East Hertfordshire Local Plan Support – Do Something Model Run Report

Client name	Date	Project number	Project name
East Hertfordshire Council	March 2017	60522529	East Hertfordshire Local Plan Support

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1: Draft for client comment (v1)	22nd March2017	FG/AY	QB
2: Final after client comment (v2)	28th March 2017	FG/AY	QB

1. Introduction

1.1 Task Objective

1.1.1 In February 2017, AECOM was commissioned by East Herts (EHC) to provide support for its upcoming Local Plan submission. The support is in relation to the district's highway network performance and covers an analysis of conditions in 2031, estimated using a strategic transport model.

1.1.2 Hertfordshire County Council's (HCC) existing 2014 Base Year, 2031 Do Minimum Forecast Year and 2031 Do Something Forecast Year COMET models (version 2, January 2017) have been used to inform this work. The 2031 forecasts includes Local Plan growth from all 10 Hertfordshire districts. The Do Minimum run included committed/very likely planned transport infrastructure mitigation schemes and the Do Something run included additional mitigation schemes as specified by Hertfordshire districts (see section 3.2.1 for a list of schemes included in the Do Something scenario). Although COMET is a multi-modal model, the focus of this work is on the interpretation of highway assignment results.

1.1.3 AECOM were previously commissioned by East Herts Council to analyse the results of the existing 2014 Base Year model and the 2031 Do Minimum scenario and these results can be found in the technical note *"East Hertfordshire Local Plan Support – Do Minimum Model Run Report f"* issued on 16th January 2017. This technical note follows on from this, using these results as a comparison to the latest 2031 Do Something Forecast Year scenario which included the additional mitigation schemes.

1.2 Caveats

1.2.1 As East Herts Council understands, COMET is a strategic countywide model and has not been developed specifically to represent traffic conditions in urban areas. The model has not been validated in urban areas located in East Hertfordshire. The model's main purpose is to simulate inter-urban movements in Hertfordshire, and the calibration/validation process has been conducted accordingly. This has an implication on the level of confidence that can be placed on results in urban areas of East Hertfordshire.

1.2.2 The highway assignment component of the COMET model suite is in SATURN. SATURN is a tool that suits the strategic geographical scale of COMET, however, does not enable investigation of detailed sections of the highway network (e.g. detailed junction or corridor assessment).

1.2.3 Further evidence may be required to underpin and understand specific network issues as well as specific development impacts as they come forward. At this stage, therefore, the results presented here should be interpreted as high level indications of likely traffic conditions.

1.3 Structure of this note

1.3.1 This note is presented in the following sections:

- Summary of previous results
- Forecast Year (2031) Do Something Schemes
- Initial Proposed Mitigation Measures
- Forecast Year (2031) Do Something Key Findings
  - Forecast Year Network Conditions (Stress, Delays and Flows)
  - Air Quality Management Areas
- Major East Hertfordshire Developments Analysis
- Further Potential Mitigation Options
- Summary and Next Steps
- Appendices
  - Appendix A – Specific Gilston Area Analysis
  - Appendix B – Glossary of Terms

2. Summary of Previous Results

2.1.1 This section of the document summarises the analysis of the previous exercise undertaken, comparing the 2031 Local Plan Do Minimum scenario against the COMET Base Year. This breakdown of the areas has been split into:

- Stress Plots – Base Year, showing the traffic volume and capacity ratio,
- Stress Plots – Forecast Year 2031 Local Plan Do Minimum scenario, and
- Proposed junctions to be monitored;

2.2 Stress Plots – Base Year

2.2.1 Figure 1 and Figure 2 show the congestion in the COMET Base Year (2014) model in East Herts for the morning and evening peaks respectively, represented using stress plots, which show the relationship between the traffic flows on one link/road and its capacity in PCUs[1] per hour. Values higher than 90% are considered an indication of congestion, and values under 80% indicate that there is capacity left on the link/road.

