1524	843	1617	4819

Table 4.4: Linsig Modelling results of the A12/North Street/Havering Road signalised Junction

Junction 1 - A12 / North Street					
	Practical Reserve Capacity (%)	MMQ			
		A Havering Road	B A12 (NE)	C North Street	D A12 (SW)
2023 AM	-22.1	41.2 / 4.8	76.6 / 15.2	11.0/6.7	17.7 / 68.4
2023PM	-28.2	48.5 / 4.8	45.8 / 13.2	69.6 / 12.3	22.5 / 91.5
2030 AM Reference Case	-27.9	53.5 / 5.7	100.6 / 16.7	11.8 / 7.7	19.3 / 88.6
2030 PM Reference Case	-34.9	61.3 / 5.2	97.2 / 14.5	90.9 / 16.7	26.6 / 116.7
2030 Do Something AM	-28.0	55.9 / 6.3	42.0 / 29.0	11.5 / 7.2	53.2 / 44.8
2030 Do Something PM	-34.2	61.3 / 6.2	34.2 / 21.9	89.8 / 17.1	79.3 / 74.9

4.13 Table 4.4 shows that the A12 junction with Havering Road and North Street is currently over capacity. This will worsen going forward without intervention. It would appear from the National Highways predicted traffic flows that some traffic will divert from this junction as a result of the LTC, however, the junction will remain over-capacity. Given the results shown in the above table, it is considered unlikely that alterations to this junction alone will remedy the issues encountered here. It will require a strategic approach to consider options for potential traffic reassignment onto other routes, possible banned turning movements, together with modal shift (noting that bus services operate along the A12 corridor as well as along North Street and Havering Road.

A12/Pettits Lane Junction

Table 4.5: A12 / Pettits Lane Traffic Flows

2023 AM

		A	B	C	D	Tot
Pettits Lane (N)	A	0	303	241	51	595
A12 (E)	B	377	0	208	1546	2131
Pettits Lane (S)	C	190	133	0	30	353
A12 (W)	D	54	1351	96	0	1501
	Tot	621	1787	545	1627	4580

2023 PM

	A	B	C	D	Tot
A	0	253	241	65	559
B	438	0	140	1444	2022
C	315	213	0	68	596
D	92	1328	107	0	1527
Tot	845	1794	488	1577	4704

2030 AM

2030 PM

		A	B	C	D	Tot
Pettits Lane (N)	A	0	317	252	53	622
A12 (E)	B	395	0	218	1618	2231
Pettits Lane (S)	C	199	139	0	31	369
A12 (W)	D	57	1414	100	0	1571
	Tot	651	1870	570	1702	4793

	A	B	C	D	Tot
A	0	266	254	68	588
B	461	0	147	1519	2127
C	331	224	0	72	627
D	97	1397	113	0	1607
Tot	889	1887	514	1659	4949

2030 DS AM

		A	B	C	D	Tot
Pettits Lane (N)	A	0	379	251	39	669
A12 (E)	B	434	0	219	1642	2295
Pettits Lane (S)	C	211	144	0	31	386
A12 (W)	D	56	1450	85	0	1591
	Tot	701	1973	555	1712	4941

2030 DS PM

	A	B	C	D	Tot
A	0	289	253	69	611
B	492	0	147	1511	2150
C	332	226	0	76	634
D	96	1418	110	0	1624
Tot	920	1933	510	1656	5019

Table 4.6: Linsig Modelling results of the A12/Pettis Lane signalised Junction

Junction 2 - A12 / Pettits Lane					
	PRC	MMQ			
		A Pettits Lane (N)	B A12 (NE)	C Pettits Lane (S)	D A12 (SW)
2023 AM	8.6	8.0 / 1.4	17.3 / 15.3 / 14.5	5.5 / 5.9	14.5 / 14.1 / 15.3
2023 PM	3.9	6.7 / 1.7	20.0 / 20.0 / 14.7	10.2 / 8.3	15.5 / 16.1 / 16.4
2030 AM	3.9	8.8 / 1.4	19.0 / 16.3 / 16.4	5.8 / 6.5	15.8 / 15.2 / 17.0
2030 PM	-3.6	7.3 / 1.8	21.8 / 21.9 / 16.8	11.1 / 10.8	17.7 / 18.1 / 18.6
2030 Do Something AM	7.7	8.6 / 1.0	23.6 / 23.5 / 13.9	6.1 / 5.9	15.0 / 15.6 / 15.7
2030 Do Something PM	-5.5	7.3 / 1.8	21.7 / 21.8 / 19.1	11.3 / 11.0	20.1 / 20.5 / 21.3

4.14 The A12 junction with Pettits Lane currently has spare capacity. In 2030 the junction capacity will reduce, remaining positive in the AM peak but will become slightly over-capacity in the PM. It would appear from the surveys undertaken that this junction has a significantly higher volume of traffic travel through it in the PM peak than the AM peak. The impact of the LTC as shown by the 'Do Something' results indicate only a small impact on PRC in the PM peak and a small improvement in PRC in the AM peak. There may be opportunities to improve this junction to cater for the future growth of traffic through this junction. The junction is already very large and therefore physical widening through the addition of lanes is unlikely to be justified, however possible mitigation could include refinement of the signal timings. There could also be merit in a wider study examining the impact of banning U-turn manoeuvres at this junction, where a high number of such manoeuvres were captured by the surveys.

4.15 As evidenced by Section 2.0 of this Report, this junction would benefit from significant enhancements to the pedestrian crossing facilities, where these are considered by Cole Easdon to be unsatisfactory at present. It is noted of course that the addition of new pedestrian crossing facilities would impact on the performance of the junction with regard to vehicle capacity and therefore further modelling and associated design work would be necessary to determine the extent of improvements that could be delivered.

A12/Harold Court Road Junction

Table 4.7: A12 / Harold Court Road Traffic Flows

2023 AM

		A	B	C	Tot
A12 (W)	A	0	1597	123	1720
A12 (E)	B	2125	0	56	2181
Harold Court Road	C	151	0	0	151
	Tot	2276	1597	179	4052

2023 PM

	A	B	C	Tot
A	0	1507	136	1643
B	1995	0	63	2058
C	206	0	0	206
Tot	2201	1507	199	3907

2030 AM

		A	B	C	Tot
A12 (W)	A	0	1671	129	1800
A12 (E)	B	2224	0	59	2283
Harold Court Road	C	158	0	0	158
	Tot	2382	1671	188	4241

2030 PM

	A	B	C	Tot
A	0	1586	143	1729
B	2099	0	66	2165
C	217	0	0	217
Tot	2316	1586	209	4111

2030 DS AM

		A	B	C	Tot
A12 (W)	A	0	1368	129	1497
A12 (E)	B	2330	0	97	2427
Harold Court Road	C	141	0	0	141
	Tot	2471	1368	226	4065

