Kent County Council

# Lower Thames Crossing Wider Network Impacts

## Agreeing the Objectives

70099014-TN01
July 2023

Confidential

Kent County Council

# Lower Thames Crossing Wider Network Impacts

## Agreeing the Objectives

**Type of document (version) Confidential**

**Project no. 70099014**

**Our Ref. No. 70099014-TN01**

**Date: July 2023**

WSP

Grosvenor House
2 Grosvenor Square
Southampton, Hampshire
SO15 2BE

Phone: +44 23 8010 1700

WSP.com

# Quality control

| Issue/revision | First issue | Revision 1 | Revision 2 | Revision 3 | Revision 4 | Revision 5 |
|---|---|---|---|---|---|---|
| Remarks | Draft 1 | Draft 2 | Final V1 | Final V2 | Final V2 | Final V4 |
| Date | 30/09/22 | 24/10/22 | 27/10/22 | 30/11/22 | 15/01/23 | 03/07/23 |
| Prepared by | SK/CW/PM | SK/CW/PM | CW/PM | CW/PM | PM | VG |
| Checked by | GH | GH | GH | GH | CW | PM |
| Authorised by | N/A | N/A | N/A | CW | CW | GH |
| Project number | 70099014 | 70099014 | 70099014 | 70099014 | 70099014 | 70099014 |
| Report number | TNO1 | TNO1 | TNO1 | TNO1 | TNO1 | TNO1 |

# Contents

# Tables

# 1 INTRODUCTION

## 1.1 Preamble

1.1.1. WSP has been commissioned by Kent County Council (KCC) to produce a pre-Strategic Outline Business Case (SOBC) desktop study on the impact of the Lower Thames Crossing (LTC) on the local highway network within Kent. This commission has been split into several tasks as outlined below:

- Task 1a - Agree Priority Order;
- Task 1b – Identification of the Problem;
- Task 1c – Agree the Objectives of the Scheme;
- Task 1d – Generate a Long List of Options;
- Task 1e – Initial Sift of Options;
- Task 1f – Develop and Assess the Options;
- Task 2 – Traffic assessment overview including consideration of the impact of taking no action;
- Task 3 – Economic Appraisal;
- Task 4 – Indicative Timetable of development, planning and construction;
- Task 5 – Stakeholder support;
- Task 6 – Identification of key risks, assumptions and uncertainties;
- Task 7 – Reporting.

1.1.2. This Technical Note (TN01) provides a summary of work completed up-to completion of Task 1c. Noting the interrelationships that exist between Task 1a, 1b and 1c it was agreed that identifying the problem and objectives of the scheme were required to agree a priority order. This note completes the identification of the problem and which junctions and corridors experience material impacts from LTC that deteriorate traffic conditions. It provides the basis for the remaining parts of Task 1 including identifying the specific challenges in particular locations and developing options to mitigate the impact of LTC on KCC's highway network.

## 1.2 Traffic Modelling

1.2.1. Extensive traffic modelling on the impacts of LTC has been completed by National Highways using the Lower Thames Area Model (LTAM), including analysis in the 2018 statutory consultation and 2020 supplementary consultation. In relation to this consultation, Stantec were commissioned by KCC to review the LTAM and produced a report in September 2020 that identified potential mitigation measures that may be required on KCC's highway network as a result of LTC.

1.2.2. Following on from a further update of the LTAM and Kent Transport Model (KTM) in 2021 it was agreed with National Highways that the KTM would be used as part of the wider impact assessments study. This allowed consideration of the following:

- Variable Demand Modelling (VDM) comparisons;
- Detail of KCC network; and
- Peak hours assessed within model.

1.2.3. Outputs from the KTM have been provided to WSP for the forecast years of 2030 (LTC opening year) and 2045 (LTC design year), Do Nothing (without LTC) and Do Something scenario (with LTC). The only difference between the Do Nothing and Do Something scenario is the completion of the Lower Thames Crossing and no additional development traffic is included in the Do Something compared to the Do Nothing scenario.

## 1.3 Initial Scope of Assessment

The LTAM and KTM assessments completed to-date have identified the following corridors and junctions for inclusion within the pre-SOBC study:

1. A206 between Crayford Way and Burnham Road:
   - WNI101: A206 Thames Road / B2186 Crayford Way; and
   - WNI102: A206 Thames Road / A206 Burnham Road
2. A2 between Spring Head and Gravesend East;
   - WNI201: A2 Spring Head (incl. A2260 and B259 roundabouts);
   - WNI202: A2 Pepper Hill (incl. Spring Head Road / Hall Road);
   - WNI203: A2 Tollgate (incl. Wrotham Road / Coldharbour Road); and
   - WNI204: A2 Gravesend East (incl. Valley Drive / Marling Way).
3. A227 between A2 and M20:
   - WNI301: A227 / Istead Rise;
   - WNI302: A227 / Green Lane; and
   - WNI303: Link mitigations / traffic management to promote strategic route hierarchy and reduce use of inappropriate routes between A2 and M20.
4. A228 between M2 and M20:
   - WNI401: A228 / Cuxton Road;
   - WNI402: A228 / Bush Road;
   - WNI403: A228 / Kent Road;
   - WNI404: A228 / Peter's Bridge
   - WNI405: A228 / Manley Boulevard
   - WNI406: A228 / Holborough Road;
   - WNI407: A228 / Malling Road;
   - WNI408: A228 / Leybourne Way; and
   - WNI409: Link mitigations / traffic management to promote strategic route hierarchy and reduce use of inappropriate routes between M2 and M20.

1.3.1. In addition to these locations, the outputs from the KTM have been reviewed to consider if there are other locations where mitigation may be required as result of LTC.

## 1.4 Structure of Technical Note

1.4.1. The remainder of this Technical Note is set out as follows:

- Section 2 provides a summary of the findings from a corridor perspective, detailing those that have been identified in addition to the original scope;
- Section 3 details the metrics used to identify locations where mitigation may be required as result of the LTC;
- Section 4 provides a summary of problems identified and objectives of any mitigation on the A206 between Crayford Way and Burnham Road (Corridor 1);
- Section 5 provides a summary of problems identified and objectives of potential mitigation on the A2 between Spring Head and Gravesend East (Corridor 2);
- Section 6 provides a summary of problems identified and objectives of potential mitigation on the A227 between A2 and M20 (Corridor 3);
- Section 7 provides a summary of problems identified and objectives of potential mitigation on the A228 between M2 and M20 (Corridor 4);
- Section 8 provides a summary of any other problems identified outside of the original scope and objectives of potential mitigation; and
- Section 9 provides a summary of the next steps for the project.

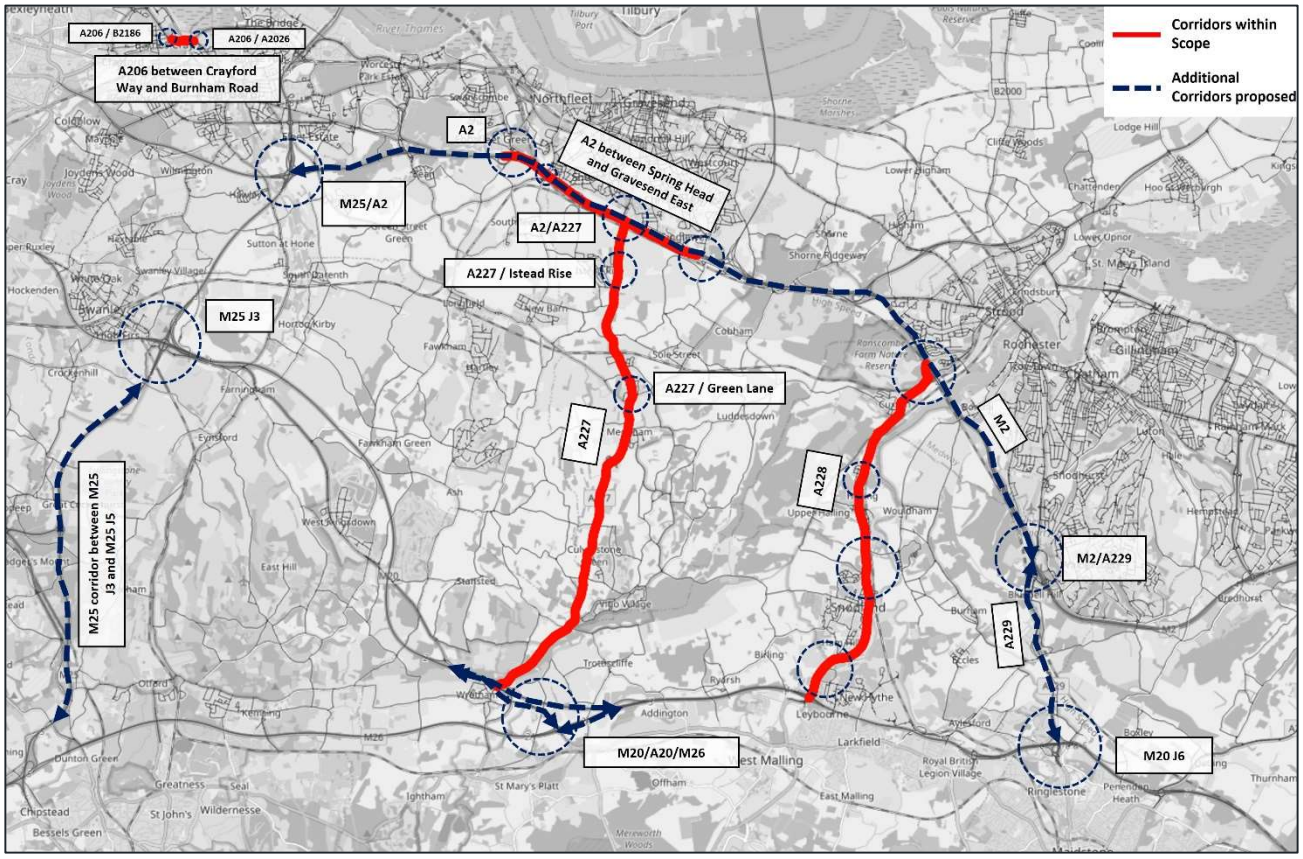
# 2 Summary of Findings and Next Steps

## 2.1 Identified Junctions and Corridors

2.1.1. **Figure 2-1** shows the junctions and corridors identified through the problem identification process and the corridors that were identified in the original brief. The map shows that significant additional corridors and junctions were picked up by the assessment metrics which are described in Section 3. A further review of these has limited the number that are proposed to be taken forward for further examination. Further mapping is included in Appendix A of this report and presents some of the tabulated results on maps.

2.1.2. The analysis shows a clear and far-reaching impact on Kent's wider road network from the introduction of the LTC. Subsequent chapters of this Technical Note provide further detail on the issues identified and the prioritisation.

**Figure 2-1 - Network Map showing corridors identified in original brief and additional corridors identified though our analysis**




2.1.3. The results are presented here grouped into the nine corridors, four of which were identified in the original brief and five new ones. The associated junctions are reported on within each corridor. The majority of the newly identified corridors are on National Highways' network

but have been included due to the possible impacts at junctions which affect traffic on local roads. The corridors are listed here and the detailed results for each are in the following chapters. Corridors included in the brief are:

- A206 corridor between Crayford Way and Burnham Road: The assessment of this corridor did not highlight any significant impacts as a result of LTC and therefore this will not be taken forward for further consideration / mitigation;
- A2 corridor between Spring Head and Gravesend East: Traffic congestion issues have been identified on junctions with the A2, leading some junctions operating over capacity as a result of LTC. This corridor will therefore be taken forward for further consideration / mitigation;
- A227 corridor between A2 and M20: General traffic and HGV flow increases have been identified along the A227 and adjacent links through areas such Meopham, Hook Green, Sole Street and Cobham. This corridor and adjacent areas will therefore be taken forward for further consideration / mitigation; and
- A228 corridor between M2 and M20: The A228 is shown to experience in general traffic / HGV flows as a result of LTC leading to detrimental impacts on journey times and junction capacities. This corridor will therefore be taken forward for further consideration / mitigation.

2.1.4. Additional corridors identified as part of this analysis:

- A229 corridor between M2 and M20;
- M25 corridor between J3 and J5;
- A2 corridor between M25 and A2 corridor included within original scope;
- M2 corridor between A2 and A229;
- A20 corridor between M20 and M26; and
- M26 corridor between A20 and M20.

2.1.5. Further inspection of the newly identified corridors has shown that impacts are largely isolated to the National Highways network and in some cases only one identification metric is triggered, and others show positive changes indicating the overall impact from LTC may be neutral or positive. As a result, only the following additional corridor is recommended for progression to the next phase of analysis:

- A229 corridor between M2 and M20.

2.1.6. Following discussions with KCC, it has been confirmed that the A229 Corridor is currently subject to a Large Local Major (LLM) SOBC, which includes improvements to Blue Bell Hill, Lord Lees Roundabout, Taddington Roundabout, A229 and A229 / M2 slip road. The objectives of this scheme are to reduce forecast traffic congestion, improve road safety, alleviate poor air quality and accommodate local growth and additional traffic from LTC. As such, whilst options for improving traffic flow on the A229 corridor will not be considered as part of this study, the proposals that form part of the LLM SOBC will be taken into consideration as part of recommendations being made for the in-scope network.

2.1.7. In addition to the five additional corridors a number of standalone junction / link locations have been identified within the study area through use of the assessment metrics discussed in Section 3. These additional locations consist of:

- A226 Gravesend Road, where traffic flow increases associated with LTC are likely to have a detrimental impact on existing on-carriageway cycle route provision; and
- Chatham Road (South of Bluebell Hill), where traffic flow increases associated with LTC are likely to have a detrimental impact on existing on-carriageway cycle route provision.

2.1.8. Further information on these identified locations is included in Section 8 and 9 of this Technical Note.

## 2.2 Treatment of 'Rat-Runs' and HGV routes

2.2.1. The identification of the corridors has included an assessment of the local roads in the study area. In several cases there are local roads that connect two corridors which show increased traffic levels, often referred to as 'rat-runs'. Where the traffic on these local roads is clearly only linking two other corridors they have not been categorised as corridors themselves and the issues are addressed as part of the associated main corridors.

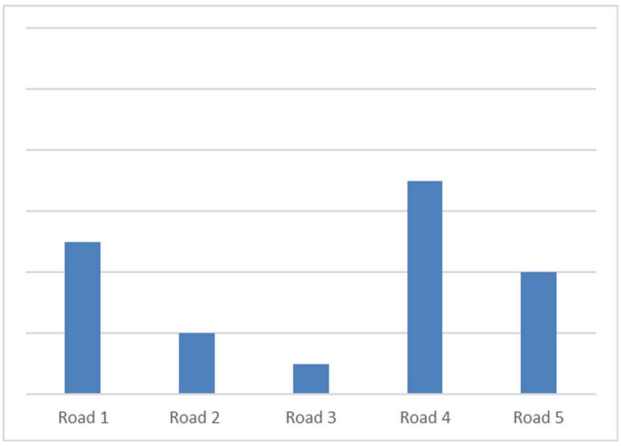
The results also show increased HGV traffic on local roads. Several of these roads are unable to handle HGV traffic, some are narrow and single carriageway, and the Local Highway Authority will want to prevent HGVs from using many of these local roads for road safety, noise, environmental and practicality reasons. It is expected that in reality some of this HGV traffic will be redistributed onto the core HGV network.

2.2.2. Figure 2-2 illustrates how increased HGV traffic on five roads might be modelled and how in reality this results in higher-than-expected HGV use of a few critical corridors and junctions.

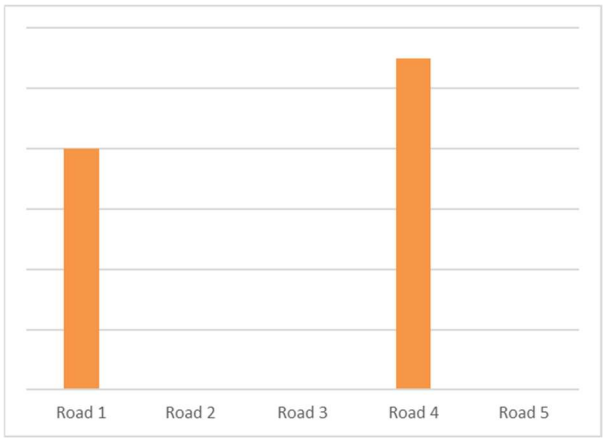
2.2.3. The next phase of our analysis will consider where this reallocation of HGV traffic is likely to exacerbate the modelled results in other locations, for example where installing a weight limit on certain minor roads, may lead to HGV traffic being re-routed onto the A227 / A228. This will need to involve discussion with KCC and possibly National Highways about what the preferred HGV routes in the area are.