2.2.2 The following junctions were found to have congestion in both the morning and evening peak.

- A414 through Hertford (particularly around Bluecoats Roundabout)
- Eastwick Roundabout (north of Harlow)
- Signalised junction in Little Hadham
- B1383 – A120 (Bishop's Stortford)
- A602 – Anchor Ln – Wadesmill Rd (north of Hertford)
- A1184 – Station Rd – West Rd (Sawbridgeworth)
- M11 Junction 8

[1] Passenger Car Unit (used in Transport Modelling). Cars and LGVs equal 1 PCU, whilst HGVs equal 2.2 PCUs

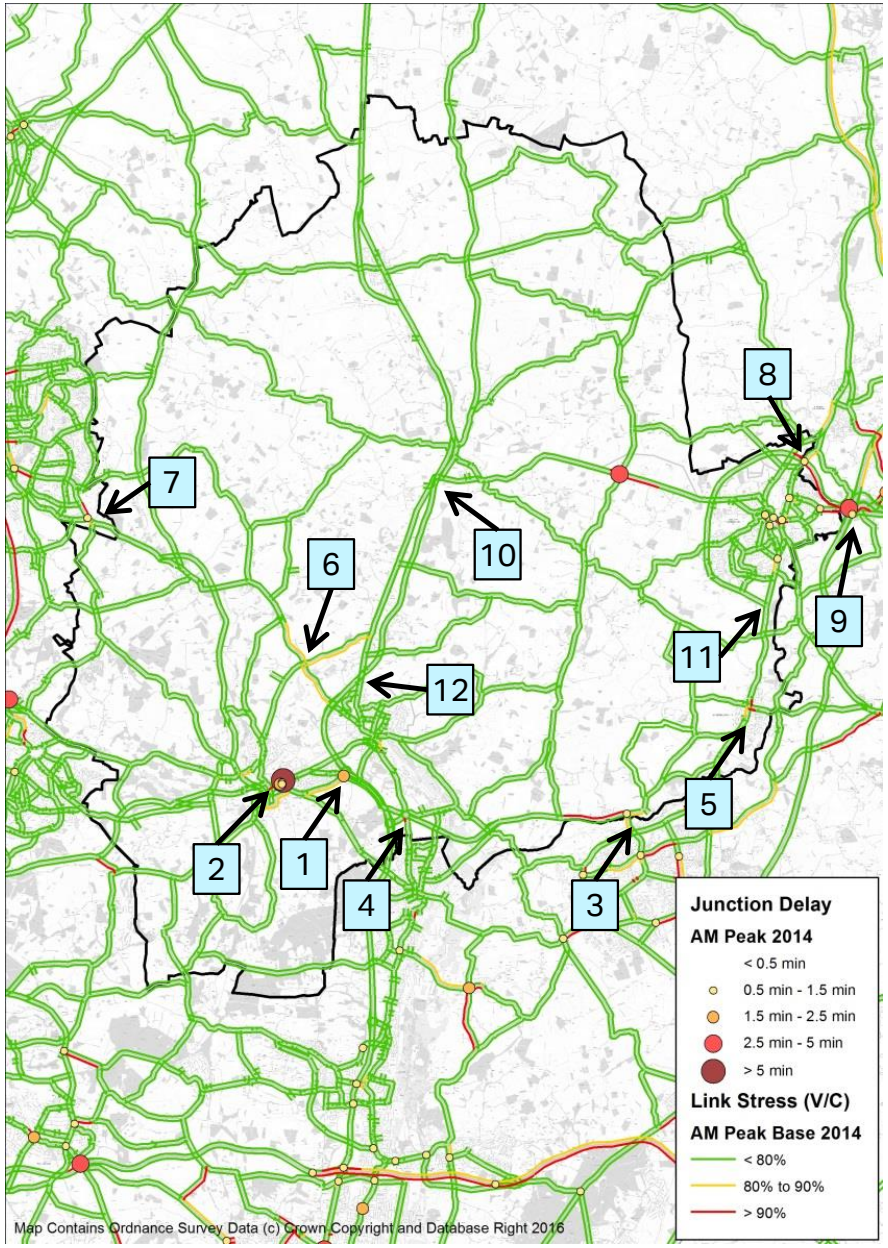

Figure 1 Morning Peak 2014 Congestion