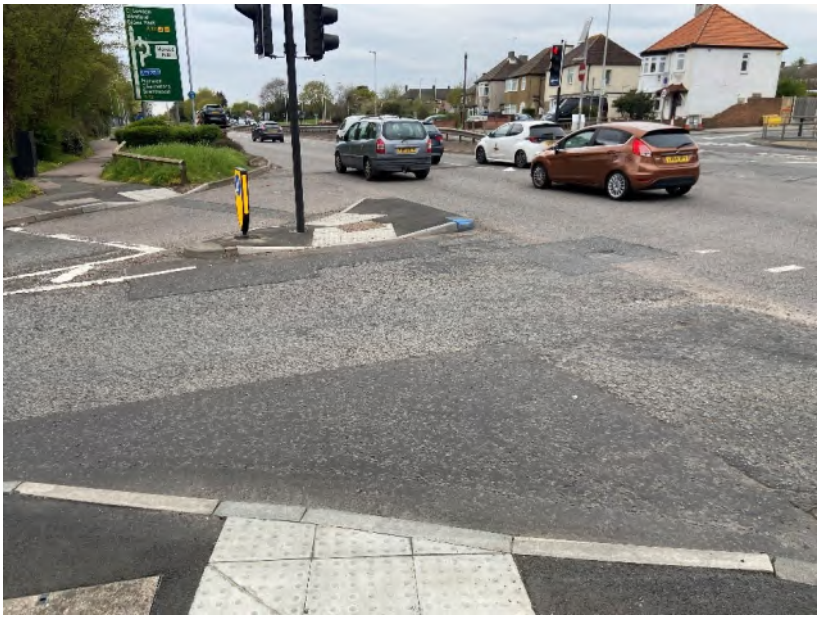
2030 DS PM

	A	B	C	Tot
A	0	1541	144	1685
B	2070	0	66	2136
C	226	0	0	226
Tot	2296	1541	210	4047

Table 4.8: Linsig Modelling results of the A12/Harold Court Road signalised Junction

Junction 3 - A12/ Harold Court Road				
	PRC	MMQ		
		A A12 Eastbound	B A12 Westbound	C Harold Court Road
2023 AM	10.7	2.1 / 3.9	8.9 / 11.2	5.2
2023 PM	17.4	1.6 / 3.5	8.8 / 10.0	6.0
2030 AM	5.8	2.8 / 4.2	9.6 / 12.4	5.5
2030 PM	11.5	2.1 / 3.6	9.8 / 11.6	6.2
2030 Do Something AM	15.3	1.1 / 4.2	10.6 / 14.6	4.7
2030 Do Something PM	14.8	1.8 / 3.6	9.6 / 11.2	6.6

4.16 The A12 junction with Harold Court Road currently operates with reserve capacity. In 2030 the junction capacity will reduce but remain positive. It would appear from the flows predicted in the Do Something scenario that traffic will divert from this junction as a result of the LTC, with the junction experiencing increases in PRC. The junction has a very unsatisfactory pedestrian crossing on Harold Court Road (with a particularly narrow pedestrian refuge island) as shown in Photograph 4.1 and it is recommended that an improvement scheme is considered in this regard.



Photograph 4.1: Informal crossing facility on Harold Court Road

A12/Gubbins Lane Junction

Table 4.9: A12 / Gubbins Lane Traffic Flows

2023 AM

		A	B	C	D	Tot
Gooshays Lane	A	0	45	405	89	539
A12 (E)	B	311	0	104	1464	1879
Gubbins Lane	C	254	95	0	94	443
A12 (W)	D	132	920	126	0	1178
	Tot	697	1060	635	1647	4039

2023 PM

	A	B	C	D	Tot
A	0	59	385	128	572
B	375	0	159	1189	1723
C	305	71	0	108	484
D	218	870	247	0	1335
Tot	898	1000	791	1425	4114

2030 AM

		A	B	C	D	Tot
Gooshays Lane	A	0	47	424	93	564
A12 (E)	B	325	0	109	1532	1966
Gubbins Lane	C	266	99	0	98	463
A12 (W)	D	138	963	132	0	1233
	Tot	729	1109	665	1723	4226

2030 PM

	A	B	C	D	Tot
A	0	62	405	135	602
B	395	0	167	1251	1813
C	321	75	0	114	510
D	229	915	260	0	1404
Tot	945	1052	832	1500	4329

2030 DS AM

		A	B	C	D	Tot
Gooshays Lane	A	0	88	406	95	589
A12 (E)	B	344	0	134	1570	2048
Gubbins Lane	C	268	82	0	97	447
A12 (W)	D	138	742	132	0	1012
	Tot	750	912	672	1762	4096

2030 DS PM

	A	B	C	D	Tot
A	0	79	371	128	578
B	396	0	144	1253	1793
C	330	88	0	102	520
D	229	830	260	0	1319
Tot	955	997	775	1483	4210

Table 4.10: Linsig Modelling results of the A12/Gubbins Lane signalised Junction

Junction 4 - A12 / Gubbins Lane					
	PRC	MMQ			
		A Gooshays Drive	B A12 Eastbound	C Gubbins Lane	D A12 Westbound
2023 AM	-3.6	14.8	15.8 / 28.1	18.1	11.3 / 12.8 / 12.8 / 6.4
2023PM	-8.0	17.0	13.6 / 27.6	18.6	12.9 / 14.8 / 14.8 / 14.5
2030 AM	-9.1	15.8	17.1 / 35.0	20.8	12.2 / 13.7 / 13.8 / 9.5
2030 PM	-13.7	18.6	14.5 / 39.0	30.6	14.5 / 16.5 / 16.5 / 18.6
2030 Do Something AM	-9.1	18.6	17.3 / 34.9	19.6	9.2 / 10.2 / 10.0 / 9.5
2030 Do Something PM	-12.8	16.5	44.3 / 18.8	31.1	11.3 / 13.2 / 13.2 / 14.7

4.17 The A12 junction with Gubbins Lane and Gooshays Drive is currently over capacity. This will worsen going forward without intervention. It would appear from the National Highways Do Something traffic flows that some traffic will divert from this junction as a result of the LTC, however, the junction will remain over-capacity. As identified within Section 2.0, the junction would benefit from the provision of improved pedestrian crossing facilities and consideration given to the banning of U-turn manoeuvres. There appears to be public highway land available either side of Gooshays Drive where consideration could be given to alternative junction layouts.