Figure 2-2 Illustration of modelled HGV route demand vs likely reality

**Modelled Outputs**




**Likely Reality**




*Roads 1 and 4 are the main HGV routes, roads 2, 3 and 5 are inappropriate for HGV's and may have future restrictions in place. Modelled HGV traffic on roads 2, 3 and 5 in reality chooses to travel on the main HGV corridors resulting in traffic on roads 1 and 4 being higher than modelled.*

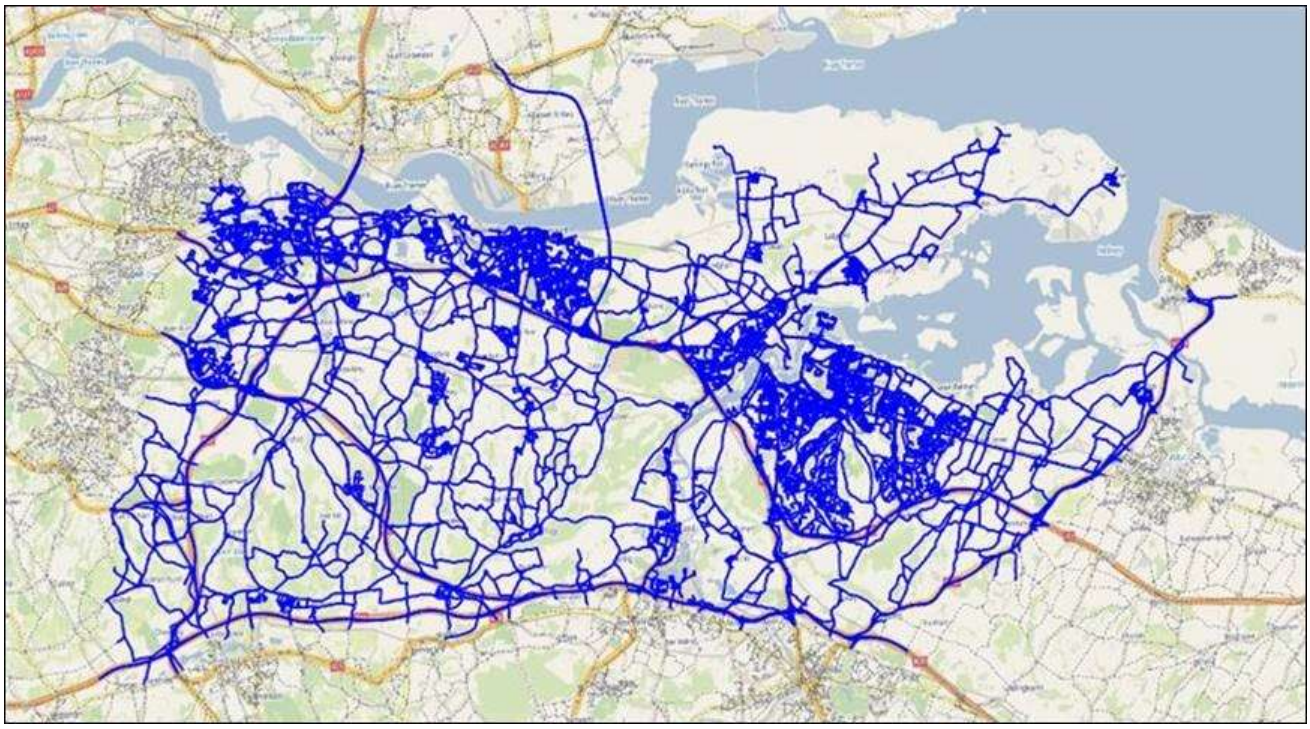
2.2.4. During the next stage WSP will undertake a qualitative and quantitative assessment for the manual reassignment of HGV and private vehicles. The assessment will identify the scale of potential reassignment and then provide an estimate on the approximate level of traffic which may use a route and if further mitigation will be required.

# 3 Priority Order and Identification of the Problem

## 3.1 Introduction

3.1.1. This section provides a summary of how the model outputs have been interrogated and analysed allowing junctions and corridors to be identified and prioritised for assessment. **Figure 3-1** shows the cordon area of the Kent Transport Model for which data has been provided.

**Figure 3-1 - Kent Transport Model Cordon Area**



## 3.2 Priority Order of Assessment

3.2.1. The 2030 forecast scenario (LTC opening year) will be prioritised for assessment purposes. This reflects the following:

- 2030 forecast scenario shows the immediate impacts that are predicted to occur on KCC's local highway network as result of LTC. Issues that present themselves in 2030 are those which are most pressing and require action soonest, they are also those that rely least on forecasts which means these model outputs have a higher level of confidence;
- An initial review of the results suggested that the majority of the issues identified in 2030 worsened in 2045, as opposed to there being new issues in 2045 only; and
- The prioritisation of the LTC opening year scenario ensures that issues resulting from background traffic growth between 2030 and 2045 are excluded from the initial prioritisation.

3.2.2. The 2045 forecast scenario (LTC design year) will be used to inform the scale of the problem and the criticality in 2030. For example, issues that do not worsen significantly between 2030 and 2045 will have a lower priority than those which deteriorate more. This detailed examination will be part of the next phase of analysis at each of the identified junctions and corridors.

## 3.3 Assessment Metrics

3.3.1. A range of metrics have been developed by WSP to assess the wider network impact of the LTC. These metrics have been selected to ensure that all highway users are considered and to ensure that the identification of impacts and subsequent mitigation is not based solely on highway capacity improvements and instead considers all highway users. This approach is aligned to KCC's Local Transport Plan 4 ambitions and the National Planning Policy Framework.

3.3.2. The initial set of metrics are shown in Table 3-1 below, these were later refined to those in Table 3-2 through the thought process outlined below. Prioritisation is not considered at this stage, so each metric is considered equally.

**Table 3-1 –Primary Assessment Metrics**

| No. | Junction / Link Metrics | Criteria 1 | Criteria 2 |
|---|---|---|---|
| 1 | Link / Junction Capacity | Volume to Capacity (V/C) increases by more than 10% in Do Something (DS) scenario | The DS V/C level is more than 85% |
| 2 | Queue length | Does it now obstruct another junction or entry/exit in DS scenario? | |
| 3 | Delay | Travel time increase by 10% in DS scenario | Travel time increases by more than 5 minutes in DS scenario |
| 4 | HGV Flow | 10% increase of HGV in DS scenario (IEMA guidance) | |
| 5 | Public Transport | Bus route journey time increases by 5% across a corridor in DS scenario | 1-minute journey time increase at individual junctions as a result of LTC |
| 6 | Active Travel | Signed cycle routes where a step-change in link or crossing provision (DMRB CD195) in DS scenario | Increases in road vehicles in proximity to signed active travel routes in DS scenario |

| | | | |
|---|---|---|---|
| 7 | Development Impact | Major development planned within 3 miles and not included in DS scenario | |
| **No.** | **Corridor Metrics** | **Criteria 1** | **Criteria 2** |
| 1 | Journey time | Increase in journey time of 10% in DS scenario | Increase of journey time of 10 minutes or more in DS scenario |

3.3.3. For all scenarios, KTM outputs for the Do Nothing (DN) scenario (without LTC) have been compared against the Do Something (DS) scenario (with LTC) to identify problems. All KTM outputs are provided in vehicle numbers rather than Passenger Carrying Units (PCUs). A link or junction is taken forward for further assessment where it triggers a single criteria across either of the two different assessment years or either of the AM or PM peak periods.

3.3.4. Based on the Primary Assessment Metrics set-out in Table 3-1 a long-list of corridors and junctions were identified for assessment with an initial sift of these completed to remove anomalies and ensure that identified locations require mitigation as a direct result of the LTC. This sifting has taken account of the following examples, which would not be picked up through use of the initial metrics:

- Increases in Volume to Capacity (V/C) ratio may not result in traffic congestion or increased traffic congestion as a result of the LTC, with some junctions identified by the primary metrics still operating within capacity or experiencing a negligible impact;
- Where HGVs have increased by more than 10% this can include roads which have very low HGV traffic and see a small increases. For example, three HGVs per day increasing to four as a result of LTC is more than a 10% increase but would not have a significant impact;
- Increases in queue lengths are most likely to occur at junctions operating over capacity or where the LTC has a significant impact on V/C ratio;

3.3.5. In considering refinement of the metrics, delay has not been taken forward in problem identification because it is a factor of increasing congestion and journey times, both of which are already being identified.

3.3.6. Queue length analysis was undertaken on an earlier set of model outputs that became superseded. When new model runs became available the V/C ratios were updated and showed that queue length analysis would not change significantly so they were not updated.

3.3.7. The development impact metric has also been removed for the initial problem identification as junctions which do not exhibit the other criteria cannot be said to be affected by the LTC. For the junctions and corridors that are identified, local developments will be reviewed during the following stages when individual junctions are focused upon.

3.3.8. Taking this into account, Table 3-2 presents the Secondary Assessment Metrics taking account of the initial sift outlined in the bullets above. These metrics will be taken forward for assessment for each junction, corridor and additional areas for assessment, as detailed in subsequent chapters of the report. As with the Primary Assessment Metrics, a link / junction is deemed to have 'failed' a test and is taken forward for further assessment if it triggers any of the identified criteria across either of the two different assessment years or either of the AM or PM peak periods. This provides a holistic approach to assessing the impacts of LTC on KCC's local highway network and avoids the subsequent mitigation measures being based upon only the alleviation of traffic congestion.

**Table 3-2 – Secondary Assessment Metrics**

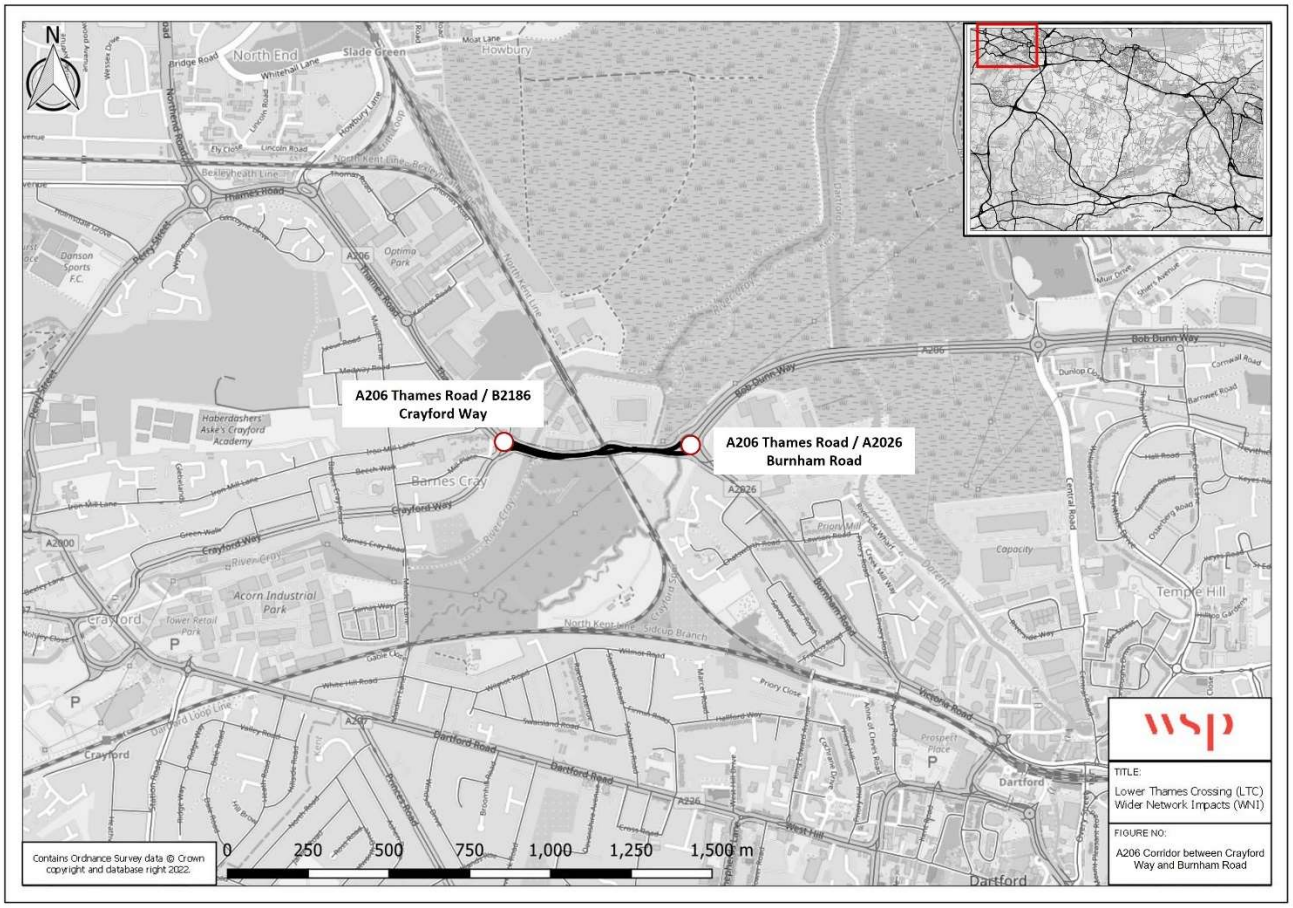
| No. | Junction / Link Metrics | Criteria 1 | Criteria 2 |
|---|---|---|---|
| 1 | Link / Junction Capacity | Junctions where V/C ratio increases by more than 10% at junctions with V/C ratio of >100% | Junctions where the DN V/C ratio is <100% in DN and >100% in DS. |
| 2 | Queue length | See Table 3-1 and Section 3.3.6 | |
| 3 | HGV Flow | HGV increase by 60 in any direction | HGVs double in any direction |
| 4 | Public Transport | Bus route journey time increases by 5% across a corridor in DS scenario | |
| 5 | Active Travel | Links that form part of signed cycle network where there is on-road cycle provision and traffic flow increase by 5% or more | |
| **No.** | **Corridor Metrics** | **Criteria 1** | **Criteria 2** |
| 1 | Journey time | Increase in journey time of 10% | Increase of journey time of 10 minutes |

# 4 A206 corridor between Crayford Way and Burnham Road

## 4.1 Introduction

This section provides a summary of the assessments undertaken for the A206 between Crayford Way and Burnham Road.

**Figure 4-1 A206 corridor between Crayford Way and Burnham Road**




## 4.2 Corridor Journey Times

4.2.1. Table 4-1 and Table 4-2 show the forecast eastbound (EB) and westbound (WB) journey time increases for the 2030 and 2045 DN and DS Scenarios. The distance for each of the journey times is as follows:

- Eastbound Distance – 0.53km
- Westbound Distance – 0.54km

**Table 4-1 – A206 Corridor 2030 Journey Time Impacts**

| | Do Nothing Scenario | | Do Something Scenario | | LTC Impact | | |
|---|---|---|---|---|---|---|---|
| | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | % Impact |
| AM Peak EB | 01:17 | 25 | 01:16 | 25 | -00:01 | +0 | -1% |
| AM Peak WB | 01:30 | 22 | 01:30 | 22 | 00:00 | 0 | 0% |
| PM Peak EB | 01:26 | 22 | 01:31 | 21 | +00:05 | -1 | 6% |
| PM Peak WB | 01:30 | 22 | 01:30 | 22 | 00:00 | 0 | 0% |

**Table 4-2 – A206 Corridor 2045 Journey Time Impacts**

| | Do Nothing Scenario | | Do Something Scenario | | LTC Impact | | |
|---|---|---|---|---|---|---|---|
| | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | % Impact |
| AM Peak EB | 01:39 | 19 | 01:31 | 21 | -00:08 | +2 | -8% |
| AM Peak WB | 01:30 | 22 | 01:30 | 22 | 00:00 | 0 | 0% |
| PM Peak EB | 01:39 | 19 | 01:39 | 19 | 00:00 | 0 | 0% |
| PM Peak WB | 01:31 | 21 | 01:31 | 21 | 00:00 | 0 | 0% |

4.2.2. The results in Table 4-1 and 4-2 show that the LTC has a negligible impact on journey times and average speeds on the A206 between Crayford Way and Burnham Road, with the most significant change being an eight second reduction in journey time experienced in the 2045 AM Peak.

## 4.3 Junction Metrics

4.3.1. Table 4-3 shows a summary of how each of the junctions within Corridor 1 performed against the assessment metrics defined in Section 3. Where issues have been identified a corresponding objective of potential mitigation has also been included within the table. The table indicates a “problem”, or impact of LTC implementation, as “Fail”, and a “Pass” where the metric is not triggered.