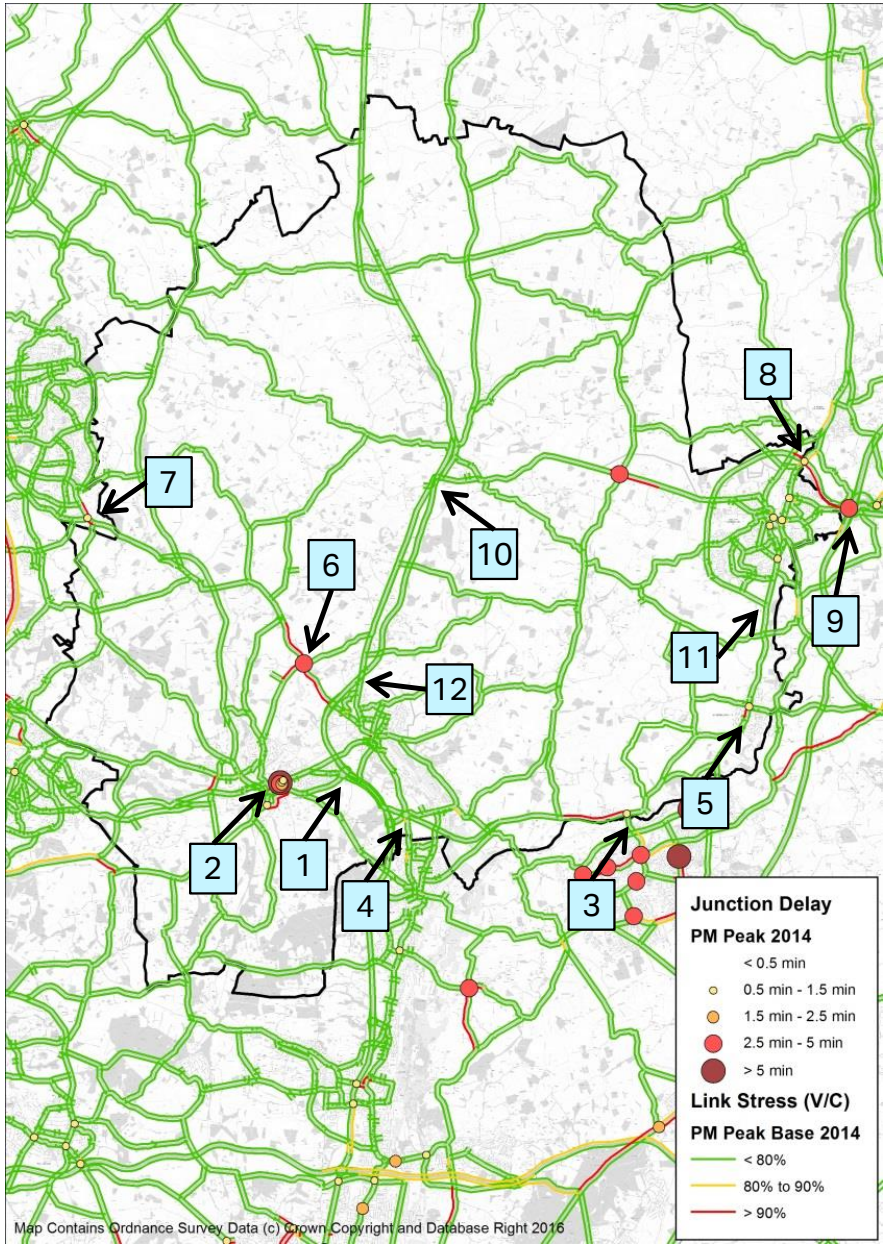

Figure 2 Evening Peak 2014 Congestion

2.3 Stress Plots – Forecast Year 2031 Local Plan Do Minimum scenario

2.3.1 Similar to the Base Year figures in section 2.2, Figure 3 and Figure 4 below show the congestion in the 2031 Forecast Year Do Minimum scenario.

2.3.2 The 2031 Forecast Year Do Minimum scenario included the most significant committed/very likely planned transport infrastructure changes. For more details on this scenario, this can be found in the previous techincal note "*East Hertfordshire Local Plan Support – Do Minimum Model Run Report" "* issued in January 2017.