A12/Squirrels Heath Road Junction

Table 4.11: A127 / Squirrels Heath Road Traffic Flows

2023 AM

		A	B	C	D	Tot
A127 (N)	A	0	170	1195	167	1532
Squirrels Heath Road	B	210	0	18	380	608
A127 (S)	C	1145	198	0	127	1470
Ardleigh Green Road	D	81	262	275	0	618
	Tot	1436	630	1488	674	4228

2030 PM

	A	B	C	D	Tot
A	0	171	1130	219	1520
B	157	0	23	424	604
C	1141	218	0	150	1509
D	81	259	275	0	615
Tot	1379	648	1428	793	4248

2030 AM

		A	B	C	D	Tot
A127 (N)	A	0	178	1251	175	1604
Squirrels Heath Road	B	220	0	19	398	637
A127 (S)	C	1198	207	0	133	1538
Ardleigh Green Road	D	85	274	288	0	647
	Tot	1503	659	1558	706	4426

2030 PM

	A	B	C	D	Tot
A	0	180	1189	230	1599
B	165	0	24	446	635
C	1200	229	0	158	1587
D	85	272	289	0	646
Tot	1450	681	1502	834	4467

2030 DS AM

		A	B	C	D	Tot
A127 (N)	A	0	151	1624	165	1940
Squirrels Heath Road	B	191	0	19	424	634
A127 (S)	C	1242	228	0	164	1634
Ardleigh Green Road	D	73	233	349	0	655
	Tot	1506	612	1992	753	4863

2030 DS PM

	A	B	C	D	Tot
A	0	169	1368	230	1767
B	173	0	24	439	636
C	1228	241	0	188	1657
D	54	256	348	0	658
Tot	1455	666	1740	857	4718

Table 4.12: Linsig Modelling results of the A127/Squirrels Heath signalised Junction

Junction 5 - A127/ Squirrels Heath / Ardleigh Green Road					
	RFC	MMQ			
		A A127 (N)	B Squirrels Heath Road	C A127 (S)	D Ardleigh Green Road
2023 AM	-54.7	147.1/ 122.2	118.3	134.5 / 139.3	2.5 / 99.5
2023PM	-59.6	124.6 / 159.8	122.8	142.7 / 151.4	2.6 / 106.1
2030 AM	-62.3	155.3 / 155.7	135.7	153.2 / 159.1	2.7 / 114.3
2030 PM	-67.0	150.8 / 174.4	141.4	164.9 / 173.5	2.7 / 122.0
2030 Do Something AM	-81.0	214.9 / 242.1	158.5	233.2 / 155.5	2.3 / 144.1
2030 Do Something PM	-79.3	194.4 / 222.2	158.8	207.7 / 181.5	1.7 / 140.5
Distance to next junction along each link		1,000m / 174PCUs to A127/A12	664m / 115PCUs to A127/Gubbins Lane	800m / 139PCUs to Wingletye Lane	183m / 32 PCUs to Adleigh Close

Red text indicates junction causes blocking upstream

4.18 As can be seen from Table 4.12, the A127 junction with Squirrels Heath Road and Ardleigh Green Road is currently well over capacity, with extensive queuing during both peak hours blocking adjacent junctions in all four directions. This situation worsens in the 2030 base in line with background traffic increases between 2023 and 2030. The LTC does however cause significant worsening of the junction's performance, with queues in particular worsening dramatically on the A127.

4.19 However, given the extent to which this junction is already over capacity, it is unlikely that physical alterations to this junction alone will remedy the issues encountered here. Additionally, the junction appears to be quite tightly constrained by existing buildings meaning the scope for an improvement scheme in terms of widening would be limited.

4.20 Instead, we suggest it will require a more strategic approach that considers possible options for re-routing traffic away from this junction together of course with modal shift. It is noted that bus services operate along the A127, Squirrels Heath Road and Ardleigh Green Road and thus there would be merit in considering bus priority measures. There is a significant amount of residential development on either side of the A127 and therefore scope to encourage greater use of bus services.

A127/Wingletye Lane Junction

Table 4.13: A127 / Wingletye Lane Traffic Flows

2023 AM

		A	B	C	Tot
A127 (W)	A	0	1665	0	1665
A127 (E)	B	1152	0	802	1954
Wingletye Lane	C	242	0	0	242
	Tot	1394	1665	802	3861

2023 PM

	A	B	C	Tot
A	0	1599	0	1599
B	1109	0	876	1985
C	242	0	0	242
Tot	1351	1599	876	3826

2030 AM

		A	B	C	Tot
A127 (W)	A	0	1743	0	1743
A127 (E)	B	1206	0	839	2045
Wingletye Lane	C	253	0	0	253
	Tot	1459	1743	839	4041

2030 PM

	A	B	C	Tot
A	0	1682	0	1682
B	1167	0	922	2089
C	255	0	0	255
Tot	1422	1682	922	4026

2030 DS AM

		A	B	C	Tot
A127 (W)	A	0	1743	0	1743
A127 (E)	B	1394	0	1061	2455
Wingletye Lane	C	159	0	0	159
	Tot	1553	1743	1061	4357

2030 DS PM

	A	B	C	Tot
A	0	1682	0	1682
B	1300	0	1039	2339
C	193	0	0	193
Tot	1493	1682	1039	4214

Table 4.14: Linsig Modelling results of the A127/Wingletye Lane Junction

Junction 6 - A127 - Wingletye Lane			
	PRC (%)	MMQ	
		B A127 Westbound	C Wingletye Lane
2023 AM	22.2		0.3
2023 PM	17.4		0.3
2030 AM	16.8		0.4
2030 PM	11.6		0.4
2030 Do Something AM	10.0		0.2
2030 Do Something PM	7.1		0.3

4.21 The A127 junction with Wingletye Lane when modelled in isolation operates well within capacity for all modelled scenarios. The junction is a left-in / left-out arrangement, i.e. traffic cannot turn right from Wingletye Lane to travel east along the A127. However, as noted within Table 4.7, queuing traffic from the Ardleigh Green Road/Squirrels Heath Road junction with the A127 will block back to this junction, thus impacting on the ability for vehicles to join the A127 from Wingletye Lane. This blocking occurs at all of the scenarios that have been analysed. It is noted that in the Do Something scenario, the PRC of the junction is expected to worsen as a

result of the LTC, reducing from 16.8% in the 2030 AM Base down to 10% in the Do Something scenario, and likewise from 11.6% to 7.1% respectively in the PM peak.

4.22 It is to be noted that the modelling for this junction carried out by National Highways did not include the left turn flow from the A127 into Wingletye Lane, where the Do Something flows indicate that an additional 222 PCUs in the AM peak and 117 PCUs in the PM peak will make this manoeuvre along Wingletye Lane. Given the presence of two schools on Wingletye Lane and a zebra crossing some 75m south of the A127, it is considered that further consideration should be given to any impacts along Wingletye Lane resulting from the LTC.

4.23 The A127 is subject to a 50mph speed limit in the vicinity of Wingletye Lane and there is limited forward visibility for westbound traffic turning left onto Wingletye Lane. In the event of traffic queues extending back from the zebra crossing adjacent to the Campion School towards the A127, this could give rise to safety concerns, with left turning vehicles from the A127 into Wingletye Lane unable to react in time. A more general concern is of course the additional traffic flow that will be generated along Wingletye Lane and the impacts of this on the adjacent schools and housing along this road.

4.24 It was noted from the traffic surveys that a significant number of vehicles perform U-turn manoeuvres at a number of signalised junctions along the A127 including the Squirrels Heath junction to the west of the Wingletye Junction. There may be some capacity gain to be achieved at the Squirrels Heath Road junction for instance, by amending the Wingletye junction to introduce a signalised arrangement that allows right turns into the A127.