**Table 4-3 – A206 Corridor: Problems and Objectives Identified**

| Junction Ref | Location | Junction / Link Capacity | | Queue length | Share of HGV | | Active Travel |
|---|---|---|---|---|---|---|---|
| | | Criteria 1 | Criteria 2 | Criteria 1 | Criteria 1 | Criteria 2 | Criteria 1 |
| WNI101 | A206 Thames Road / B2186 Crayford Way | Pass | Pass | Pass | Pass | -Pass | Pass |
| WNI102 | A206 Thames Road / A2026 Burnham Road | Pass | Pass | Pass | Pass | Pass | Pass |
| N/A | A206 Corridor | Pass | Pass | N/A | Fail | | Pass |

Corridor Wide Summary / Objectives

Journey times do not appear to be significantly affected and other results do not indicate a clear negative impact, despite the junctions operating over capacity in the 2030 and 2045 DN scenarios. For example, V/C values on the A206 Thames Road / B2186 Crayford Way only change by 1% in 2030 DS scenarios and up 4% in the 2045 DS scenarios. Similarly, the A206 Thames Road / Burnham Road junction has maximum V/C increases of 1% and 6% in the 2030 and 2045 scenarios, respectively.

HGV flows double as a result of LTC but remain less than 10 vehicles per hour. As the A206 is a route through a primarily commercial area of Dartford and this increase is unlikely to have a significant impact.

No impacts were identified in relation to public transport or active travel routes.

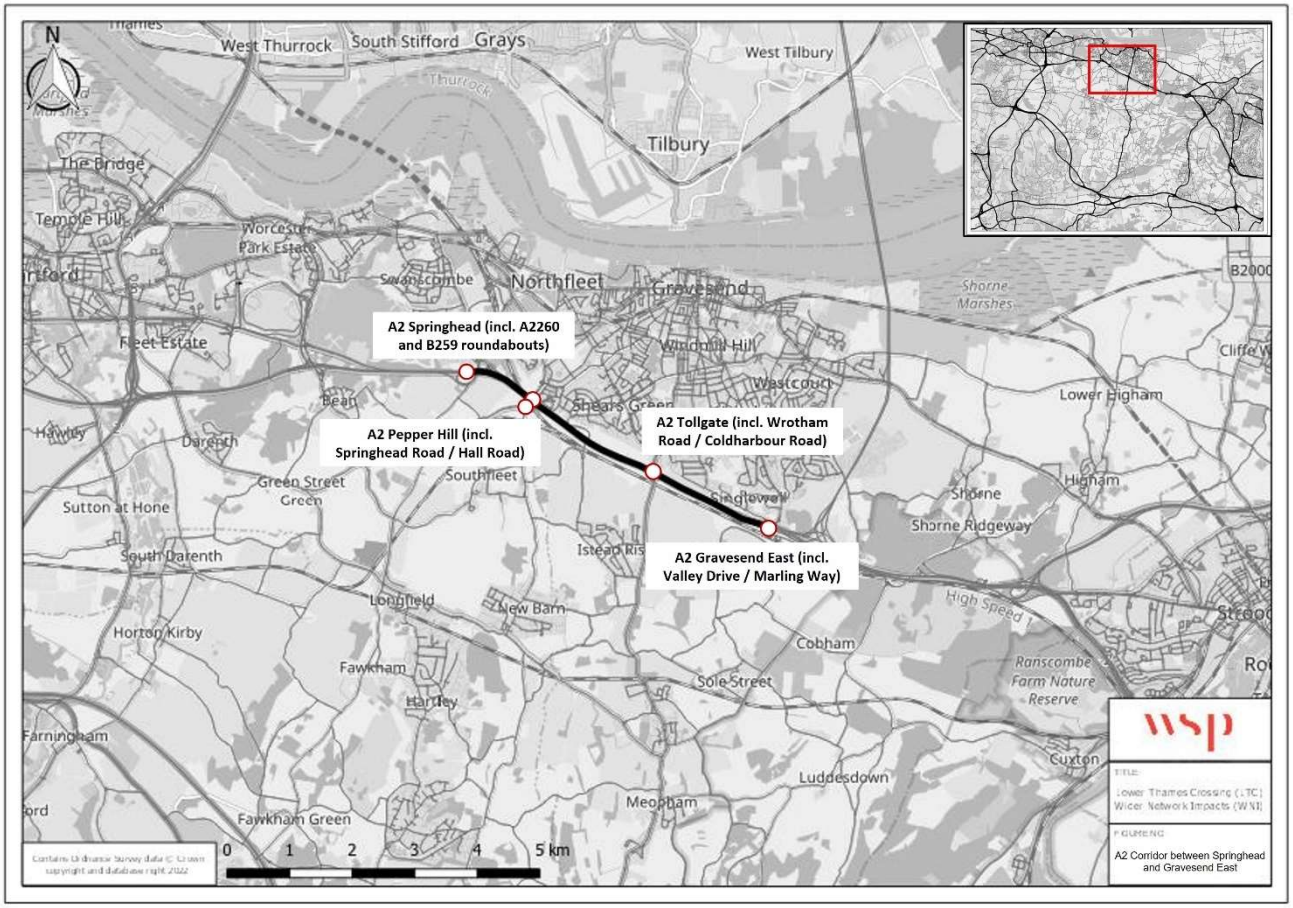
The results of our analysis indicate that the A206 is unlikely to merit investment in mitigation as a direct result of LTC.

# 5 A2 corridor between Spring Head and Gravesend East

## 5.1 Introduction

This section provides a summary of the assessments undertaken for the A2 between Spring Head and Gravesend East.

**Figure 5-1 A2 corridor between Spring Head and Gravesend East**




## 5.2 Corridor Journey Times

5.2.1. Table 5-1 and 5-2 show the forecast journey time increases for the 2030 and 2045 DN and DS Scenarios. The distance for each of the journey times is as follows:

- Southeast bound Distance – 6.27km
- Northwest bound Distance – 7.25km

**Table 5-1 – A2 Corridor 2030 Journey Time Impacts**

| | Do Nothing Scenario | | Do Something Scenario | | LTC Impact | | |
|---|---|---|---|---|---|---|---|
| | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | % Impact |
| AM Peak EB | 04:55 | 77 | 04:41 | 80 | -00:14 | +3 | -5% |
| AM Peak WB | 07:41 | 58 | 07:01 | 63 | -00:46 | +6 | -9% |
| PM Peak EB | 06:00 | 63 | 05:18 | 71 | -00:42 | +8 | -12% |
| PM Peak WB | 06:10 | 72 | 05:59 | 74 | -00:11 | +2 | -3% |

**Table 5-2 – A2 Corridor 2045 Journey Time Impacts**

| | Do Nothing Scenario | | Do Something Scenario | | LTC Impact | | |
|---|---|---|---|---|---|---|---|
| | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | % Impact |
| AM Peak EB | 05:08 | 73 | 04:50 | 78 | -00:18 | +5 | -6% |
| AM Peak WB | 08:26 | 53 | 07:35 | 59 | -00:51 | +6 | -10% |
| PM Peak EB | 06:54 | 55 | 05:42 | 66 | -01:12 | +11 | -17% |
| PM Peak WB | 06:28 | 69 | 06:17 | 71 | -00:11 | +2 | -3% |

5.2.2. As summarised in Table 5-1 and 5-2, a significant journey time reduction is experienced in the AM both in the 2030 and 2045 DS scenarios as compared to the respective DN scenarios, which is reflected in an increase in average speed. In the PM peak, it is forecast that there will be significant reductions in journey time in each of the 2030 and 2045 DS scenarios as compared to the respective DN scenarios eastbound whilst in the westbound the journey improvements are negligible. LTC is anticipated to have a positive impact on the journey times in this corridor.

## 5.3 Junction Metrics

5.3.1. Table 5-3 shows a summary of how each of the junctions within Corridor 2 performed against the assessment metrics defined in Section 3. Where issues have been identified a corresponding objective of potential mitigation has also been included within the table. Where relevant, additional junction that have been identified where they met the criteria for assessment.

**Table 5-3 – A2 Corridor: Problems and Objectives Identified**

| Junction Ref | Location | Junction Capacity | | Queue length | Share of HGV | | Active Travel |
|---|---|---|---|---|---|---|---|
| | | Criteria 1 | Criteria 2 | Criteria 1 | Criteria 1 | Criteria 2 | Criteria 1 |
| WNI201 | A2 Spring Head (incl. A2260 and B259 roundabouts) | Pass | Pass | Pass | Pass | Pass | Pass |
| WNI202: | A2 Pepper Hill (incl. Spring Head Road / Hall Road) | Pass | Fail | Pass | Pass | Fail | Pass |
| WNI203 | A2 Tollgate (incl. Wrotham Road / Coldharbour Road) | Pass | Fail | Fail | Pass | Fail | Pass |
| WNI204 | A2 Gravesend East (incl. Valley Drive / Marling Way) | Fail | Fail | Fail | Pass | Fail | Pass |
| NEW | Hall Road / Station Road / New Barn Road (South of A2) | Fail | Pass | Pass | Pass | Fail | Pass |
| N/A | A2 Corridor | Pass | Pass | N/A | Fail | | Pass |

Corridor Wide Summary / Objectives

The A2 Pepper Hill junction is operating close to capacity in the DN scenario and is forecast to experience worst-case increases of 1% in the 2030 DS PM and 4% in 2045 DS PM scenarios. In the 2045 DS PM scenario the junction is forecast to operate over capacity with the V/C value increasing from 97% in the DN scenario to 101% in the DS scenario.

The A2 Tollgate junction fails to operate within capacity as a result of LTC, leading to queue lengths blocking back along Wrotham Road / Coldharbour Road junction for a length of 110 metres in the 2045 DS PM which is an increase of 10m from the 2045 DN PM scenario. The impact of LTC was most significant in the 2030 AM where the V/C ratio increased from 94% to 101%.

The A2 Gravesend East junction is forecast to experience large V/C ratio increases towards Valley Drive of 53% in the 2030 DS AM scenario, 55% in the 2030 DS PM scenario, 62% in the 2045 DS AM scenario and 63% in the 2045 DS AM scenario. The V/C ratio increased to 100% for the 2030 DS AM scenario, 99% for the 2030 DS PM scenario and to 115% for the 2045 DS AM and to 114% for the 2045 DS PM scenarios, showing that LTC has a significant detrimental impact on the operation of this junction. The A2 Gravesend East junction away from Valley Drive is operating over capacity in the DN scenario and is forecast to experience V/C increases of 6% in the 2030 DS AM scenario, 19% in the 2030 DS PM scenario, 6% in the 2045 DS AM scenario and 21% in the 2045 DS PM scenario. The forecast queue at the junction is 120m in the 2045 DS PM this is an increase of approximately 35m when compared to the 2045 DM PM scenario. The forecast queue increases in the 2045 DS AM by 25m when compared to the 2045 DM AM scenario.

Hall Road / Station Road / New Barn Road is operating over capacity in the DN scenario and are forecast to experience significant increases in V/C values of 12% in the 2030 DS AM and 16% in 2045 DS AM scenarios, as a result of LTC.

On all junctions except the A2 Springhead, the peak hour HGV flows increase significantly as a result of LTC, which is likely to put further strain on junction capacity whilst also having a detrimental impact on pedestrians and cyclists in the vicinity of these junctions. This included worst-case increases at the A2 / Wrotham Road Roundabout for 2030 AM from 222 to 262, 2030 PM from 113 to 125, 2045 AM showing the largest increase of 40 per hour, from 233 to 273 and 2045 PM forecast increasing from 116 to 139.

However, the journey time analysis presented in Table 5-1 and 5-2 show that the A2 itself is not negatively impacted by LTC with regards the average speed of journey times. The objectives of any mitigation will therefore focus on capacity improvements that bring junctions identified to within capacity in the DS scenario. Based on our analysis the junctions should be prioritised in the following order:

1. A2 Gravesend East (incl. Valley Drive / Marling Way: This junction mitigation will be considered highest priority as a result of LTC pushing the junction overcapacity in the AM peak, the significant V/C increases forecast in the DS scenarios and the anticipated increases in queue lengths and HGV flow at the junction. Each of these metrics suggest that LTC will result in a significant increase in congestion at this junction in comparison with the DN scenario;

2. A2 Tollgate (incl. Wrotham Road / Coldharbour Road): Due to the junction being pushed over capacity as a result of LTC, with queue lengths forecast to block back through upstream junctions;

3. Hall Road / Station Road/ New Barn Road: Due to the junction being over capacity and showing significant increases in V/C as a result of LTC but without forecast issues with queue lengths; and

4. A2 Pepper Hill (incl; Springhead Road / Hall Road): Whilst this is pushed over capacity as a result of LTC, V/C increases by 1-4% and there being no issues forecast with queue lengths

## 5.4 Gravesend Corridor Journey Times

5.4.1. Further to the assessment of the A2 corridor, an additional assessment has been completed of the highway corridors running across the A2 and north towards Gravesend, given the junction impacts identified in Table 5-8. This assessment has been completed confirm if the impacts reported at each junction continue to occur on key corridors to / from Gravesend, which is in a unique location being the only major urban conurbation located between LTC and the existing Dartford Crossing. As such there is likely to be a change in trip distribution as a result of LTC for those travelling north of the river and this will impact the key corridors into Gravesend.

5.4.2. The additional corridors identified for assessment are as follows:

- Corridor 1 – B259 – Stanhope Road – High Street between A2260 Ebbsfleet Gateway and A226
- Corridor 2 – Hall Road / Springfield Road between south of the A2 and B2175 London Road;
- Corridor 3 - A227 Wrotham Road between A2 and Rathmore Road; and
- Corridor 4 – Valley Drive between A2 and B261 Old Road East.

5.4.3. A227 Wrotham Road (Corridor 3) and Valley Drive (Corridor 4) include a number of local bus services, which may be negatively impacted by additional or different traffic movements associated with LTC. These bus routes are summarised in Table 5.4 and Table 5.5 below.

**Table 5-4 – Corridor 3 Bus Services**

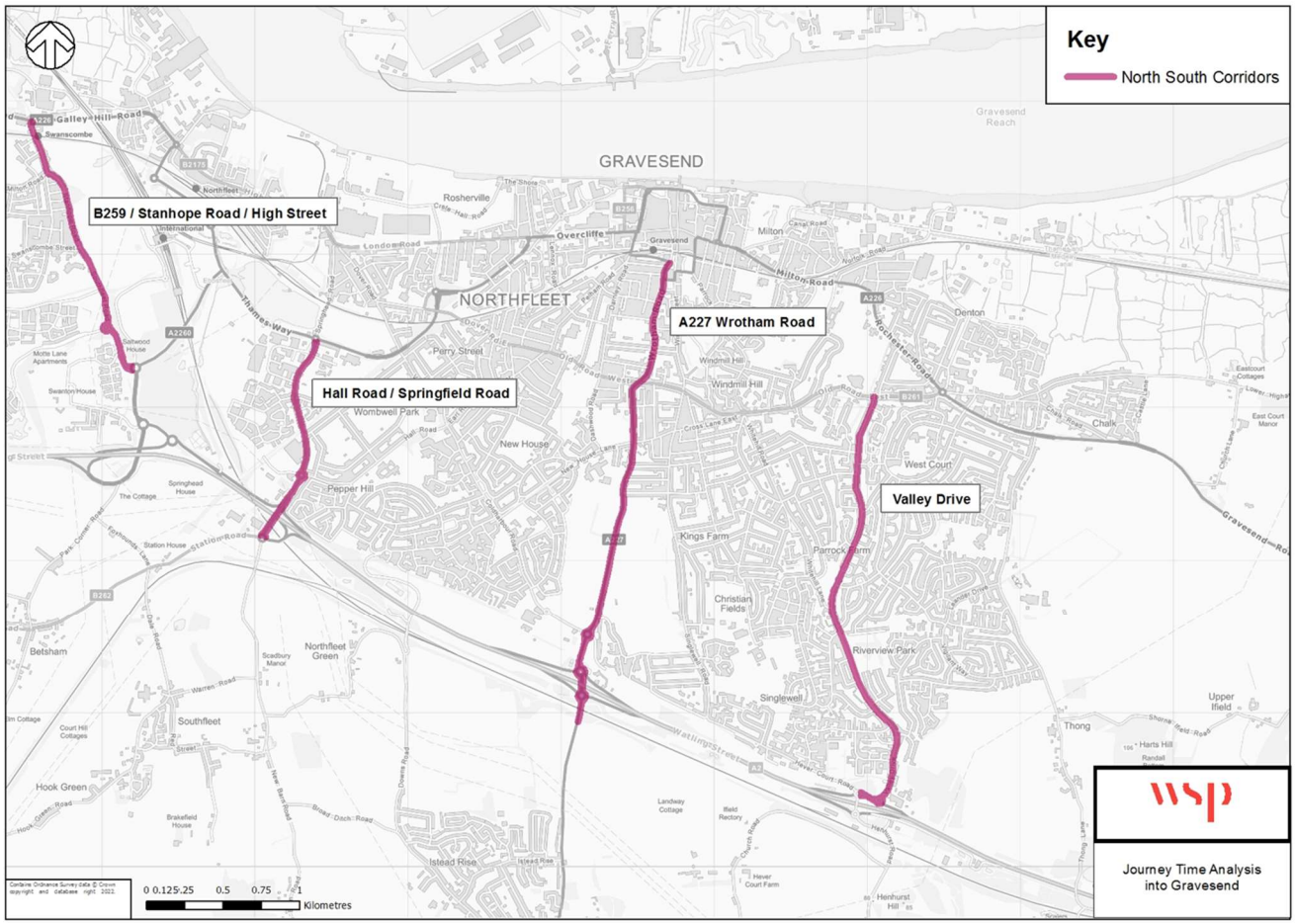
| Service | Route | Direction | First Bus | Last Bus | Peak Frequency | Off-peak Frequency |
|---|---|---|---|---|---|---|
| Red Route Bus 306/308 | Sevenoaks – Meopham – Gravesend | North / West bound * | 07:40 | 19:06 | Every Hour | Every hour and a half |
| | | South / East bound ** | 09:00 | 17:46 | Every Hour | Every hour and a half |

**Table 5-5 – Corridor 4 Bus Services**

| Service | Route | Direction | First Bus | Last Bus | Peak Frequency | Off-peak Frequency |
|---|---|---|---|---|---|---|
| Arriva 480 / 490 | Singlewell / Valley Drive / Gravesend Swanscombe / Bluewater / Dartford | North / West bound * | 04:30 | 23:55 | Every 20 -22 minutes | Every 20 minutes |
| | | South / East bound ** | 04:26 | 00:46 | Every 20 -22 minutes | Every 20 minutes |

5.4.4. The assessment has been undertaken due to the number of bus services which utilise the roads and to understand the impact on LTC on these services. Figure 5-2 presents the locations of the each of the Journey Times for the corridor Gravesend.

**Figure 5-2 - Locations of Journey Times into Gravesend**




5.4.5. The following tables present the journey times on the corridors below. Corridors will be taken forward for assessment if any of the journey times increase by 10% for private vehicles or 5% where there is a significant number of bus routes utilising the corridor, as aligned to the Assessment Metrics defined in Section 3.

**Table 5-6 – B259 – Stanhope Road – High Street Corridor**

| | 2030 | | | | 2045 | | | |
|---|---|---|---|---|---|---|---|---|
| | DN Scenario | DS Scenario | LTC Impact | | DN Scenario | DS Scenario | LTC Impact | |
| | Journey Time (mm:ss) | Journey Time (mm:ss) | Journey Time (mm:ss) | % Impact | Journey Time (mm:ss) | Journey Time (mm:ss) | Journey Time (mm:ss) | % Impact |
| AM Peak NB | 02:54 | 02:54 | 00:00 | 0% | 03:07 | 03:08 | 00:01 | 1% |
| AM Peak SB | 02:49 | 02:53 | 00:04 | 2% | 03:01 | 03:03 | 00:02 | 1% |
| PM Peak NB | 02:43 | 02:45 | 00:02 | 1% | 02:45 | 02:50 | 00:05 | 3% |
| PM Peak SB | 03:10 | 03:13 | 00:03 | 2% | 03:48 | 03:30 | -00:08 | -4% |

**Table 5-7 – Hall Road and Springhead Road**

| | 2030 | | | | 2045 | | | |
|---|---|---|---|---|---|---|---|---|
| | DN Scenario | DS Scenario | LTC Impact | | DN Scenario | DS Scenario | LTC Impact | |
| | Journey Time (mm:ss) | Journey Time (mm:ss) | Journey Time (mm:ss) | % Impact | Journey Time (mm:ss) | Journey Time (mm:ss) | Journey Time (mm:ss) | % Impact |
| AM Peak NB | 02:47 | 03:02 | 00:15 | 9% | 02:50 | 03:01 | 00:11 | 6% |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| AM Peak SB | 02:32 | 02:32 | 00:00 | 0% | 02:36 | 02:40 | 00:04 | 3% |
| PM Peak NB | 02:43 | 02:42 | -00:01 | -1% | 03:12 | 03:03 | -00:09 | -5% |
| PM Peak SB | 03:10 | 03:25 | 00:15 | 8% | 03:07 | 03:29 | 00:22 | 12% |

**Table 5-8 – A227 Wrotham Road**

| | 2030 | | | | 2045 | | | |
|---|---|---|---|---|---|---|---|---|
| | DN Scenario | DS Scenario | LTC Impact | | DN Scenario | DS Scenario | LTC Impact | |
| | Journey Time (mm:ss) | Journey Time (mm:ss) | Journey Time (mm:ss) | % Impact | Journey Time (mm:ss) | Journey Time (mm:ss) | Journey Time (mm:ss) | % Impact |
| AM Peak NB | 03:23 | 03:25 | 00:02 | 1% | 03:23 | 03:26 | 00:03 | 1% |
| AM Peak SB | 03:35 | 03:47 | 00:12 | 6% | 03:40 | 03:52 | 00:12 | 5% |
| PM Peak NB | 03:31 | 03:37 | 00:06 | 3% | 03:34 | 03:40 | 00:06 | 3% |
| PM Peak SB | 03:42 | 03:47 | 00:05 | 2% | 03:40 | 03:48 | 00:08 | 4% |

**Table 5-9 – Valley Drive**

| | 2030 | | | | 2045 | | | |
|---|---|---|---|---|---|---|---|---|
| | DN Scenario | DS Scenario | LTC Impact | | DN Scenario | DS Scenario | LTC Impact | |
| | Journey Time (mm:ss) | Journey Time (mm:ss) | Journey Time (mm:ss) | % Impact | Journey Time (mm:ss) | Journey Time (mm:ss) | Journey Time (mm:ss) | % Impact |
| AM Peak NB | 04:05 | 04:11 | 00:06 | 2% | 04:09 | 04:16 | 00:07 | 3% |
| AM Peak SB | 04:23 | 04:45 | 00:22 | 8% | 04:25 | 04:58 | 00:33 | 12% |
| PM Peak NB | 04:17 | 04:41 | 00:24 | 9% | 04:18 | 04:46 | 00:28 | 11% |
| PM Peak SB | 04:15 | 04:28 | 00:13 | 5% | 04:17 | 04:40 | 00:23 | 9% |

5.4.6. Based on the metrics outlined in Table 3-2, three of the four corridors presented in this section will be taken forward for assessment as part of the A2 Corridor as a result of the following journey time increases:

- Hall Road and Springhead Road experiences an 8-12% increase in journey time in the PM peak southbound direction as a result of LTC. This matches the assessment period where A2 Pepper Hill junction is forecast to pushed over capacity as a result of LTC and therefore reflects an increase in congestion approaching the A2. It is also noted that whilst it is not a major public transport route, bus service 489 crosses the A2 on Hall Road on a route between New Ash Green and Gravesend.
- A227 Wrotham Road is forecast to experience journey time increases of 5-6% in the AM peak southbound direction as a result of LTC and is a major bus corridor, serving six buses in the AM peak and three buses in the PM peak. This again reflects the V/C impacts reported in Table 5-3 with the A2 Tollgate junction pushed over capacity as a result of LTC in the AM peak. It is also noted that queue lengths are forecast to block back through upstream junctions as a result additional congestion created by LTC, meaning that real world journey time impacts are likely to be higher than the model forecasts; and
- Valley Drive is forecast to experience an increase in journey time of 8-12% in the AM peak southbound direction and 9-11% in the PM peak northbound direction as a result of LTC. This is a major public transport corridor as it has six buses per hour in the AM and

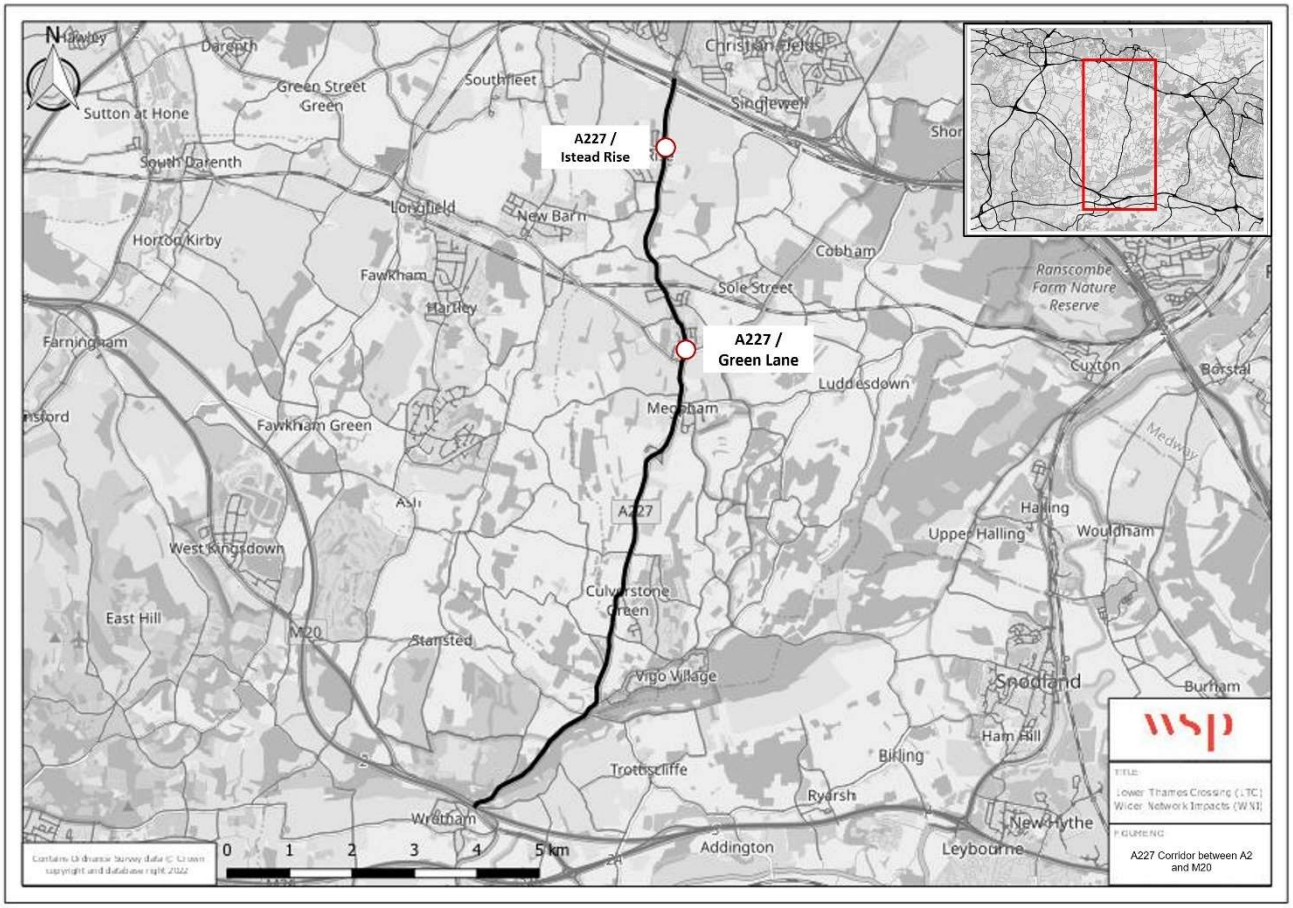
PM peak.  As with the two corridors above, these journey time increases are reflective of the increases congestion experienced at the A2 Gravesend East junction as a result of LTC.

# 6 A227 corridor between A2 and M20

## 6.1 Introduction

This section provides a summary of the assessments undertaken for the A227 between A2 and M20.

**Figure 6-1 A227 corridor between A2 and M20**




## 6.2 Corridor Journey Times

6.2.1. Table 6-1 and 6-2 show the forecast journey time increases for the 2030 and 2045 DN and DS Scenarios. The distance for each of the journey times is as follows:

- Northbound Distance – 13.02km
- Southbound Distance - 13.02km

**Table 6-1 – A227 Corridor 2030 Journey Time Impacts**

| | Do Nothing Scenario | | Do Something Scenario | | LTC Impact | | |
|---|---|---|---|---|---|---|---|
| | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | % Impact |
| AM Peak NB | 15:42 | 50 | 15:51 | 49 | +00:09 | -1 | 1% |
| AM Peak SB | 15:53 | 49 | 15:56 | 49 | +00:03 | 0 | 0% |
| PM Peak NB | 16:53 | 46 | 16:50 | 46 | -00:03 | 0 | 0% |
| PM Peak SB | 15:37 | 50 | 15:55 | 49 | +00:18 | -2 | 2% |

**Table 6-2 – A227 Corridor 2045 Journey Time Impacts**

| | Do Nothing Scenario | | Do Something Scenario | | LTC Impact | | |
|---|---|---|---|---|---|---|---|
| | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | % Impact |
| AM Peak NB | 15:57 | 49 | 16:08 | 48 | +00:11 | -1 | 1% |
| AM Peak SB | 16:20 | 48 | 16:23 | 48 | +00:03 | 0 | 0% |
| PM Peak NB | 17:22 | 45 | 17:19 | 45 | -00:03 | 0 | 0% |
| PM Peak SB | 15:58 | 49 | 16:19 | 48 | +00:21 | -1 | 2% |

6.2.2. As summarised in Table 6-1 and 6-2, AM and PM journey time results show a negligible increase in the 2030 and 2045 DS scenarios as compared to the respective DN scenarios.

6.2.3. The journey times along this corridor is not significantly impacted by LTC.

## 6.3 Junction Metrics

6.3.1. Table 6-3 shows a summary of how each of the junctions within Corridor 3 performed against the assessment metrics defined in Section 3. Where issues have been identified a corresponding objective of potential mitigation has also been included within the table.

**Table 6-3 – A227 Corridor: Problems and Objectives Identified**

| Junction Ref | Location | Junction Capacity | | Queue length | Share of HGV | | Active Travel |
|---|---|---|---|---|---|---|---|
| | | Criteria 1 | Criteria 2 | Criteria 1 | Criteria 1 | Criteria 2 | Criteria 1 |
| WNI301 | A227/Istead Rise | Pass | Pass | Pass | Pass | Pass | Pass |
| WNI302: | A227/Green Lane | Pass | Pass | Pass | Pass | Fail | Pass |
| N/A | A227 Corridor | Pass | Pass | N/A | Pass | | Pass |

Corridor Wide Summary / Objectives (Including WNI303: Link mitigations / traffic management to promote strategic route hierarchy and reduce use of inappropriate routes between M2 and M20)

The review of data from the KTM has showed that LTC does not result in capacity or queue length issues at either of the junctions included within the original scope of assessment. For example, V/C values at A227 Istead Rise remained below 62% in all scenarios while at A227 / Green Lane, V/C values are forecast to remain below 54%.

The A227 / Green Road junction however does experience a significant increase in HGV traffic as a result of LTC, which suggests use of inappropriate routes through Meopham, Hook Green, Sole Street and Cobham to access LTC. This impact is further highlighted through the HGV traffic flows experienced south of the A227 / Green Lane junction, where increases of 25%-75% are shown across the DS 2030 and 2045 scenarios, which is the equivalent to 68 to 90 per hour in 2030 AM and 71 to 95 in 2045 AM. Similar increases are expected during PM rush hour, showing increase from 30 to 47 HGVs in 2030 and 35 to 52 HGVs in 2045, DN to DS respectively. The findings of this investigation are supported by findings from National Highways that increased traffic in this area would be likely to increase noise levels and so should be mitigated. The use of these routes reflects concerns raised by local stakeholders and existing issues which will be exacerbated by additional HGV traffic associated with LTC. Therefore the forecast HGV flows are considered to provide a robust estimate of future network conditions in this location.