4.25 It is noted that there is residential development located to the north of the A127 and therefore there is likely to be demand for north-south pedestrian movement across the A127 and onwards south along Wingletye Lane. The junction would therefore benefit from a redesign that incorporates pedestrian crossing facilities, where this may also help to stagger the onward westbound flow to the Squirrels Heath Road.

4.26 It is suggested that further analysis is conducted of the potential impacts arising along Wingletye Lane as a result of the LTC traffic, and options explored for a junction improvement scheme.

A127/Hall Lane Northern Junction

Table 4.15: A127 / Hall Lane (northern section) Traffic Flows

2023 AM

	From \ To	A	B	C	Total
A127 off-slip W	A	0	337	378	715
Hall Lane (N)	B	233	0	18	251
Hall Lane (E)	C	317	35	0	352
	Total	550	372	396	1318

2023 PM

From \ To	Arm A	Arm B	Arm C	Total
Arm A	0	335	379	714
Arm B	266	0	23	289
Arm C	364	46	0	410
Total	630	381	402	1413

2030 AM

	From \ To	A	B	C	Total
A127 off-slip W	Arm A	0	353	396	749
Hall Lane (N)	Arm B	244	0	19	263
Hall Lane (E)	Arm C	332	37	0	369
	Total	576	390	415	1381

2030 PM

From \ To	A	B	C	Total
A	0	353	399	752
B	280	0	25	305
C	383	49	0	432
Total	663	402	424	1489

2030 DS AM

	From \ To	A	B	C	Total
A127 off-slip W	Arm A	0	353	360	713
Hall Lane (N)	Arm B	352	0	14	366
Hall Lane (E)	Arm C	568	53	0	621
	Total	920	406	374	1700

2030 DS PM

From \ To	A	B	C	Total
A	0	353	360	713
B	280	0	27	307
C	586	47	0	633
Total	866	400	387	1653

Table 4.16: Junctions 10 Modelling results of the A127 / Hall Lane Junction (northern section)

Junction 7 - A127 - Hall Lane (Northern section)										
	AM					PM				
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Set ID	Queue (PCU)	Delay (s)	RFC	LOS
	2023 Surveyed									
Hall Lane Southbound, left and right turn	D1	1.5	19.92	0.61	C	D2	2.4	27.99	0.71	D
Hall Lane westbound		0.1	6.26	0.06	A		0.1	6.39	0.08	A
	2030 Growthed									
Hall Lane Southbound, left and right turn	D3	1.8	22.80	0.65	C	D4	3.2	35.75	0.77	E
Hall Lane westbound		0.1	6.41	0.07	A		0.1	6.58	0.09	A
	2030 Do Something									
Hall Lane Southbound, left and right turn	D5	12.9	119.14	0.99	F	D6	4.0	45.62	0.82	E
Hall Lane westbound		0.1	6.47	0.09	A		0.1	6.40	0.08	A

4.27 The A127 junction with Hall Lane (northern section) operates well within capacity for both 2023 and 2030 base scenarios. However, when the predicted traffic impact flows associated with

the Lower Thames Crossing scheme are added, the junction encounters a significant increase in queuing and delay on the southbound flow along Hall Lane, and the junction is predicted to exceed its capacity with an RFC of 0.99 (where values above 0.85 are considered to be above capacity). It is considered that there may be scope to improve this junction through redesign, where there would appear to be highway land available for this purpose.

A127/Hall Lane Southern Junction

Table 4.17: A127 / Hall Lane (southern section) Traffic Flows

2023 AM

	From \ To	A	B	C	D	Total
Hall Lane (N)	A	0	0	460	89	549
A127 slip-off	B	175	0	174	1	350
Hall Lane (S)	C	673	0	0	109	782
A127 on-slip	D	0	0	0	0	0
	Total	848	0	634	199	1681

2023 PM

From \ To	A	B	C	D	Total
A	0	0	530	108	638
B	110	0	164	0	274
C	604	0	0	154	758
D	0	0	0	0	0
Total	714	0	694	262	1670

2030 AM

	From \ To	Arm A	Arm B	Arm C	Arm D	Total
Hall Lane (N)	A	0	0	482	94	576
A127 slip-off	B	184	0	183	2	369
Hall Lane (S)	C	705	0	0	115	822
A127 on-slip	D	0	0	0	0	0
	Total	889	0	667	211	1767

2030 PM

From \ To	A	B	C	D	Total
A	0	0	558	114	672
B	116	0	173	0	289
C	636	0	0	163	799
D	0	0	0	0	0
Total	752	0	731	277	1760

2030 DS AM

	From \ To	A	B	C	D	Total
Hall Lane (N)	A	0	0	441	81	522
A127 slip-off	B	289	0	228	2	519
Hall Lane (S)	C	853	0	0	78	933
A127 on-slip	D	0	0	0	0	0
	Total	1142	0	671	161	1974

2030 DS PM

From \ To	A	B	C	D	Total
A	0	0	520	110	630
B	192	0	200	0	392
C	761	0	0	131	892
D	0	0	0	0	0
Total	953	0	720	241	1914

Table 4.18: Junctions 10 Modelling results of the A127 / Hall Lane Junction (southern section)

Junction 7 - A127 - Hall Lane (Southern section)										
	AM					PM				
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Set ID	Queue (PCU)	Delay (s)	RFC	LOS
	2023									
A127 westbound off-slip, ahead and left	D1	0.7	13.04	0.41	B	D2	0.6	11.83	0.37	B
A127 westbound off-slip, right		1.6	31.47	0.63	D		0.7	20.87	0.41	C
Hall Lane southbound		0.8	6.02	0.29	A		1.2	6.34	0.37	A
Entry to A127 westbound on-slip		0.0	0.00	0.00	A		0.0	0.00	0.00	A
Hall Lane northbound		0.0	0.00	0.00	A		0.0	0.00	0.00	A
	2030									
A127 westbound off-slip, ahead and left	D3	0.8	14.50	0.45	B	D4	0.7	12.82	0.40	B
A127 westbound off-slip, right		2.1	39.17	0.69	E		0.8	23.86	0.46	C
Hall Lane southbound		0.9	6.21	0.32	A		1.4	6.67	0.41	A
Entry to A127 westbound on-slip		0.0	0.00	0.00	A		0.0	0.00	0.00	A
Hall Lane northbound		0.0	0.00	0.00	A		0.0	0.00	0.00	A
	2030 Do Something									
A127 westbound off-slip, ahead and left	D5	1.5	21.35	0.60	C	D6	1.0	17.01	0.51	C
A127 westbound off-slip, right		24.5	268.69	1.13	F		3.2	59.25	0.79	F
Hall Lane southbound		0.8	6.32	0.29	A		1.4	6.98	0.41	A
Entry to A127 westbound on-slip		0.0	0.00	0.00	A		0.0	0.00	0.00	A
Hall Lane northbound		0.0	0.00	0.00	A		0.0	0.00	0.00	A

4.28 The A127 junction with Hall Lane (southern section) operates well within capacity for both 2023 and 2030 base scenarios. However, when the predicted traffic impact flows associated with the Lower Thames Crossing scheme are added, the junction encounters an increase in queuing and delay and is predicted to operate above capacity. This queuing will occur on the exit slip for the A127, with the AM peak queue extending almost back to the A127 through lane. This dangerous queuing will be generated by the LTC scheme and therefore warrants further consideration in relation to potential mitigation that might be required.

4.29 Altering the existing priority junction arrangement at the exit slip where it meets Hall Lane to a roundabout junction may minimise or remove the excessive queuing caused and we would recommend that further modelling and design work is conducted to explore the feasibility of this.

A127/Front Lane Junction

Table 4.19: A127 / Front Lane Traffic Flows

2023 AM

		A	B	C	Tot
A127 (W)	A	0	1766	0	1766
A127 (E)	B	2143	0	198	2341
Front Lane	C	89	0	0	89
	Tot	2232	1766	198	4196

2023 PM

	A	B	C	Tot
A	0	1658	0	1658
B	1891	0	318	2209
C	93	0	0	93
Tot	1984	1658	318	3960

2030 AM

		A	B	C	Tot
A127 (W)	A	0	1848	0	1848
A127 (E)	B	2243	0	207	2450
Front Lane	C	93	0	0	93
	Tot	2336	1848	207	4391

2030 PM

	A	B	C	Tot
A	0	1744	0	1744
B	1990	0	335	2325
C	98	0	0	98
Tot	2088	1744	335	4167

2030 DS AM

		A	B	C	Tot
A127 (W)	A	0	1848	0	1848
A127 (E)	B	2793	0	328	3121
Front Lane	C	151	0	0	151
	Tot	2944	1848	328	5120

2030 DS PM

	A	B	C	Tot
A	0	1744	0	1744
B	2322	0	358	2680
C	161	0	0	161
Tot	2483	1744	358	4585

Table 4.20: Linsig Modelling results of the A127 Southend Arterial Road/Front Lane Junction

Junction 8 - A127 Southend Arterial Road/Front Lane Junction		
	PRC	MMQ
		Front Lane (entry to A127)
2023 AM	51.7	0.1
2023 PM	58.3	0.1
2030 AM	45.3	0.1
2030 PM	51.1	0.1
2030 Do Something AM	15.5	0.2
2030 Do Something PM	32.7	0.2

4.30 Table 4.20 indicates that the A127 Southend Arterial Road/Front Lane junction will operate with reserve capacity in all scenarios modelled. Our findings differ from those of National Highways, whose modelling predicted that this junction would operate over capacity in the Do Something scenario. We believe the differences in modelling outcomes at this junction are likely to be due to the fact that National Highways have not modelled the left turn flow from the A127 into Front Lane (whereas Cole Easdon's modelling does).

4.31 In our model, owing to the left turn being included, Linsig has assigned more of the westbound straight through traffic to Lane 2 (to account for the fact that drivers will be wanting to avoid slowing down for the left turners), thereby allowing more traffic to merge into lane one from Front Lane. It should be noted however that the LTC does significantly reduce PRC values compared with the 2030 base scenario.

A13/Marsh Way Junction

Table 4.21: A13 / Marsh Way Traffic Flows

2023 AM

		A	B	C	D	E	F	Tot
Marsh Way (N)	A	0	31	315	147	8	184	685
Consul Avenue	B	0	0	68	34	2	41	145
A13 (E)	C	271	33	77	214	54	338	987
Marsh Way (S)	D	119	15	32	0	0	57	223
Courier Road	E	30	4	8	1	0	3	46
A13 (W)	F	172	47	2	43	3	53	320
	Tot	592	130	502	439	67	676	2406

2023 PM

		A	B	C	D	E	F	Tot
Marsh Way (N)	A	0	12	445	58	9	258	782
Consul Avenue	B	0	0	74	10	2	43	129
A13 (E)	C	283	27	135	67	43	6	561
Marsh Way (S)	D	207	20	98	0	0	105	430
Courier Road	E	53	5	24	1	0	18	101
A13 (W)	F	486	24	2	8	2	32	554
	Tot	1029	88	778	144	56	462	2557

2030 AM

		A	B	C	D	E	F	Tot
Marsh Way (N)	A	0	32	330	154	8	193	717
Consul Avenue	B	0	0	71	36	2	43	152
A13 (E)	C	284	35	81	224	57	354	1035
Marsh Way (S)	D	125	16	33	0	0	60	234
Courier Road	E	31	4	8	1	0	3	47
A13 (W)	F	180	49	2	45	3	55	334
	Tot	620	136	525	460	70	708	2519

2030 PM

		A	B	C	D	E	F	Tot
Marsh Way (N)	A	0	13	468	61	9	271	822
Consul Avenue	B	0	0	78	11	2	45	136
A13 (E)	C	298	28	142	70	45	6	589
Marsh Way (S)	D	218	21	103	0	0	110	452
Courier Road	E	56	5	25	1	0	19	106
A13 (W)	F	511	25	2	8	2	34	582
	Tot	1083	92	818	151	58	485	2687

2030 DS AM

		A	B	C	D	E	F	Tot
Marsh Way (N)	A	0	28	329	154	8	186	705
Consul Avenue	B	0	0	75	36	2	40	153
A13 (E)	C	275	45	81	224	57	354	1036
Marsh Way (S)	D	125	16	33	0	0	60	234
Courier Road	E	31	4	8	1	0	3	47
A13 (W)	F	177	49	2	45	3	55	331
	Tot	608	142	528	460	70	698	2506

2030 DS PM

		A	B	C	D	E	F	Tot
Marsh Way (N)	A	0	11	472	61	9	270	823
Consul Avenue	B	0	0	82	11	2	44	139
A13 (E)	C	304	34	142	70	45	6	601
Marsh Way (S)	D	218	21	103	0	0	110	452
Courier Road	E	56	5	25	1	0	19	106
A13 (W)	F	514	24	2	8	2	34	584
	Tot	1092	95	826	151	58	483	2705

Table 4.22: Linsig Modelling results of the A13 / Marsh Way Junction

Junction 9 - Marsh Way Junction							
	PRC			MMQ			
		A March Way	B Consul Avenue	C A13 (East)	D Marsh Way	E Courier Road	F A13 (West)
2023 AM	71.0	0.1 / 0.1	0 / 0	5.8 / 4.3	0.0 / 0.1	0 / 0	1.7 / 2.1
2023PM	59.3	0.2 / 0.1	0 / 0	0.7 / 6.0	0.0 / 1.1	0 /0	3.2 / 0.7
2030 AM	63.7	0.1 / 0.1	0 / 0	6.4 / 4.6	0.0 / 0.1	0 / 0	1.9 / 2.1
2030 PM	51.5	0.2 / 0.1	0 / 0	0.7 / 6.2	0.0 / 1.7	0 / 0	3.4 / 0.8
2030 Do Something AM	65.9	0.1 / 0.1	0 / 0	6.4 / 4.6	0.0 / 0.1	0 / 0	2.2 / 1.7
2030 Do Something PM	50.0	0.2 / 0.1	0 / 0	0.7 / 6.2	0.0 / 1.7	0 / 0	3.5 / 0.8