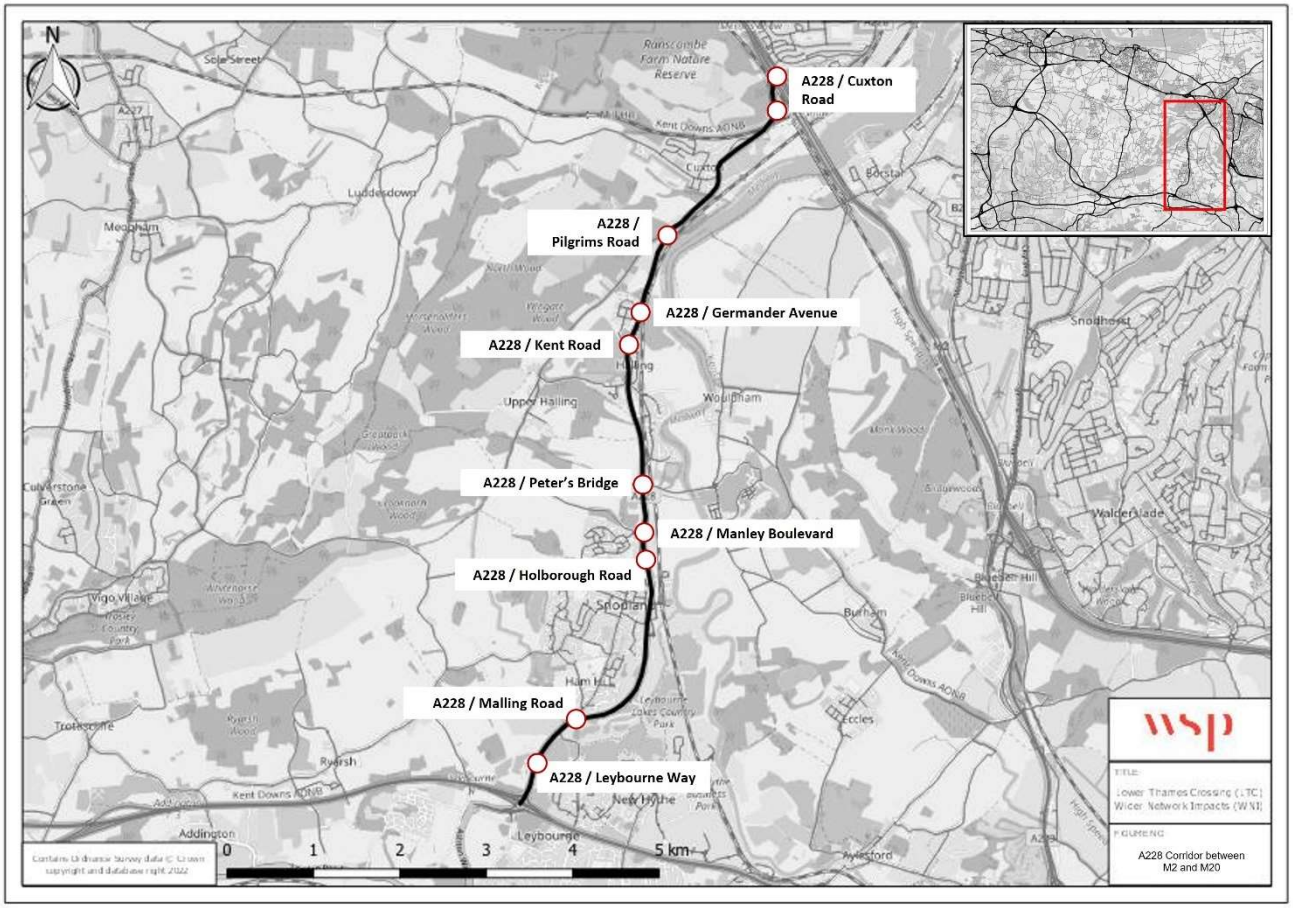
Based on these results, the mitigation for the A227 should focus upon reducing HGV traffic flows from using the A227 and the route through Hook Green, Sole Street and Cobham to access LTC.

# 7 A228 corridor between M2 and M20

## 7.1 Introduction

This section provides a summary of the assessments undertaken for the A228 between M2 and M20.

**Figure 7-1 A228 corridor between M2 and M20**




## 7.2 Corridor Journey Times

7.2.1. Table 7-1 and 7-2 show the forecast journey time increases for the 2030 and 2045 DN and DS Scenarios. The distance for each of the journey times is as follows:

- Northbound Distance – 9.67km
- Southbound Distance - 9.71km

**Table 7-1 – A228 Corridor 2030 Journey Time Impacts**

| | Do Nothing Scenario | | Do Something Scenario | | LTC Impact | | |
|---|---|---|---|---|---|---|---|
| | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | % Impact |
| AM Peak NB | 11:12 | 52 | 12:07 | 48 | +00:55 | -4 | 8% |
| AM Peak SB | 11:35 | 50 | 12:38 | 46 | +01:03 | -4 | 9% |
| PM Peak NB | 12:08 | 48 | 12:38 | 46 | +00:30 | -2 | 4% |
| PM Peak SB | 10:44 | 54 | 12:09 | 48 | +01:25 | -6 | 13% |

**Table 7-2 – A228 Corridor 2045 Journey Time Impacts**

| | Do Nothing Scenario | | Do Something Scenario | | LTC Impact | | |
|---|---|---|---|---|---|---|---|
| | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | % Impact |
| AM Peak NB | 11:39 | 50 | 12:40 | 46 | +01:01 | -4 | 9% |
| AM Peak SB | 12:43 | 46 | 13:36 | 43 | +00:53 | -3 | 7% |
| PM Peak NB | 13:02 | 45 | 13:26 | 43 | +00:24 | -2 | 3% |
| PM Peak SB | 11:11 | 52 | 12:31 | 46 | +01:20 | -6 | 12% |

7.2.2. The results presented in Table 7-1 and 7-2 show that the A228 experiences a 7-13% increase in journey times as a result of LTC, which is the equivalent to approximately 60-90 seconds. The PM peak experiences the most significant increase in each of the 2030 and 2045 scenarios, with a 12-13% increase in journey time. This is also reflected by decreases in average speed across all of the scenarios tested and most significantly in the southbound direction in the 2045 PM peak.

## 7.3 Junction Metrics

7.3.1. Table 7-4 shows a summary of how each of the junctions within Corridor 4 performed against the assessment metrics defined in Section 3. Where issues have been identified, a corresponding objective of potential mitigation has also been included within the table.

7.3.2. To highlight the increases in HGVs reported along the A228, Table 7-3 provides a summary of forecast traffic flows along the corridor and adjacent links Whilst it should be noted that baseline HGV flows reported in the DN scenario relate to land-uses located in the vicinity of the A228, such as the Tesco distribution centre, Mid Kent Business Park (incl. Royal Mail depot) and Smurfit Kappa recycling centre, these land-uses are not the cause of the impacts reported. As stated in Section 3, KTM outputs for the DN scenario (without LTC) have been compared against the DS scenario (with LTC) to identify problems directly associated within the introduction of LTC.

**Table 7-3 - Actual HGV Increase on A228 and Adjacent Links**

| | | No LTC | | LTC | | Difference | | No LTC | | LTC | | Difference | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2030 AM | 2030 PM | 2030 AM | 2030 PM | 2030 AM | 2030 PM | 2045 AM | 2045 PM | 2045 AM | 2045 PM | 2045 AM | 2045 PM |
| Green Lane | EB | 4 | 9 | 9 | 15 | 5 | 6 | 4 | 12 | 11 | 19 | 5 | 7 |
| | WB | 5 | 3 | 19 | 11 | 14 | 8 | 6 | 3 | 20 | 11 | 14 | 8 |
| Bush Road | EB | 27 | 5 | 28 | 6 | 1 | 1 | 22 | 5 | 30 | 6 | 8 | 1 |
| | WB | 8 | 8 | 12 | 8 | 4 | 0 | 9 | 8 | 13 | 9 | 4 | 1 |
| Village Road | NB | 2 | 1 | 2 | 1 | 0 | 0 | 2 | 2 | 2 | 1 | 0 | -1 |
| | SB | 1 | 1 | 1 | 0 | 0 | -1 | 1 | 2 | 3 | 1 | 2 | -1 |
| Rochester Road | NB | 6 | 6 | 9 | 15 | 3 | 9 | 5 | 2 | 7 | 14 | 2 | 12 |
| | SB | 34 | 35 | 46 | 45 | 12 | 10 | 36 | 30 | 50 | 43 | 14 | 13 |
| Ford Lane | NB | 5 | 2 | 8 | 6 | 3 | 4 | 6 | 3 | 9 | 6 | 3 | 3 |
| | SB | 7 | 2 | 17 | 7 | 10 | 5 | 7 | 3 | 17 | 7 | 10 | 4 |
| A228 | NB | 70 | 50 | 139 | 88 | 69 | 38 | 70 | 51 | 149 | 91 | 79 | 40 |
| | SB | 68 | 41 | 161 | 134 | 93 | 95 | 73 | 40 | 173 | 145 | 72 | 105 |

**Table 7-4 – Corridor 4: Problems and Objectives Identified**

| Junction Ref | Location | Junction Capacity | | Queue length | Share of HGV | | Active Travel |
|---|---|---|---|---|---|---|---|
| | | Criteria 1 | Criteria 2 | Criteria 1 | Criteria 1 | Criteria 2 | Criteria 1 |
| WNI401 | A228 / Cuxton Road | Pass | Fail | Pass | Pass | Pass | Pass |
| WNI402 | A228 / Bush Road | Pass | Fail | Pass | Pass | Fail | Pass |
| WNI403 | A228 / Kent Road | Pass | Pass | Pass | Pass | Fail | Pass |
| WNI404 | A228 / Peter's Bridge | Pass | Pass | Pass | Pass | Fail | Pass |
| WNI405 | A228 / Manley Boulevard | Pass | Pass | Pass | Pass | Fail | Pass |
| WNI406 | A228 / Holborough Road | Pass | Pass | Pass | Pass | Fail | Pass |
| WNI407 | A228 / Malling Road | Pass | Pass | Pass | Pass | Fail | Pass |
| WNI408 | A228 / Leybourne Way | Pass | Pass | Pass | Pass | Pass | Pass |
| NEW | A228 / Station Road | Pass | Fail | Pass | Pass | Fail | Pass |
| NEW | A228 / Pilgrims Road | Pass | Fail | Pass | Pass | Fail | Pass |
| NEW | A228 / Sundridge Hill roundabout | Fail | Fail | Pass | Pass | Fail | Pass |
| NEW | A228 / Germander Avenue | Pass | Fail | Pass | Pass | Fail | Pass |
| N/A | A228 Corridor | Fail | Pass | N/A | Fail | | Pass |

Corridor Wide Summary / Objectives (Including WNI409: Link mitigations / traffic management to promote strategic route hierarchy and reduce use of inappropriate routes between M2 and M20)

The A228 / Cuxton Road junction operates over capacity in the 2030 AM, 2045 AM and 2045 PM DN scenarios but is pushed over capacity by LTC in the 2030 PM scenario with the V/C value increasing from 98% to 104%. At worst, the V/C value increases by 8% to 127% in the 2045 DS PM scenario.

The A228 / Bush Road junction operates between 81% and 97% in the DN scenarios and is pushed over capacity in the 2045 AM DS Scenario where the V/C value increases from 97% in the DN scenario to 101% in the DS scenario. In the other scenarios V/C values increase by 9% in the 2030 DS AM scenario, 13% in the 2030 DS PM scenario, and 15% in the 2045 DS PM scenario but the junction operates within capacity.

The A228 / Manley Boulevard, Holborough Road, and Malling Road junctions are operating below 49%, 25% and 77% for the DS scenarios respectively.

The A228 / Station Road, A228 / Pilgrims Road and A228 / Germander Avenue junctions all operate over capacity in the 2045 AM scenario as a result of LTC, with V/C values increasing from 97% to 101% at all junctions. In addition, V/C values are forecast to increase by 4-10% in each of the 2030 DS scenarios leading to the junctions operating at capacity with V/C values of 98% and 100%

The A228/ Sundridge Hill Roundabout experiences a significant increase in V/C from 102% to 115% in the 2045 PM peak, whilst the junction is pushed over capacity by LTC in each of the 2030 DS scenarios with V/C values increasing from 93% to 103% and 99% to 108%.

Most junctions experience a significant increase in the number of HGVs in one direction in the either the AM or PM peak as a result of LTC. The junctions at both Bush Road and Pilgrim Way forecast identical increases for all four scenarios. 2030 AM shows an increase from 204 (DN) to 366 (DS); 2030 PM forecasts increase from 110 (DN) to 245 (DS), 2045 AM shows 205 (DN) to 392 (DS), and the 2045 PM forecast shows an increase of 113 for DN to 261 DS. The A228/ Malling Road Roundabout is forecast to experience an increase in HGV traffic for all four scenarios. 2030 AM shows an increase from 187 (DN) to 332 (DS), 2030 PM from 140 (DN) to 258 (DS), 2045 AM from 332 (DN) to 367 (DS), and 2045 PM from 258 (DN) to 282 (DS).

These results validate Kent County Council's concerns regarding rat running of HGVs as well as other traffic between the A229, A228 and A227 to connect between the M2/A2 corridor and the M20/A20 corridor. Many of these roads are unsuitable to accommodate HGV traffic due to their narrow width, tight bends and routes through village centres. In addition to the junctions listed above, the roads that see an increase in vehicles or HGVs between the DS and DN include Bush Road, Village Road, Birling Road, Rochester Road, White Horse Road. This is not an exhaustive list but provides some examples of rat running corridors.

These results highlight that additional traffic movements associated with LTC will have a significant detrimental impact on the A228 corridor with a forecast increase in traffic congestion at a number of junctions and significant increases in HGV traffic. This will impact upon all road users, leading to a deterioration in air quality and increased road safety risks, whilst also encouraging the use of alternative local routes that are unsuitable for high volumes of traffic.

Based on these results, the mitigation for the A228 should focus on reducing HGV traffic flows from the A228 and reducing the capacity constraints at northern junctions on the route, whilst also ensuring that this is not transferred to the A227 or other surrounding routes where identified impacts would be worsened.

# 8 Other Locations Identified

## 8.1 Introduction

8.1.1. This section provides a summary of additional locations which have been identified as potentially requiring mitigation as a result of LTC. This analysis has been completed to reflect that the KTM outputs used supersede all previous assessments of KCC's highway network and reflect the latest LTAM Uncertainty Log and LTC design proposals.

8.1.2. The starting point for the identification of additional junctions was those locations that met Criteria 1 of the Link / Junction Capacity Primary Assessment Metric (V/C >85%) before additional sifting was undertaken as per the original scope of assessment.

8.1.3. As with the original scope, these have been categorised as corridors where possible although in some instances individual junctions have been identified. Additional corridors that have been identified are summarised in Section 8.2 to 8.8 whilst other standalone locations are included in Section 8.9

## 8.2 Additional Corridors Identified

The following additional corridors have been identified as potentially requiring mitigation as a result of LTC:

- A229 corridor between M2 and M20;
- M25 corridor between M25 J3 and M25 J5;
- A2 corridor between M25 and A2 west of corridor included within original scope;
- M2 corridor between A2 and A229;
- A20 corridor between M20 and M26; and
- M26 corridor between A20 and M20.

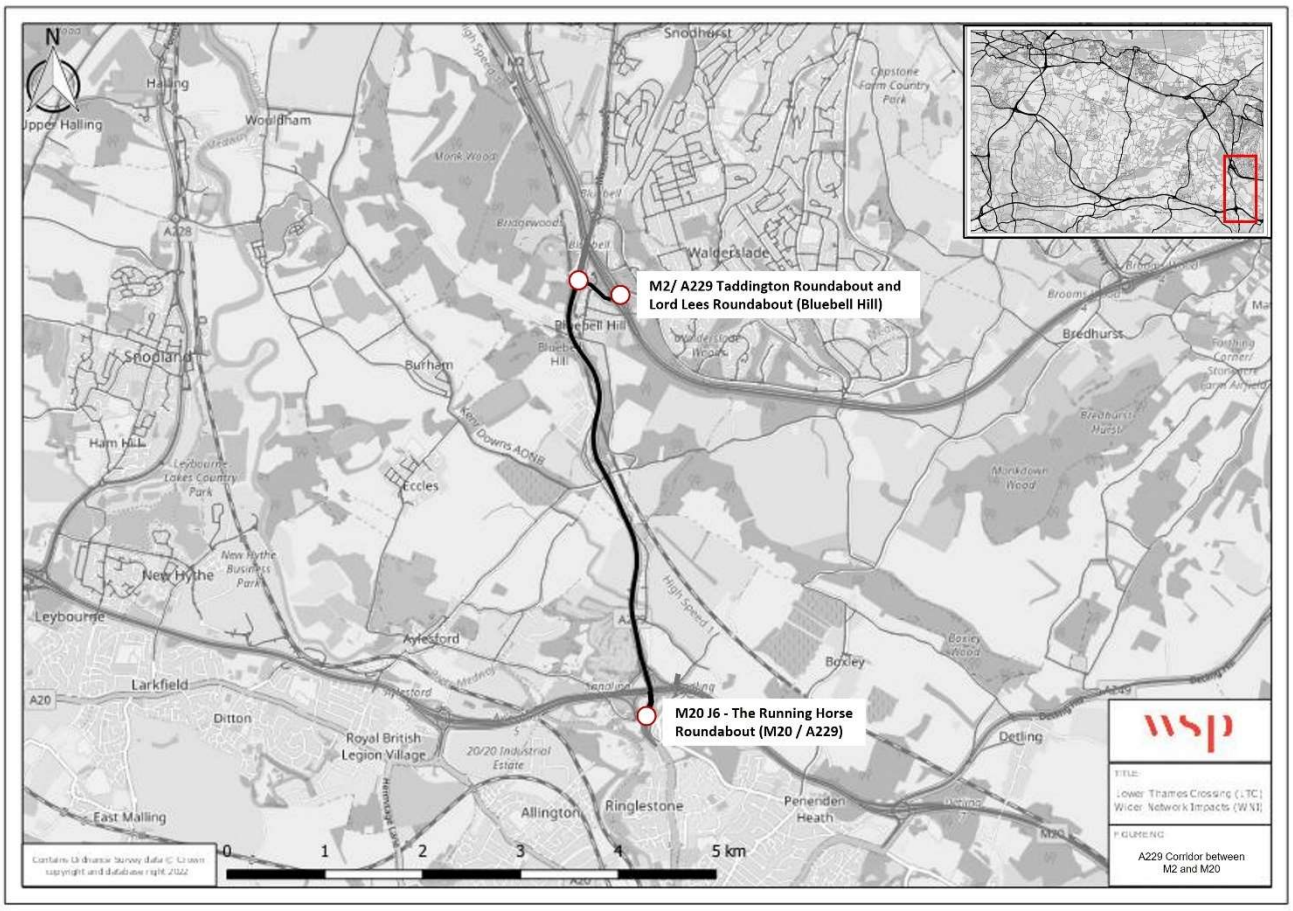
8.2.1. As part of the assessment of these corridors, a review has been undertaken of local network junctions and on/off-slip roads that are located within or at the start / finish of each corridor. Where such issues have been identified they have been summarised within the subsequent sections.