4.32 Table 4.22 indicates that the A13 Marsh Way junction will operate with reserve capacity in all scenarios modelled.

A13/Wennington Road Junction

Table 4.23: A13 / Wennington Road (northern roundabout) Traffic Flows

2023 AM

	From \ To	Arm 2	Arm 3	Arm 4	Arm 1	Total
A13 Eastbound on-slip	Arm 2	0	0	0	0	0
Bridge	Arm 3	279	5	0	635	919
A13 Eastbound off-slip	Arm 4	1	345	0	158	504
Wennington Road	Arm 1	449	557	0	1	1007
	Total	729	907	0	794	-

2023 PM

From \ To	Arm 2	Arm 3	Arm 4	Arm 1	Total
Arm 2	0	0	0	0	0
Arm 3	302	11	0	719	1032
Arm 4	1	397	0	355	753
Arm 1	453	526	0	12	991
Total	756	934	0	1086	-

2030 AM

	From \ To	Arm 2	Arm 3	Arm 4	Arm 1	Total
A13 Eastbound on-slip	Arm 2	0	0	0	0	0
Bridge	Arm 3	293	6	0	665	964
A13 Eastbound off-slip	Arm 4	2	362	0	166	530
Wennington Road	Arm 1	470	583	0	2	1055
	Total	765	951	0	833	-

2030 PM

From \ To	Arm 2	Arm 3	Arm 4	Arm 1	Total
Arm 2	0	0	0	0	0
Arm 3	317	12	0	753	1082
Arm 4	2	416	0	372	790
Arm 1	475	551	0	13	1039
Total	794	979	0	1138	-

2030 DS AM

	From \ To	Arm 2	Arm 3	Arm 4	Arm 1	Total
A13 Eastbound on-slip	Arm 2	0	0	0	0	0
Bridge	Arm 3	304	6	0	691	1001
A13 Eastbound off-slip	Arm 4	2	303	0	166	471
Wennington Road	Arm 1	470	576	0	2	1048
	Total	776	885	0	859	-

2030 DS PM

From \ To	Arm 2	Arm 3	Arm 4	Arm 1	Total
Arm 2	0	0	0	0	0
Arm 3	403	12	0	773	1188
Arm 4	2	364	0	372	738
Arm 1	475	581	0	13	1069
Total	880	957	0	1158	-

Table 4.23: A13 / Wenningon Road (southern roundabout) Traffic Flows

2023 AM

	From \ To	Arm 1	Arm 2	Arm 3	Arm 4	Total
Arterial Road	Arm 1	40	525	559	0	1124
A13 Westbound on-slip	Arm 2	0	0	0	0	0
Bridge	Arm 3	644	255	3	0	902
A13 Westbound off-slip	Arm 4	280	2	366	0	648
	Total	964	782	928	0	-

2023 PM

From \ To	Arm 1	Arm 2	Arm 3	Arm 4	Total
Arm 1	37	466	668	0	1171
Arm 2	0	0	0	0	0
Arm 3	687	230	5	0	922
Arm 4	212	4	349	0	565
Total	936	700	1022	0	-

2030 AM

	From \ To	Arm 1	Arm 2	Arm 3	Arm 4	Total
Arterial Road	Arm 1	42	550	586	0	1178
A13 Westbound on-slip	Arm 2	0	0	0	0	0
Bridge	Arm 3	675	267	4	0	946
A13 Westbound off-slip	Arm 4	294	3	384	0	681
	Total	1011	820	974	0	-

2030 PM

From \ To	Arm 1	Arm 2	Arm 3	Arm 4	Total
Arm 1	39	488	700	0	1227
Arm 2	0	0	0	0	0
Arm 3	720	241	6	0	967
Arm 4	222	5	366	0	593
Total	981	734	1072	0	-

2030 DS AM

	From \ To	Arm 1	Arm 2	Arm 3	Arm 4	Total
Arterial Road	Arm 1	42	496	586	0	1124
A13 Westbound on-slip	Arm 2	0	0	0	0	0
Bridge	Arm 3	609	267	4	0	880
A13 Westbound off-slip	Arm 4	294	3	421	0	718
	Total	945	766	1011	0	-

2030 DS PM

From \ To	Arm 1	Arm 2	Arm 3	Arm 4	Total
Arm 1	39	469	700	0	1208
Arm 2	0	0	0	0	0
Arm 3	653	228	6	0	887
Arm 4	222	5	472	0	699
Total	914	702	1178	0	-

Table 4.24: Linsig Modelling results of the A13 / Wennington Road Junction

Junction 10 - A13 - A1306 Wennington Road										
	AM					PM				
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Set ID	Queue (PCU)	Delay (s)	RFC	LOS
	2023									
Northern RA – Internal Road (S)	D1	0.7	2.58	0.42	A	D2	0.9	2.80	0.47	A
Northern RA – A13 Eastbound Off-slip		0.5	3.28	0.34	A		1.1	4.84	0.53	A
Northern RA – New Road (A1306)		0.9	2.90	0.47	A		0.9	3.04	0.48	A
Southern RA - Arterial Road		1.1	3.12	0.52	A		1.1	3.18	0.53	A
Southern RA - Internal Road (N)		0.6	2.51	0.36	A		0.6	2.55	0.37	A
Southern RA - A13 Westbound Off-slip		0.5	2.49	0.33	A		0.4	2.37	0.29	A
	2030 Base									
Northern RA - Internal Road (S)	D3	0.8	2.67	0.44	A	D4	1.0	2.93	0.49	A
Northern RA - A13 Eastbound Off-slip		0.6	3.48	0.36	A		1.3	5.42	0.57	A
Northern RA - New Road (A1306)		1.0	3.12	0.50	A		1.0	3.28	0.51	A
Southern RA- Arterial Road		1.2	3.38	0.55	A		1.3	3.45	0.56	A
Southern RA- Internal Road (N)		0.6	2.58	0.38	A		0.6	2.63	0.39	A
Southern RA- A13 Westbound Off-slip		0.5	2.62	0.35	A		0.4	2.48	0.31	A
	2030 Do Something									
Northern RA - Internal Road (S)	D5	0.9	2.76	0.46	A	D6	1.2	3.24	0.54	A
Northern RA - A13 Eastbound Off-slip		0.5	3.36	0.33	A		1.3	5.62	0.56	A
Northern RA - New Road (A1306)		1.0	2.98	0.49	A		1.1	3.49	0.53	A
Southern RA- Arterial Road		1.2	3.37	0.54	A		1.4	3.85	0.59	A

	AM					PM				
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Set ID	Queue (PCU)	Delay (s)	RFC	LOS
	2023									
Southern RA- Internal Road (N)		0.6	2.61	0.38	A		0.8	2.82	0.43	A
Southern RA- A13 Westbound Off-slip		0.6	2.72	0.37	A		0.6	2.86	0.38	A

4.33 Table 4.24 indicates that the A13 / Wennington Road junction will operate with reserve capacity in all scenarios modelled.