## 8.3 A229 corridor between M2 and M20

8.3.1. As noted in Section 2, KCC have confirmed that the A229 Corridor is currently subject to a Large Local Major SOBC, which includes capacity improvements to Blue Bell Hill, Lord Lees Roundabout, Taddington Roundabout, A229 and A229 / M2 slip road. A summary of forecast impacts however has been provided given that the corridor is anticipated to be operating over capacity with V/C values of more than 100% in each of the 2045 DS scenarios.

8.3.2. The corridor is shown to have a V/C no less than 90%, with the majority of the corridor over 100% in all of 2030 and 2045 DS scenarios.

**Figure 8-1 A229 corridor between M2 and M20**




8.3.3. Table 8-1 and 8-2 show the forecast journey time increases for the 2030 and 2045 DN and DS Scenarios. The distance for each of the journey times is as follows:

- Northbound Distance – 4.52km
- Southbound Distance – 4.42km

**Table 8-1 – A229 corridor between M2 and M20 2030 Journey Time Impacts**

| | Do Nothing Scenario | | Do Something Scenario | | LTC Impact | | |
|---|---|---|---|---|---|---|---|
| | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | % Impact |
| AM Peak NB | 04:00 | 70 | 04:17 | 66 | +00:17 | -4 | 7% |
| AM Peak SB | 06:23 | 50 | 06:28 | 49 | +00:05 | -1 | 1% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| PM Peak NB | 05:00 | 56 | 05:19 | 53 | +00:19 | -3 | 6% |
| PM Peak SB | 04:49 | 66 | 05:35 | 57 | +00:46 | -9 | 16% |

**Table 8-2 - A229 corridor between M2 and M20 2045 Journey Time Impacts**

| | Do Nothing Scenario | | Do Something Scenario | | LTC Impact | | |
|---|---|---|---|---|---|---|---|
| | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | % Impact |
| AM Peak NB | 04:07 | 60 | 04:43 | 68 | +00:36 | -8 | 15% |
| AM Peak SB | 07:03 | 45 | 07:12 | 44 | +00:09 | 1 | 2% |
| PM Peak NB | 05:38 | 50 | 06:08 | 46 | +00:30 | -4 | 9% |
| PM Peak SB | 05:03 | 63 | 06:08 | 52 | +01:05 | -11 | 21% |

8.3.4. Based on the summarised results for journey times along A229 between M2 and M20 in Table 8-1, an increase in journey times was demonstrated in the 2030 DS scenarios as compared to the DN scenarios. This was also reflected by a decrease in average speed of between 1km per hour and 11km per hour.

8.3.5. An increase in journey time is also forecast in the 2045 DS scenario compared to the corresponding DN scenario as shown in Table 8-2. The journey times are expected to increase by up to 21%, with average speeds decreasing by between no change and 11km per hour.

8.3.6. LTC, thus is anticipated to have negative impact on the journey times and average speeds along this corridor and has been taken forward for a more detailed assessment of individual junctions, as identified in Table 8-3 below.

**Table 8-3 - A229 corridor: Problems and Objectives Identified**

| Junction Ref | Location | Junction / Link Capacity | | Queue length | Share of HGV | | Active Travel |
|---|---|---|---|---|---|---|---|
| | | Criteria 1 | Criteria 2 | Criteria 1 | Criteria 1 | Criteria 2 | Criteria 1 |
| 501 | M2 / A229 Taddington Roundabout and Lord Lees Roundabout (Bluebell Hill) | Fail | Pass | Fail | Fail | | Pass |
| 502 | A2045 Walderslade Wood / \Fostington Way Roundabout | Pass | Fail | Pass | Pass | Pass | Pass |
| 503 | The Running Horse Roundabout (M20 / A229) | Fail | Fail | Fail | Pass | Fail | Pass |
| N/A | A229 | Pass | Fail | N/A | Fail | | Pass |

Corridor Wide Summary / Objectives

The review of data from the KTM has showed that LTC does have a significant impact on the A229 corridor with three of the four junctions being pushed over capacity. In addition, the interchange of the M2 / A229 at Taddington Roundabout and Lord Lees Roundabout (Bluebell Hill) experiences increases with the V/C increases of 6% for 2045 AM DS for 2045 PM DS (from 101% to 107%). with queueing back through the junction forecast to interfere with upstream junctions causing capacity issues to the highway network.

The A2045 Walderslade Wood / Fostington Way junction is operating close to or at capacity in the DN scenario and is forecast to experience worst-case increases of up to 6% in the DS scenarios, with the junction operating over capacity as a result of LTC in the 2045 PM scenario where the V/C value increases from 101% (DN) to 107% (DS). The 2045 DS AM scenario is forecast to be 96% from 93% in the 2045 DN PM scenario.

The Running Horse Roundabout (M20 / A229) also experiences a significant increase in V/C from 117% in the DN scenario to 141% in the 2045 AM DS scenario and 110% in the DN scenario to 119% in the 2045 PM DS scenario, which reflects the increased usage of the junction as a result of LTC.

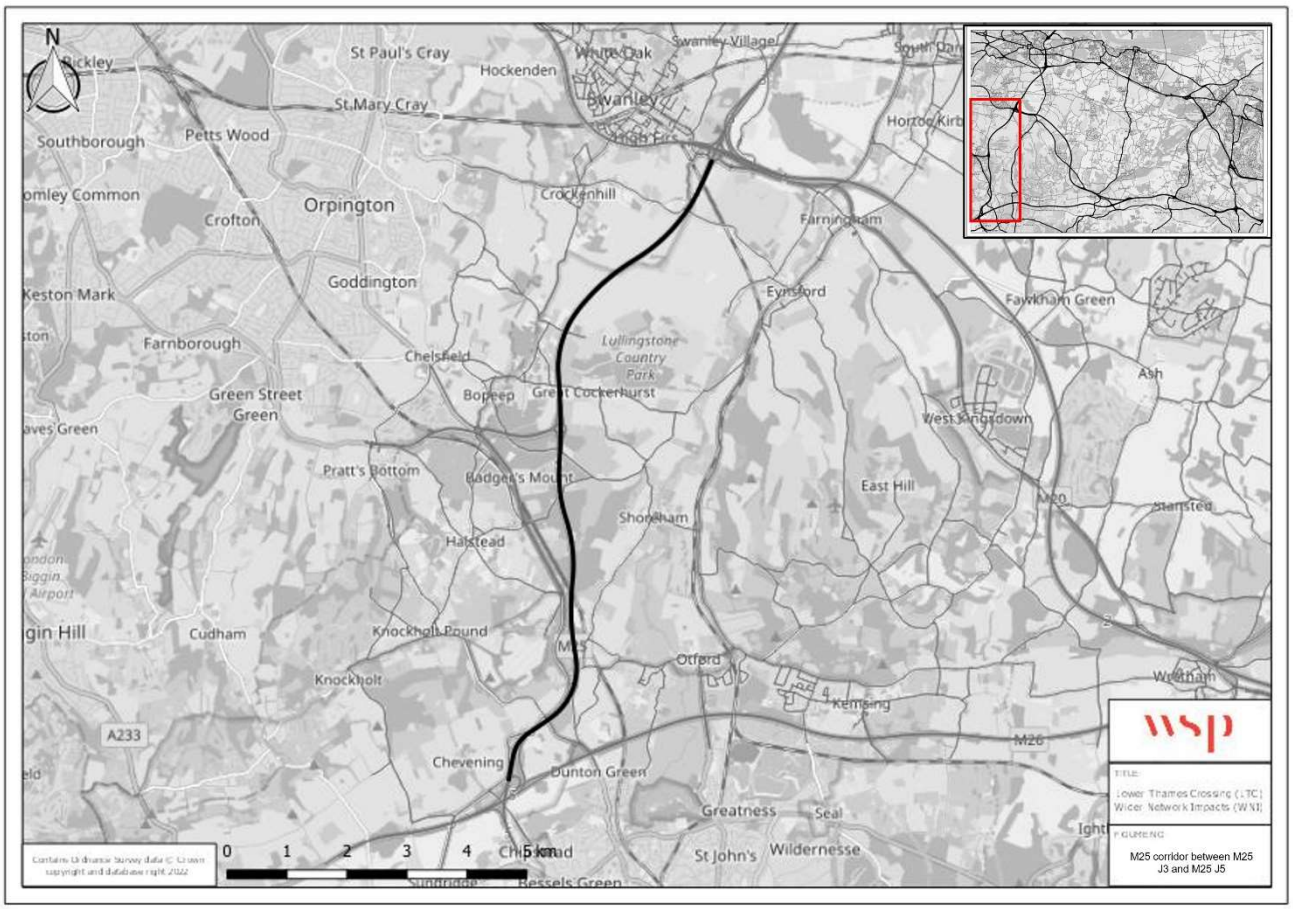
In terms of HGV flows the Taddington Roundabout at the M2 / A229 junction demonstrates a significant increase in HGVs for all four scenarios between DN and DS. For example, 2030 AM shows an increase from 95 to 167, 2030 PM shows an increase from 38 to 133, 2045 AM shows an increase from 140 to 237, and 2045 PM shows an increase from 105 to 194 HGVs per hour. The Running Horse Roundabout (M20 / A229) is also forecast to experience a significant increase in HGV traffic in the 2045 AM scenario; an increase between DN and DS from 53 to 118 is expected. This additional HGV traffic will put a greater strain on highway capacity and may increase traffic congestion further due to the higher volume of slow-moving HGV traffic.

Results indicate this corridor will experience significant worsening of conditions with LTC in place and this is to be expected as it would be the fastest existing route for traffic from the southeast, including freight from Europe, to access LTC. Given the road network it is expected that this corridor will experience more severe issues than the modelling shows as it is likely other corridors will be unsuitable for freight vehicles and the A229 will remain the default route for much of the traffic irrespective of traffic conditions. Mitigating these issues, through the implementation of capacity improvements identified through the Large Local Major SOBC, will also assist in reducing forecast traffic increases and associated congestion on the A227 and A228 given that these routes will be used to avoid delays on the primary road network and SRN (A229 and M2). It is therefore considered essential that improvements along the A229 are progressed, through the current SOBC or other funding routes, to mitigate the impact of LTC.

## 8.4 M25 corridor between M25 J3 and M25 J5

8.4.1. This corridor has been included for the initial assessment as it was shown to be over capacity during the 2045 Do Something scenario, with a V/C greater than 100% during the PM scenario. This route was shown to operate with V/C values below 100% in the DN and DS scenarios in 2030.

**Figure 8-2 M25 corridor between M25 J3 and M25 J5**




8.4.2. Table 8-4 and 8-5 show the forecast journey time increases for the 2030 and 2045 DN and DS Scenarios. The distance for each of the journey times is as follows:

- Northbound Distance – 11.86km
- Southbound Distance - 10.93km

**Table 8-4 – M25 corridor between M25 J3 and M25 J5 2030 Journey Time Impacts**

| | Do Nothing Scenario | | Do Something Scenario | | LTC Impact | | |
|---|---|---|---|---|---|---|---|
| | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | % Impact |
| AM Peak NB | 07:12 | 99 | 07:12 | 99 | 00:00 | 0 | 0% |
| AM Peak SB | 06:55 | 95 | 06:56 | 95 | +00:01 | 0 | 0% |
| PM Peak NB | 07:37 | 93 | 07:43 | 92 | +00:06 | -1 | 1% |
| 2030 PM Peak SB | 06:24 | 102 | 06:24 | 102 | 00:00 | 0 | 0% |

**Table 8-5 – M25 corridor between M25 J3 and M25 J5 2045 Journey Time Impacts**

| | Do Nothing Scenario | | Do Something Scenario | | LTC Impact | | |
|---|---|---|---|---|---|---|---|
| | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | % Impact |
| AM Peak NB | 07:27 | 96 | 07:33 | 94 | +00:06 | -2 | 1% |
| AM Peak SB | 07:15 | 90 | 07:26 | 88 | +00:11 | -2 | 3% |
| PM Peak NB | 08:06 | 88 | 08:23 | 85 | +00:17 | -3 | 3% |
| PM Peak SB | 06:39 | 99 | 06:42 | 98 | +00:03 | -1 | 1% |

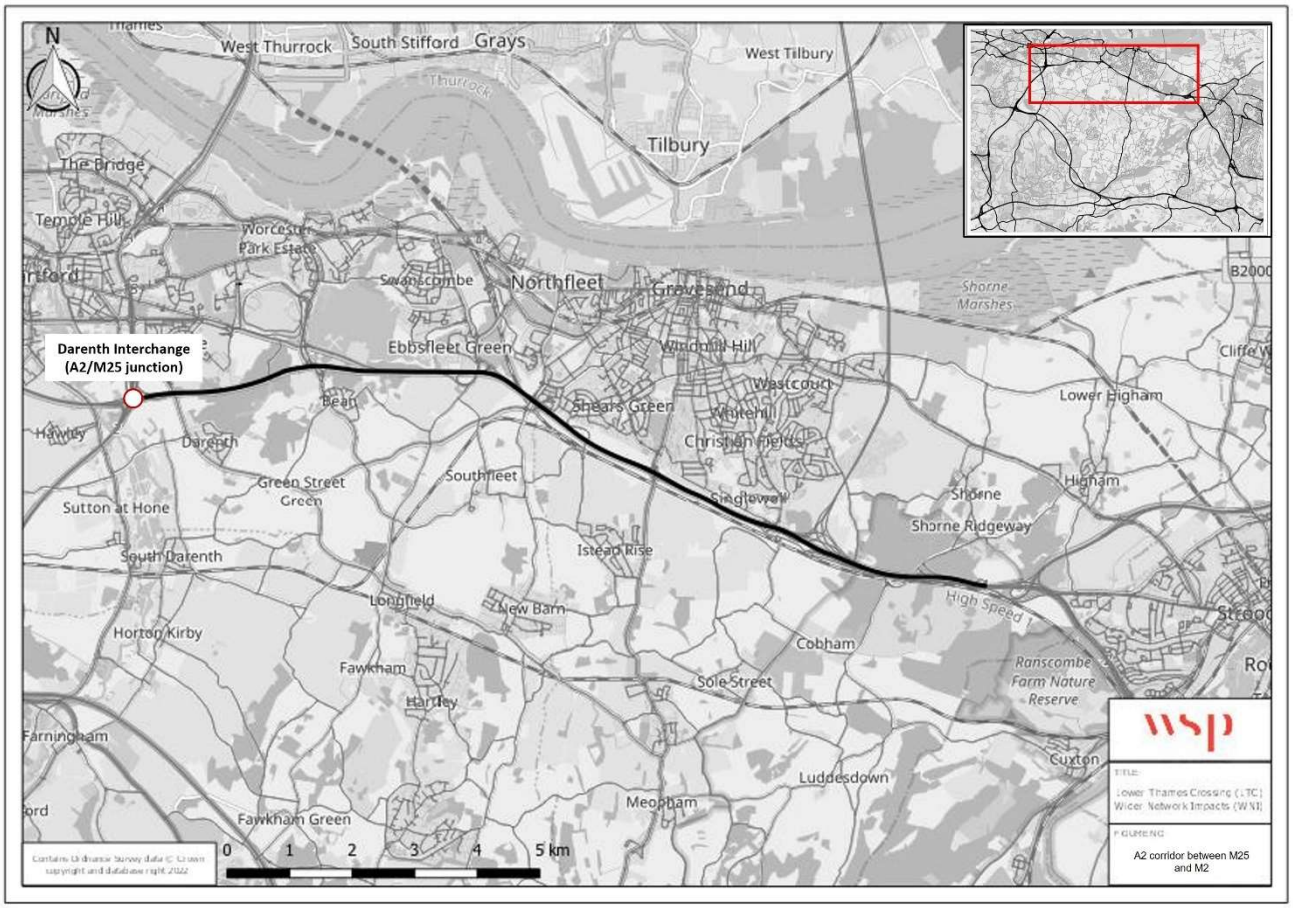
8.4.3. Based on the summarised results for journey times along M25 between M25 J3 and M25 J5 in Table 8-4 and Table 8-5, a negligible increase in AM and PM journey times and average speeds is anticipated in the 2030 and 2045 DS scenarios as compared to the respective DN scenarios. Generally, it is observed that the journey times along this corridor are not impacted by LTC. Also, as there were no impacts identified on junctions that form part of

KCC's local highway network, and so this corridor has not been taken forward for further assessment.