St Mary's Lane/Station Road Junction Traffic Flows

Table 4.25: St Mary's Lane / Station Road Junction Traffic Flows

2023 AM

		A	B	C	D	Tot
Station Road	A	0	54	299	237	590
St Mary's Lane (E)	B	53	0	76	230	359
Corbets Tey Road	C	294	83	0	51	428
St Mary's Lane (W)	D	343	227	34	0	604
	Tot	690	364	409	518	1981

2023 PM

	A	B	C	D	Tot
A	0	80	333	264	677
B	81	0	123	239	443
C	264	146	0	78	488
D	353	342	56	0	751
Tot	698	568	512	581	2359

2030 AM

		A	B	C	D	Tot
Station Road	A	0	65	359	284	708
St Mary's Lane (E)	B	64	0	91	276	431
Corbets Tey Road	C	353	100	0	61	514
St Mary's Lane (W)	D	412	272	41	0	725
	Tot	829	437	491	621	2378

2030 PM

	A	B	C	D	Tot
A	0	96	400	317	813
B	97	0	148	287	532
C	317	175	0	94	586
D	424	410	67	0	901
Tot	838	681	615	698	2832

2030 DS AM

		A	B	C	D	Tot
Station Road	A	0	44	329	287	660
St Mary's Lane (E)	B	63	0	74	188	325
Corbets Tey Road	C	381	105	0	59	545
St Mary's Lane (W)	D	457	283	42	0	782
	Tot	901	432	445	534	2312

2030 DS PM

	A	B	C	D	Tot
A	0	93	355	350	798
B	97	0	140	268	505
C	327	207	0	96	630
D	421	417	77	0	915
Tot	845	717	572	714	2848

Table 4.26: Linsig Modelling results of the St Mary's Lane / Station Road (Bell Corner) junction

Junction 11 - St Mary's Lane - Station Road					
	PRC	MMQ			
		A Station Road	B St Mary's Lane (E)	C Corbets Tey Road	D St Mary's Lane (W)

Junction 11 - St Mary's Lane - Station Road					
2023 AM	47.6	7.9 / 6.6	7.3	6.0 / 5.3	8.5 / 5.4
2023 PM	30.5	9.3 / 8.0	9.8	6.8 / 6.0	9.0 / 9.7
2030 AM	23.3	10.0 / 8.7	9.6	7.6 / 6.9	11.1 / 6.8
2030 PM	10.2	12.3 / 10.9	13.4	9.5 / 8.4	11.6 / 12.6
2030 Do Something AM	18.6	10.0 / 8.5	5.7	8.0 / 7.4	12.3 / 6.9
2030 Do Something PM	6.6	12.6 / 11.0	12.0	10.3 / 9.2	11.5 / 13.3

4.34 Table 4.26 indicates that the St Mary's Lane / Station Road junction will operate with reserve capacity in all scenarios modelled. The LTC does impact on PRC values in the time periods modelled, however spare capacity remains in the junction.

5.0 SUMMARY & CONCLUSIONS

5.1 The Healthy Streets analysis set out within Section 2.0 of this Report has identified a number of interventions that should be considered for future implementation at each of the junctions, based on the specific consideration given to the relevant Healthy Streets criteria.

5.2 The Accident Analysis presented within Section 3.0 of this Report has identified particularly high concentrations of accidents at the following locations:

- A12 / North Street (38 accidents in 5 years);
- A12 / Pettits Lane (25 accidents in 5 years);
- A12 / Gubbins Lane (19 accidents in 5 years);
- A127 / Squirrels Heath (19 accidents in 5 years); and
- A127 / Hall Lane (19 accidents in 5 years).

5.3 A recommendation has been made within the Report that these particular junctions are given further consideration with regard to a more detailed safety review, to include Road Safety Audits.

5.4 The Report has also identified a requirement for a more detailed review of the impacts of the LTC on Wingletye Lane, noting the presence of two schools on this road, and the fact that National Highways omitted the left-turn flow from the A127 into Wingletye Lane from their modelling.

5.5 With regard to the junction modelling outcomes, the following junctions operate within capacity and will continue to do so in the year 2030 with or without the impact of the Lower Thames Crossing scheme:

- A12 Colchester Road/Harold Court Road;
- A127 Southend Arterial Road/Wingletye Lane; *
- A13/Marsh Way;
- A127/Front Lane;
- A13/A1306 Wennington Road (Wennington Interchange); and
- A124 St Mary's Lane/Station Road/B1421 Corbetts Tey Road (Bell Corner).

** As noted in Section 4 of this Report, the Wingletye Lane junction works in isolation, however, it is impacted by queueing that extends back from the A127 / Ardleigh Green Road / Squirrels Heath Road junction.*

5.6 The following junctions will operate over capacity in 2030, with or without the LTC, however, there may be scope to improve this junction:

- A12 Colchester Road/Gubbins Lane/Gooshays Drive.

5.7 The LTC causes the following junctions to operate over capacity (i.e. without the LTC, these junctions would operate with reserve capacity in 2030):

- A127 Southend Arterial Road/Hall Lane; and
- A12 Eastern Avenue/Pettits Lane/Pettits Lane North;

5.8 The following junctions are severely over-capacity, both now and in the 2030 Do Something scenario. As such these junctions will likely require amendments to the strategic network to alleviate the strain on these junctions:

- A12/North Street/B175 Havering Road;
- A127 Southend Arterial Road/Ardleigh Green Road/Squirrels Heath Road.

5.9 A brief summary of the overall findings and recommendations relevant to all of the topics considered for each junction is set out in Table 5.1 below.

Table 5.1: Summary of Findings and Recommendations at Each Junction

Junction	Recommended Healthy Streets Interventions	Accidents & Safety Findings/Interventions	Junction Performance Findings/Interventions
A12/North Street	Installation of controlled pedestrian crossing facilities and imposition of a ban on U-turns. Consider bus priority measures	38 accidents in 5 years. Recommend that a Road Safety Audit is conducted of the junction	Junction significantly over capacity in 2023 and continues to be in 2030 Do Something scenario. Strategic approach required to look at options for rerouting traffic away from this junction together with modal shift measures.
A12/Pettits Lane	Installation of controlled pedestrian crossing facilities and imposition of a ban on U-turns. Consider bus priority measures. Consider more compact junction layout that is more pedestrian / cyclist friendly.	25 accidents in 5 years. Recommend that a Road Safety Audit is conducted of the junction	Junction within capacity in 2023 base and 2030 Do Minimum scenarios. LTC causes junction to operate over capacity in Do Something scenario. Considered to be scope to improve junction performance through signal timings review and possible U-turn ban.
A12/Harold Court Road	Recommend installation of a controlled crossing on Harold Court Road – existing uncontrolled crossing considered unsatisfactory	16 accidents in 5 years. No particular safety concerns aside from the crossing on Harold Court Road.	Junction will operate with reserve capacity in all scenarios.

Junction	Recommended Healthy Streets Interventions	Accidents & Safety Findings/Interventions	Junction Performance Findings/Interventions
A12/Gubbins Lane/Gooshays Drive	Installation of controlled pedestrian crossing facilities and imposition of a ban on U-turns. Consider bus priority measures	19 accidents in 5 years. Recommend that a Road Safety Audit is conducted of the junction.	Overcapacity in all scenarios modelled, however there is likely to be scope to implement capacity improvements through measures such as signal timing reviews.
A127/Squirrels Heath Road/Ardleigh Green Road	Installation of controlled pedestrian crossing facilities and imposition of a ban on U-turns. Consider bus priority measures	19 accidents in 5 years. Recommend that a Road Safety Audit is conducted of the junction.	Significantly overcapacity in all scenarios modelled. Strategic approach needed with respect to mitigation at this junction.
A127/Wingletye Lane	Consider feasibility of signalising the junction to incorporate pedestrian crossing facilities and to allow right turn movements from Wingletye Lane onto the A127. May help to reduce capacity issues at the Squirrels Heath junction.	8 accidents in 5 years. Recommend that further work is conducted with specific regard to impact of the LTC on Wingletye Lane and the two schools located along this road.	Operates within capacity in all scenarios considered, however queueing back from the Squirrels Heath / Ardleigh Green Road impacts this junction.
A127/Hall Lane (northern and southern junctions)	No Healthy Streets interventions identified	19 accidents in 5 years. Recommend that a Road Safety Audit is conducted of the junction.	Junction within capacity in 2023 base and 2030 Do Minimum scenarios. LTC causes junction to operate over capacity in Do Something scenario, leading to dangerous queue lengths almost back to the A127 through lane. Altering the existing priority junction arrangement at the exit slip where it meets Hall Lane to a roundabout junction may minimise or remove the excessive queuing caused. This is recommended for further investigation.
A127/Front Lane	Commission survey and report of usage of the existing staggered crossing on the A127 and options for its removal, retention or alteration.	7 accidents in 5 years. Consider safety of existing staggered crossing.	Junction will operate with reserve capacity in all scenarios.

Junction	Recommended Healthy Streets Interventions	Accidents & Safety Findings/Interventions	Junction Performance Findings/Interventions
A13/Marsh Way	Consider provision of additional pedestrian crossing facilities and also consider provision of a foot/cycleway along the western side of Marsh Way between the two roundabouts. Consider addition of Advanced Stop Lines for cyclists.	17 accidents in 5 years. Additional crossing facilities would be beneficial.	Junction will operate with reserve capacity in all scenarios.
A13/Wennington Road	Crossing points require tactile paving. Foot/cycle ways require resurfacing and vegetation cutting back	8 accidents in 5 years. No specific interventions identified.	Junction will operate with reserve capacity in all scenarios.
St Mary's Lane / Station Road (Bell Corner)	Consider provision of Advanced Stop Lines for cyclists and bus priority measures	9 accidents in 5 years. No specific interventions identified.	Junction will operate with reserve capacity in all scenarios.

Cole Easdon Consultants Limited

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Appendix B - Protective Provisions for Transport for London from M25 Junction 28 Improvements DCO

TfL Unclassified

SCHEDULE 9

Articles 20, 37 and 44

PROTECTIVE PROVISIONS

PART 7

FOR THE PROTECTION OF TRANSPORT FOR LONDON

Application

70. The provisions of this Part of this Schedule have effect unless otherwise agreed in writing between the undertaker and Transport for London.

Interpretation

71. In this Part of this Schedule—

"Commuted Sum" means the sum to be paid by the undertaker to Transport for London for the future maintenance of any highway assets not previously forming part of the TLRN which will be transferred to Transport for London, as calculated in accordance with paragraph 73 of this Part;

"Detailed Local Operating Agreement" means an agreement to be made between the undertaker and Transport for London detailing the traffic management arrangements to be implemented during the carrying out of the authorised development;

"TfL Road" means any public, vehicular highway which is vested or vests or is intended at the completion of works to vest in or be otherwise maintainable by Transport for London;

"TLRN" means the Transport for London Road Network comprising highways for which Transport for London is the responsible highway authority; and

"Works" means any works authorised by the Order undertaken on, to or under any part of the TLRN or a TfL Road.

Costs

72. The undertaker must pay to Transport for London in respect of the Works a sum equal to the whole of any costs and expenses which Transport for London reasonably incur in–

(a) requests from the undertaker to participate in the design of any part of the authorised development, the examination or approval of design or construction information required for the Works including for the protection of the TLRN and for Work No. 29, and reaching agreement on the schedule of highway assets pursuant to paragraph 73;

(b) including the schedule of highway assets agreed pursuant to paragraph 73 within its road maintenance framework contracts;

(c) agreeing and operating a Detailed Local Operating Agreement;

(d) participation in road safety audits relating to the Works;

(e) inspecting the construction and completion of the Works including any remediation works;

(f) the issue of certificates relating to the Works required for the completion, hand over and defects;

(g) carrying out any surveys and testing which are reasonably required in connection with the construction of the Works; and

(h) the transfer or vesting in Transport for London of any land and rights acquired by the undertaker.

Commuted Sum

73. —(1) The undertaker must use reasonable endeavours to agree with Transport for London a schedule of new highway assets which are proposed to become the maintenance responsibility of Transport for London as a result of the authorised development under article 11 (construction and maintenance of new, altered or diverted streets and other structures) and article 16(1)(b) (classification of roads, etc.) of the Order.

(2) Where the schedule prepared under paragraph (1) cannot be agreed, the matters of dispute shall be determined in accordance with paragraph 74.

(3) Following agreement of the schedule under sub-paragraph (1) or determination under sub-paragraph (2), Transport for London must prepare a calculation of the Commuted Sum based on the maintenance Transport for London considers to be required for the schedule of highway assets agreed under sub-paragraph (1) or determined under sub-paragraph (2) and must use reasonable endeavours to agree it with the undertaker.

(4) The undertaker must be provided with a complete breakdown of the calculation of the Commuted Sum by Transport for London under sub-paragraph (3) including any assumptions used.

(5) Where the calculation prepared under sub-paragraph (3) cannot be agreed, the matters of dispute shall be determined in accordance with paragraph 74.

(6) The undertaker must pay the Commuted Sum to Transport for London in one instalment within 10 working days of the later of -

(a) the date of completion of the authorised development; or

(b) the date of agreement of the value of the Commuted Sum under sub-paragraph (3) or determination under sub-paragraph (5).

Disputes

74. Any difference arising between the undertaker and Transport for London under this Part of this Schedule (other than in difference as to the meaning or construction of this Part of this Schedule) shall be escalated to a more senior level within Transport for London and the undertaker and if the matters of dispute still cannot be resolved then they will be resolved by arbitration under article 53 (arbitration).