## 8.5 A2 corridor between M25 and M2

8.5.1. The A2 corridor has been included in the initial assessment as it is forecast to be over capacity during both the 2045 Do Something AM and PM scenario. During the PM scenario, the majority of the corridor has a V/C over 100%. The corridor here is an alternative extended section of the original A2 corridor to assess whether a longer corridor should be taken forward.

**Figure 8-3 A2 corridor between M25 and M2**




8.5.2. Table 8-6 and Table 8-7 show the forecast journey time impacts for the 2030 and 2045 DN and DS Scenarios. The distance for each of the journey times is as follows:

- Eastbound Distance – 14.21km
- Westbound Distance – 13.45km

**Table 8-6 – A2 corridor between M25 and M2 2030 Journey Time Impacts**

| | Do Nothing Scenario | | Do Something Scenario | | LTC Impact | | |
|---|---|---|---|---|---|---|---|
| | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | % Impact |
| 2030 AM Peak EB | 09:47 | 87 | 09:02 | 94 | -00:45 | +7 | 8% |
| 2030 AM Peak WB | 11:50 | 70 | 10:17 | 83 | -01:33 | +13 | 13% |
| 2030 PM Peak EB | 13:23 | 64 | 10:52 | 78 | -02:31 | +14 | 19% |
| 2030 PM Peak WB | 08:59 | 95 | 08:37 | 99 | -00:22 | +4 | 4% |

**Table 8-7 - A2 corridor between M25 and M2 2045 Journey Time Impacts**

| | Do Nothing Scenario | | Do Something Scenario | | LTC Impact | | |
|---|---|---|---|---|---|---|---|
| | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | % Impact |
| 2045 AM Peak EB | 10:30 | 81 | 09:34 | 89 | -00:56 | +8 | 9% |
| 2045 AM Peak WB | 13:34 | 63 | 11:14 | 76 | -02:20 | +13 | 17% |
| 2045 PM Peak EB | 16:06 | 53 | 11:54 | 72 | -04:12 | +19 | 26% |
| 2045 PM Peak WB | 09:42 | 88 | 09:04 | 94 | -00:38 | +6 | 7% |

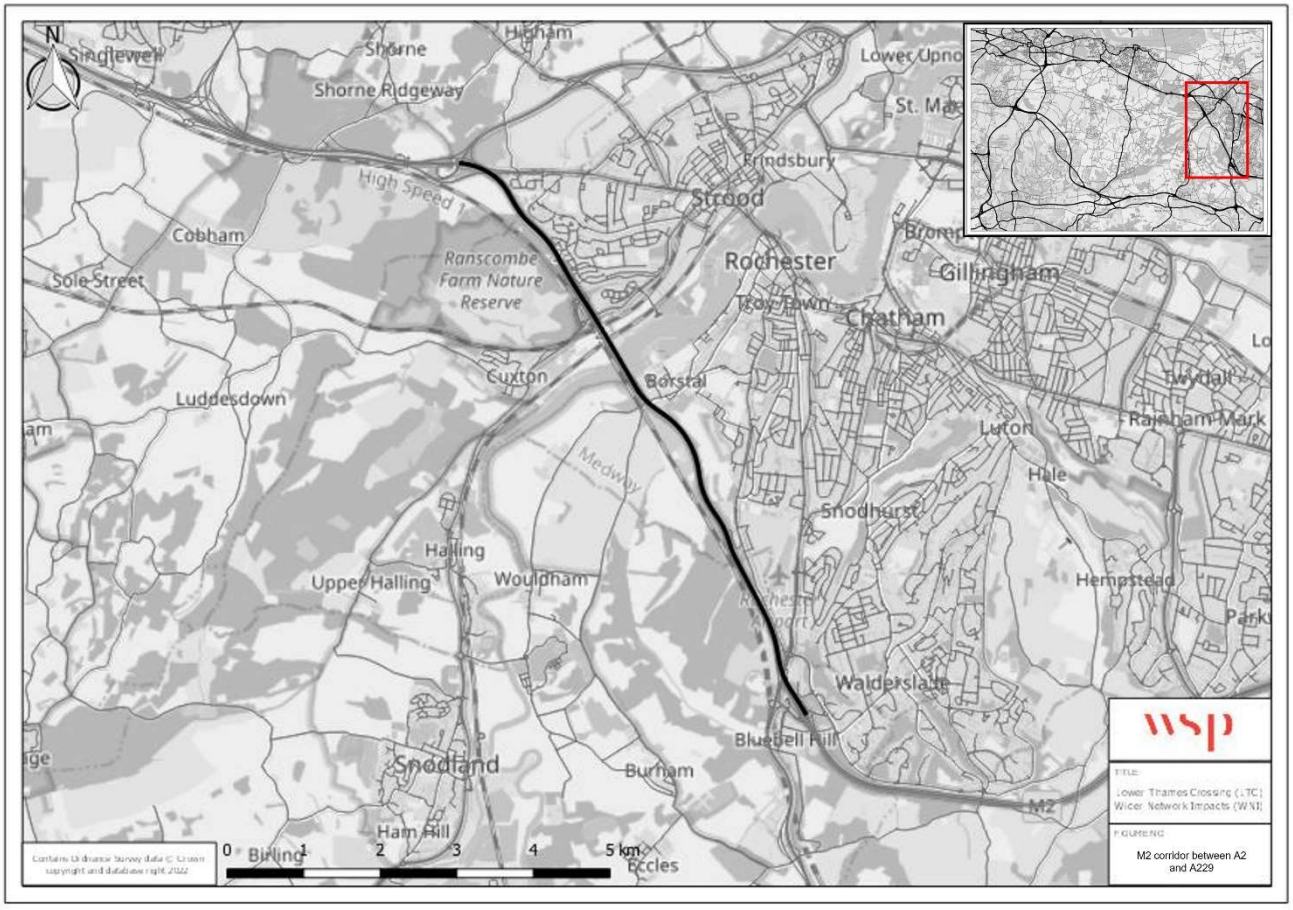
8.5.3. The AM and PM journey time results are summarised in Table 8-6 and Table 8-7 which demonstrate that for traffic on the A2 between M25 and M2, decreases are expected in the 2030 and 2045 DS scenarios as compared to the respective DN scenarios. This is reflected in increases in average speeds across all of the assessed scenarios.

8.5.4. Parts of the corridor are already congested in 2030 with sections reporting Volume over Capacity (V/C) ratios greater than 90% in both Do Nothing and Do Something scenarios. However, given the journey time improvements and as there were no impacts identified on junctions that form part of KCC's local highway network, this extended corridor has not been taken forward for further assessment.

## 8.6 M2 corridor between A2 and A229

8.6.1. This corridor has been included in the initial assessment because during the 2045 Do Something AM and PM scenarios this corridor is shown to be over capacity including several junctions.

**Figure 8-4 M2 corridor between A2 and A229**




8.6.2. Table 8-8 and Table 8-9 show the forecast journey time increases for the 2030 and 2045 DN and DS Scenarios. The distance for each of the journey times is as follows:

- Northwest bound Distance – 9.38km
- Southeast bound Distance - 9.35km

**Table 8-8 – M2 Corridor between A2 and A229 2030 Journey Time Impacts**

| | Do Nothing Scenario | | Do Something Scenario | | LTC Impact | | |
|---|---|---|---|---|---|---|---|
| | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | % Impact |
| 2030 AM Peak EB | 05:23 | 105 | 05:41 | 104 | +00:18 | -1 | 6% |
| 2030 AM Peak WB | 05:24 | 105 | 05:27 | 99 | +00:03 | -6 | 1% |
| 2030 PM Peak EB | 05:22 | 98 | 05:35 | 93 | +00:13 | -5 | 4% |
| 2030 PM Peak SB | 05:45 | 105 | 06:04 | 101 | +00:19 | -4 | 6% |

**Table 8-9 - M2 Corridor between A2 and A229 2045 Journey Time Impacts**

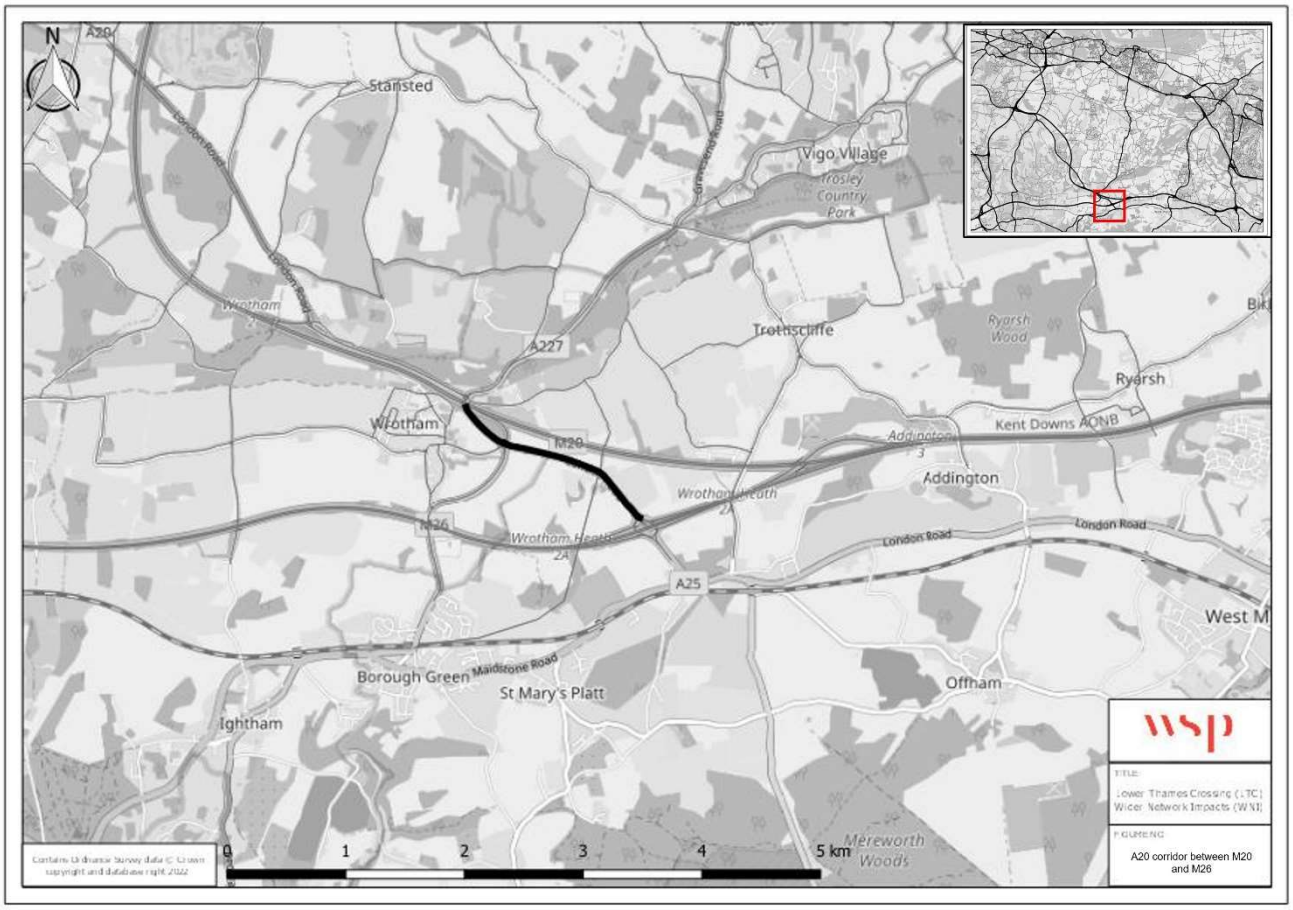
| | Do Nothing Scenario | | Do Something Scenario | | LTC Impact | | |
|---|---|---|---|---|---|---|---|
| | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | Journey Time (mm:ss) | Average Speed (Km/h) | % Impact |
| 2045 AM Peak EB | 05:30 | 103 | 06:02 | 101 | +00:32 | -2 | 10% |
| 2045 AM Peak WB | 05:30 | 102 | 05:36 | 93 | +00:06 | -9 | 2% |
| 2045 PM Peak EB | 05:31 | 95 | 05:53 | 84 | +00:22 | -11 | 7% |
| 2045 PM Peak WB | 05:58 | 102 | 06:42 | 96 | +00:44 | -6 | 12% |

8.6.3. Table 8-8 and Table 8-9 demonstrate that journey times are forecast to increase across all of the scenarios assessed with corresponding reductions in average speed of between 1km per hour and 11 km per hour. However, despite these impacts, further analysis using the Assessment Metrics did not highlight any KCC junctions that were negatively impacted by LTC. As a result, this corridor has not been taken forward for further assessment.

## 8.7 A20 corridor between M20 and M26

8.7.1. This corridor has been included in the initial assessment as it is expected to be over capacity during the 2045 Do Something AM and PM scenarios. The AM peak shows a minimum V/C of 85%, with a maximum of over 100%.

**Figure 8-5 A20 corridor between M20 and M26**




8.7.2. Table 8-10 and Table 8-11 show the forecast journey time impacts for the 2030 and 2045 DN and DS Scenarios. The distance for each of the journey times is as follows:

- Southeast bound Distance – 1.90km
- Northwest bound Distance - 1.91km

**Table 8-10 – A20 corridor 2030 Journey Time Impacts**

| | Do Nothing Scenario | | Do Something Scenario | | LTC Impact | | |
|---|---|---|---|---|---|---|---|
| | Journey Time | Average Speed | Journey Time | Average Speed | Journey Time | Average Speed | % Impact |
| 2030 AM Peak EB | 02:38 | 41 | 02:36 | 44 | -00:02 | +3 | 1% |
| 2030 AM Peak WB | 02:46 | 44 | 02:34 | 44 | -00:12 | +1 | 7% |
| 2030 PM Peak EB | 02:15 | 32 | 02:14 | 33 | -00:01 | +1 | 1% |
| 2030 PM Peak WB | 03:34 | 51 | 03:30 | 51 | -00:04 | 0 | 2% |

**Table 8-11 - A20 corridor 2045 Journey Time Impacts**

| | Do Nothing Scenario | | Do Something Scenario | | LTC Impact | | |
|---|---|---|---|---|---|---|---|
| | Journey Time | Average Speed | Journey Time | Average Speed | Journey Time | Average Speed | % Impact |
| 2045 AM Peak EB | 02:58 | 37 | 02:53 | 40 | -00:05 | +3 | 3% |
| 2045 AM Peak WB | 03:07 | 39 | 02:52 | 40 | -00:15 | +1 | 8% |
| 2045 PM Peak EB | 02:28 | 30 | 02:28 | 30 | -00:00 | 0 | 0% |
| 2045 PM Peak WB | 03:50 | 46 | 03:47 | 46 | -00:03 | 0 | 1% |

8.7.3. Table 8-10 and Table 8-11 shows that the A20 corridor is anticipated to experience an improvement in journey time and average speed across all of the assessed scenarios as a result of LTC. As there were no impacts identified on junctions that form part of KCC's local highway network, this corridor has not been taken forward for further assessment.

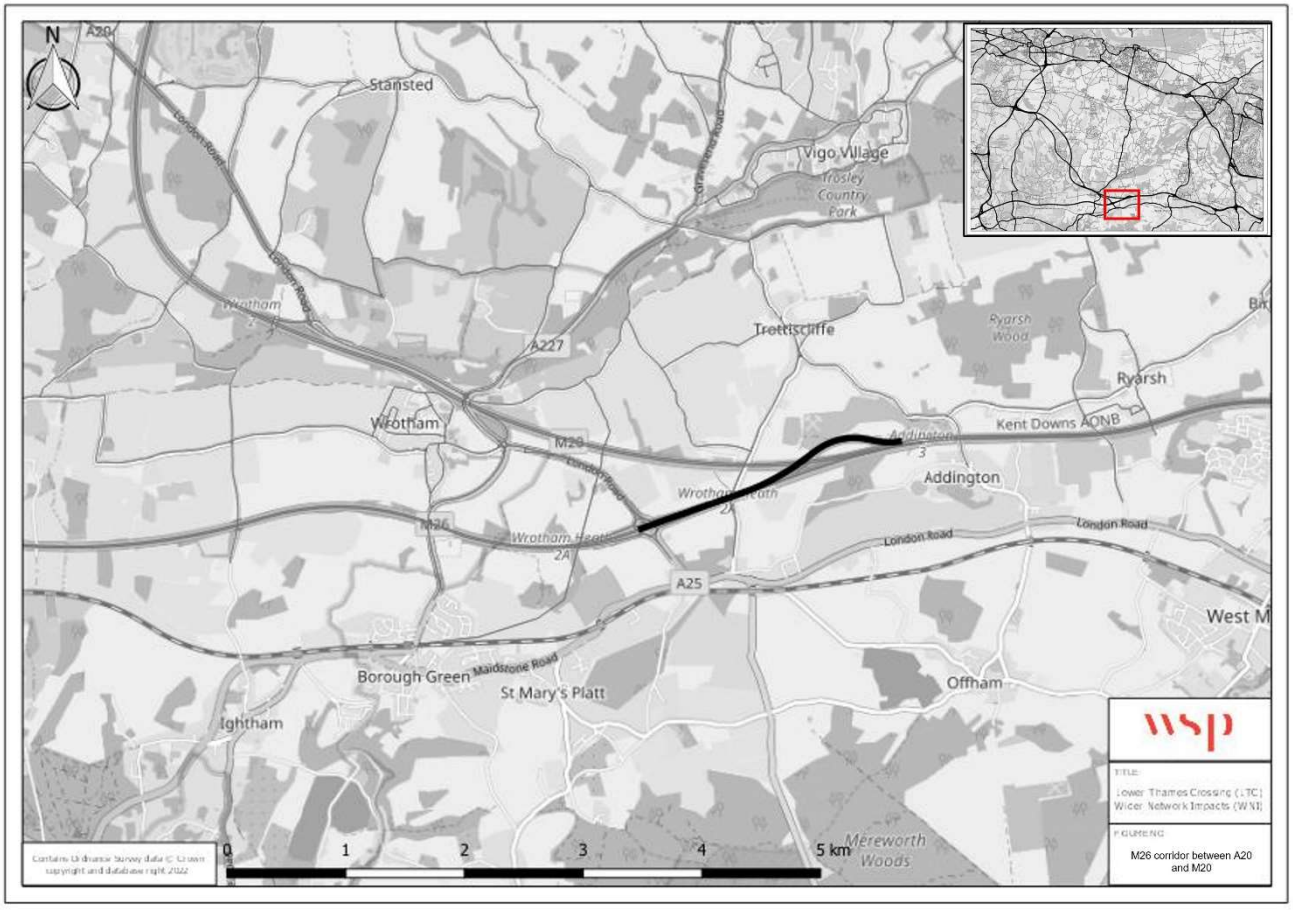
8.7.4. In reviewing these journey times, it was also noted that the A20 / M26 Wrotham Heath Interchange is forecast to operate over capacity in the 2030 PM and 2045 PM DN and DS

scenarios. However, given the impact of LTC is only forecast to be 1%, this junction will not be taken forward for further assessment.

## 8.8 M26 corridor between A20 and M20

8.8.1. The M26 corridor between A20 and M20 was included in the initial assessment as it is expected to experience a V/C over a 100% in the 2045 Do Something PM peak and a minimum of 85% during the AM peak. This means the link is forecast to operate above capacity.

**Figure 8-6 - M26 Corridor between A20 and M20**




8.8.2. Table 8-12 and 8-13 show the forecast journey time impacts for the 2030 and 2045 DN and DS Scenarios. The distance for each of the journey times is as follows:

- Northeast bound Distance – 2.31km
- Southwest bound Distance - 2.36km

**Table 8-12 – M26 Corridor 2030 Journey Time Impacts**

| | Do Nothing Scenario | | Do Something Scenario | | LTC Impact | | |
|---|---|---|---|---|---|---|---|
| | Journey Time | Average Speed | Journey Time | Average Speed | Journey Time | Average Speed | % Impact |
| 2030 AM Peak EB | 01:29 | 93 | 01:29 | 93 | 00:00 | 0 | 0% |
| 2030 AM Peak WB | 01:36 | 89 | 01:36 | 89 | 00:00 | 0 | 0% |
| 2030 PM Peak EB | 03:18 | 42 | 03:14 | 43 | -00:04 | 0 | 2% |
| 2030 PM Peak WB | 01:25 | 100 | 01:25 | 100 | 00:00 | 0 | 0% |

**Table 8-13 - M26 Corridor 2045 Journey Time Impacts**

| | Do Nothing Scenario | | Do Something Scenario | | LTC Impact | | |
|---|---|---|---|---|---|---|---|
| | Journey Time | Average Speed | Journey Time | Average Speed | Journey Time | Average Speed | % Impact |
| 2045 AM Peak EB | 01:34 | 88 | 01:34 | 88 | 00:00 | 0 | 0% |
| 2045 AM Peak WB | 01:46 | 80 | 01:43 | 83 | -00:03 | +3 | 3% |
| 2045 PM Peak EB | 04:13 | 33 | 04:12 | 33 | -00:01 | 0 | 0% |
| 2045 PM Peak WB | 01:29 | 96 | 01:28 | 97 | -00:01 | +1 | 1% |

8.8.3. Table 8-12 and Table 8-13 shows that the M26 corridor is anticipated to experience a negligible impact in journey times and average speeds as a result of LTC. As there were no impacts identified on junctions that form part of KCC's local highway network, this corridor has not been taken forward for further assessment.

## 8.9 Individual Junctions Identified

8.9.1. Table 8-14 shows a summary other individual junctions / locations identified against the assessment metrics defined in Section 3. Where issues have been identified a corresponding objective of potential mitigation has also been included within the table.

**Table 8-14 – Individual Junctions: Problems and Objectives Identified**

| Junction Ref | Location | Junction / Link Capacity | | Queue length | Share of HGV | | Active Travel |
|---|---|---|---|---|---|---|---|
| | | Criteria 1 | Criteria 2 | Criteria 1 | Criteria 1 | Criteria 2 | Criteria 1 |
| | A226 Gravesend Road, between Church Road and Crown Lane - Medway | Pass | Pass | Pass | Pass | Pass | Fail |
| | A226 Gravesend Road, between Crutches Lane and A289 – Medway | Pass | Pass | Pass | Pass | Pass | Fail |
| | A226 Gravesend Road, between A289 and Dillywood Lane | Pass | Pass | Pass | Pass | Pass | Fail |
| | Chatham Road, between Old Chatham Road and A229 – Kit's Coty (South of Bluebell Hill) | Pass | Pass | Pass | Pass | Pass | Fail |

**Summary of Issues / Objectives**

The A226 Gravesend Road has been identified in three separate locations as experiencing traffic flow increases that would have a detrimental impact upon users due to the existing level of cycle provision which consists of a 1-1.5m mandatory cycle lane on each side of the carriageway. In 2045 DS scenario this route is forecast to experience an increase in traffic flow of between 5-12% from a DN baseline ADDT of approximately 8,000-9,000 as a result of LTC. With the 40/50mph speed limit and forecast traffic flows the provision of segregated cycle tracks is required in accordance with DMRB CD195.

Similarly, Chatham Road, between Old Chatham Road and A229 has narrow on road advisory cycle provision and is forecast to have a 7% increase in AADT from 5,612 to 6,026 as a result of the LTC in the 2045 DS scenario. This increase, equivalent to an additional 400 vehicles per day, will have a detrimental impact on users of this cycle route. Given the traffic are flows are in excess of 5,000 vehicles AADT, this provision should also be upgraded to segregated cycle tracks.

## 8.10 Summary of Additional Corridor Assessments

8.10.1. The review of the additional corridors has shown that most of those identified are not forecast to experience detrimental impacts because of changing traffic associated with LTC. This is reflected by the fact that journey times are forecast to either remain static or improve on most routes and the limited number of local network junctions that have been identified as experiencing capacity issues.

8.10.2. The exception to this is the A229 corridor, which is forecast to experience significant journey time increases and congestion issues in both the 2030 and 2045 DS scenarios. The introduction of LTC worsens congestion problems identified in the DN scenario, such as at the M2 / A229 Bluebell Hill interchange but is also the cause of the Walderslade Wood roundabout and M20 / A229 Running Horse Roundabout operating over capacity in the peak hours.

8.10.3. These delays on the A229 will lead to increased traffic using the A227 and A228 as alternative routes and it is therefore important that these issues are resolved, either through the Large Local Major SOBC or alternative funding streams. Given the SOBC process is already underway, options for improving the A229 will not be considered as part of this study.

8.10.4. It should also be noted that significant changes to the A229 would impact the expectation of problems on the rest of the local network and would be likely to impact the recommendations for investment in the wider network. A scheme that significantly improves the A229 and its motorway interchanges would materially affect driver route choice.

8.10.5. The following additional locations will be taken forward for further assessment:

- A226 Gravesend Road; and
- Chatham Road, Kit's Coty.

# 9 Next Steps

## 9.1 Introduction

9.1.1. This Technical Note has assessed the impact of LTC on KCC's highway network and identified the locations where this impact is expected to be most problematic.

9.1.2. The next phase of this project will focus more closely on the locations identified, determining potential mitigation measures to alleviate the identified problems through a more detailed assessment of each location and identified concern.. Options for mitigating these issues will then be developed and presented to KCC for consideration.

## 9.2 Draft Prioritised List of Junctions and Corridors

9.2.1. Taking account of the analysis contained within this Technical Note, the corridors and / or junctions shown in Table 9-1 are proposed to be taken forward to Task 1d, which will involve the development of a long list of options to mitigate the identified issues. For reference Table 9-1 also includes a summary of the issues and identified at each location, the objectives of any mitigation measures and the priority order in which they will be considered.

**Table 9-1: Draft Prioritised list of junctions and Corridors.**

| Priority Order | Corridor | Locations | Reason | Objectives |
|---|---|---|---|---|
| 1 | A2 Corridor between Spring Head and Gravesend | Local highway junctions on A2 Corridor between Spring Head and Gravesend Road including:<br>1. A2 Gravesend East<br>2. A2 Tollgate (incl. Wrotham Road / Coldharbour Road)<br>3. Hall Road / Station Road/ New Barn Road<br>4. A2 Pepper Hill.<br>In addition, the following corridors, located between the A2 and Gravesend centre<br>▪ Hall Road and Springhead Road (north of A2 Pepper Hill junction)<br>▪ A227 Wrotham Road (north of A2 Tollgate junction); and<br>▪ Valley Drive (North of A2Gravesend East junction as a result of LTC). | Significant capacity issue have been identified at multiple local network junctions as a result of the traffic redistribution effects associated with LTC, with the following junctions forecast to operate over capacity in the 2030 and/or 2045 DS scenario:<br>• 1. A2 Gravesend East<br>• 2. A2 Tollgate (incl. Wrotham Road / Coldharbour Road)<br>• 3. Hall Road / Station Road/ New Barn Road<br>• A2 Pepper Hill.<br>Of these junctions the A2 Tollgate and A2 Gravesend East junctions were forecast to experience queue lengths which block back through upstream junctions, which would likely lead to greater levels of delay than reported by the KTM whilst also generating a potential road safety risk.<br>The Hall Road / Springhead Road north corridor is included due to journey time increases exceeding 10%, partly related to congestion increased at the A2 Pepper Hill junction as a result of LTC.<br>A227 Wrotham Road and Valley Drive have been included as a result of them being servicing a number of local bus services and having forecast journey time increases of at least 5% as a result of LTC. | The primary objective will be to improve junction capacity at the junctions highlighted in order to reduce traffic congestion, particularly where these are shown to block back through other junctions and lead to additional delays / road safety issues. Whilst partly related to the congestion forecast at the junctions with the A2, the second objective will be to reduce residual journey times increases between the A2 and Gravesend with a focus on those corridors serving main bus routes. |
| 2 | A228 Corridor between M2 and M20 | A228 Corridor between M2 and M20 (including all junctions, alternative routes identified within Table 7-3 and the following junctions which are forecast to operate over capacity with LTC:<br>• A228 / Cuxton Road;<br>• A228 / Bush Road;<br>• A228 / Station Road;<br>• A228 / Pilgrims Road;<br>• A228 / Sundridge Hill roundabout; and<br>• A228 Germander Avenue. | The vast majority of junctions along the A228 are forecast to see significant increases in HGV traffic as a result of LTC with HGV traffic flows along the A228 increasing by 143-322 vehicles per hour PM peak 2045.<br>A number of junctions are also forecast to operate over capacity either as a direct result of LTC or with LTC in place, which lead to further congestion and use of inappropriate alternative routes | The objectives of the A228 corridor will need to consider a number of different aspects - a balance needs to be achieved between implementing capacity improvements at junctions shown to be operating over capacity and mitigation along the A228 to reduce impacts of HGV traffic, whilst also ensuring these do not lead to increases in use of inappropriate alternative routes. |

| | | | | |
|---|---|---|---|---|
| | | | | ensuring that these capacity improvements do not promote use of alternative routes and considering mitigation |
| 3 | A227 between A2 and M20 | A227 between A2 and M20 with particular focus on alternative routes north of the A227 / Green Lane junction | Significant increases in HGV flow on alternative routes between A227 / Green Lane and A2, including villages of Meopham, Hook Green, Sole Street and Cobham to access LTC. | The aim will be to remove additional HGV traffic forecast in the DS scenarios from the A227 and unsuitable routes between the A227 / Green Lane and A2. |
| 4 | A226 Gravesend Road, between A289 and Dillywood Lane | | Traffic flow increases as a result of LTC will have a detrimental impact on cyclists using the existing on-road cycle lanes | The objectives will be to enhance existing on-carriageway cycle provision to ensure that traffic flow increases associated with LTC do not have a detrimental impact on cyclists / potential to cycle. |
| 6 | Chatham Road, between Old Chatham Road and A229 – Kit's Coty (South of Bluebell Hill) | | Traffic flow increases as a result of LTC will have a detrimental impact on cyclists using the existing on-road cycle lanes | The objectives will be to enhance existing on-carriageway cycle provision to ensure that traffic flow increases associated with LTC do not have a detrimental impact on cyclists / potential to cycle. |

## 9.3 Final List of Prioritised Junction and Corridors

9.3.1. Following on from submission of this Technical Note to National Highways on 30th November 2022 and a subsequent meeting held on 8th December 2022 a final list of prioritised junctions and corridors was agreed between Kent County Council and National Highways. Table 9-2 below shows this agreed priority list, which has been taken from Technical Note 'Response to 700099014-TN01 – Revision 3' (Doc No: T0253-TN-0001) completed by Arcadis on behalf of National Highways and included in Appendix B.

**Table 9-2: Agreed Prioritised list of junctions and Corridors**

| Priority Order | Corridor | Locations | Recommendation |
|---|---|---|---|
| 1 | A2 Corridor between Spring Head and Gravesend | 1A – A2 Gravesend East Junction and Valley Drive Corridor | Combine junction and corridor assessment |
| | | 1B – A2 Tollgate (Incl. Wrotham Road / Coldharbour Road Junction | Wrotham Road excluded as it only marginally triggers the public transport metric by 1% and buses are infrequent along this route (hourly in peak time and every 90 mins off peak) |
| | | 1C – Hall Road / Station Road / New Barn Road in combination with A2 Pepper Hill and Hall Road and Springhead Road Corridor | Combine junctions due to proximity along with corridor assessment. |
| 2 | A228 Corridor between M2 and M20 | | Freight strategy for A228 and A227 combined.<br>Mitigation of HGV traffic on the A228 to be assessed to understand rerouting and possible ease on the junction capacities before further assessment of junctions along this route |
| | A227 Corridor between M2 and M20 | | Combined freight strategy with A228 corridor |
| 3 | A226 Gravesend Road between A289 and Dillywood Lane | | Option generation for cycling mitigation impact |
| 4 | Chatham Road between Old Chatham Road and A229 – Kit's Coty (South of Bluebell Hill | | Option generation for cycling mitigation impact |

Grosvenor House
2 Grosvenor Square
Southampton, Hampshire
SO15 2BE

**wsp.com**