2.3.3 To summarise the overall results for the Do Minimum scenario, congestion generally increases across the district due to growth in traffic volumes. Again further details are available in the previous technical note mentioned above.

2.3.4 Table 3 on page 13 of this report provides a summary of the Base Year and Forecast Year Do Minimum scenario produced from the previous report at the selected junctions defined above.

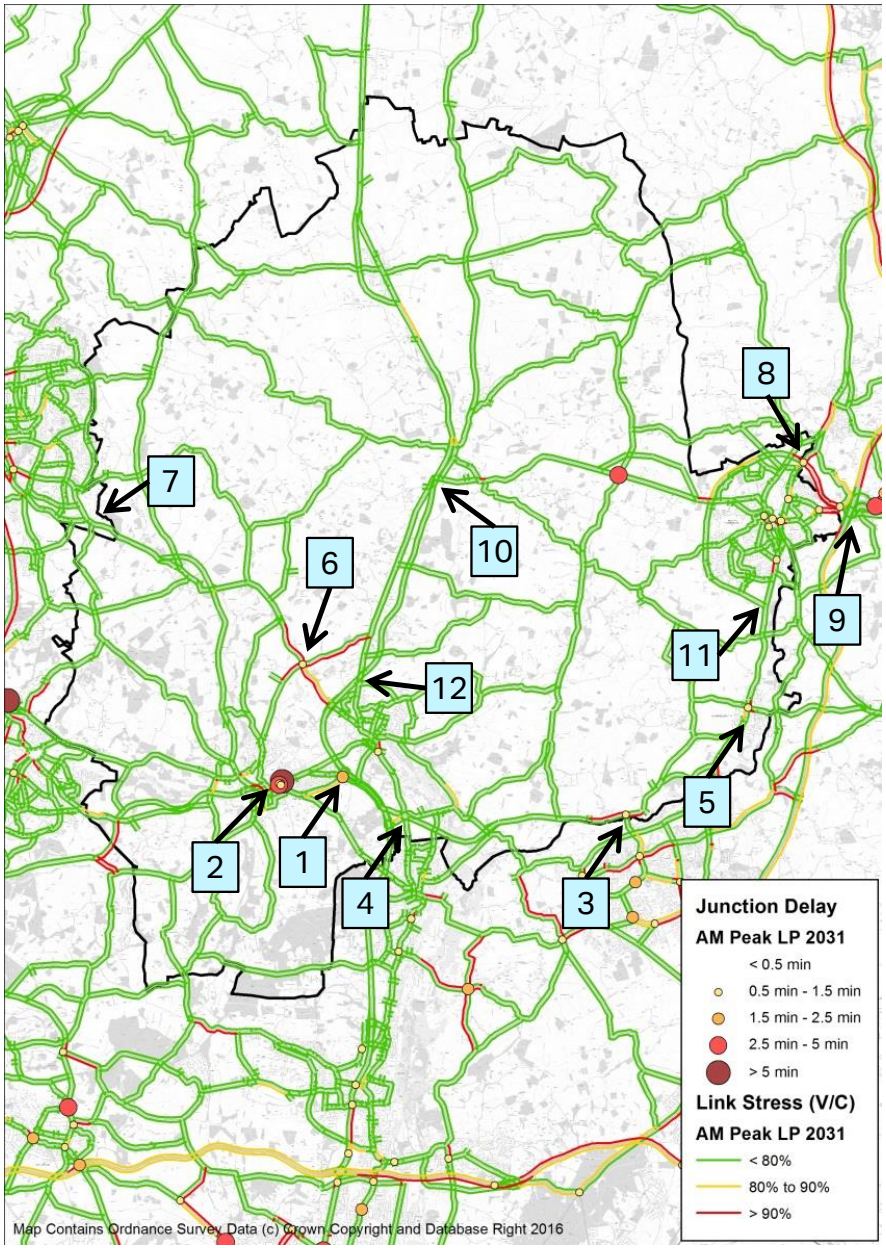

Figure 3 Morning Peak 2031 Do Minimum Congestion

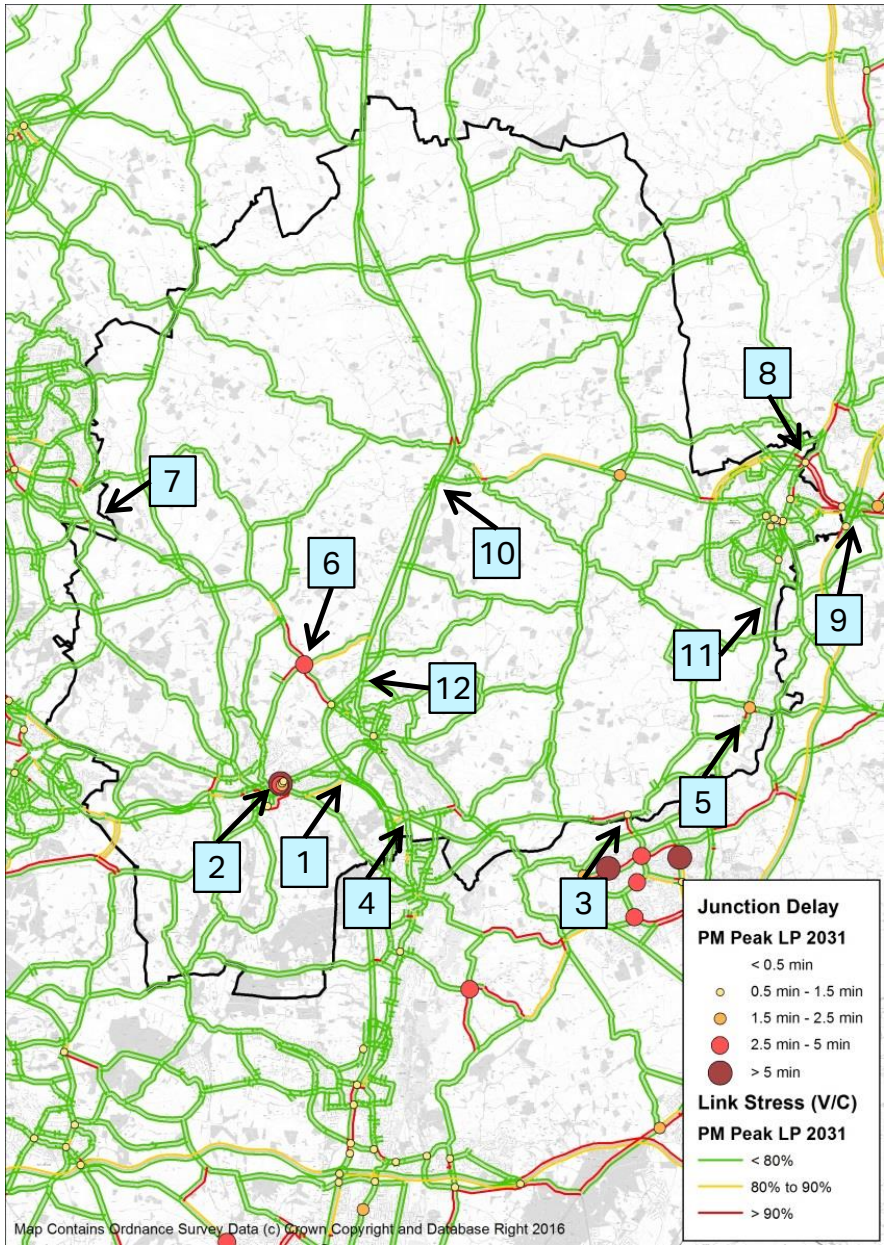

Figure 4 Evening Peak 2031 Do Minimum Congestion

2.4 Proposed Junctions to be monitored

2.4.1 The previous 2031 Do Minimum Local Plan – Base Year comparison task identified twelve junctions where highway impacts needed to be monitored. Therefore, the highway network analysis for the 2031 Do Something focused on those twelve selected junctions in East Herts, shown in Figure 4. The figure also shows whether any mitigation has been included as part of the 2031 Do Something Forecast Year COMET models (version 2, January 2017) at these junctions.

2.4.2 These junctions were chosen because they are or may become congestion hotspots and have been selected following previous HCC studies, interrogation of TrafficMaster Data and liaison with East Herts Council.

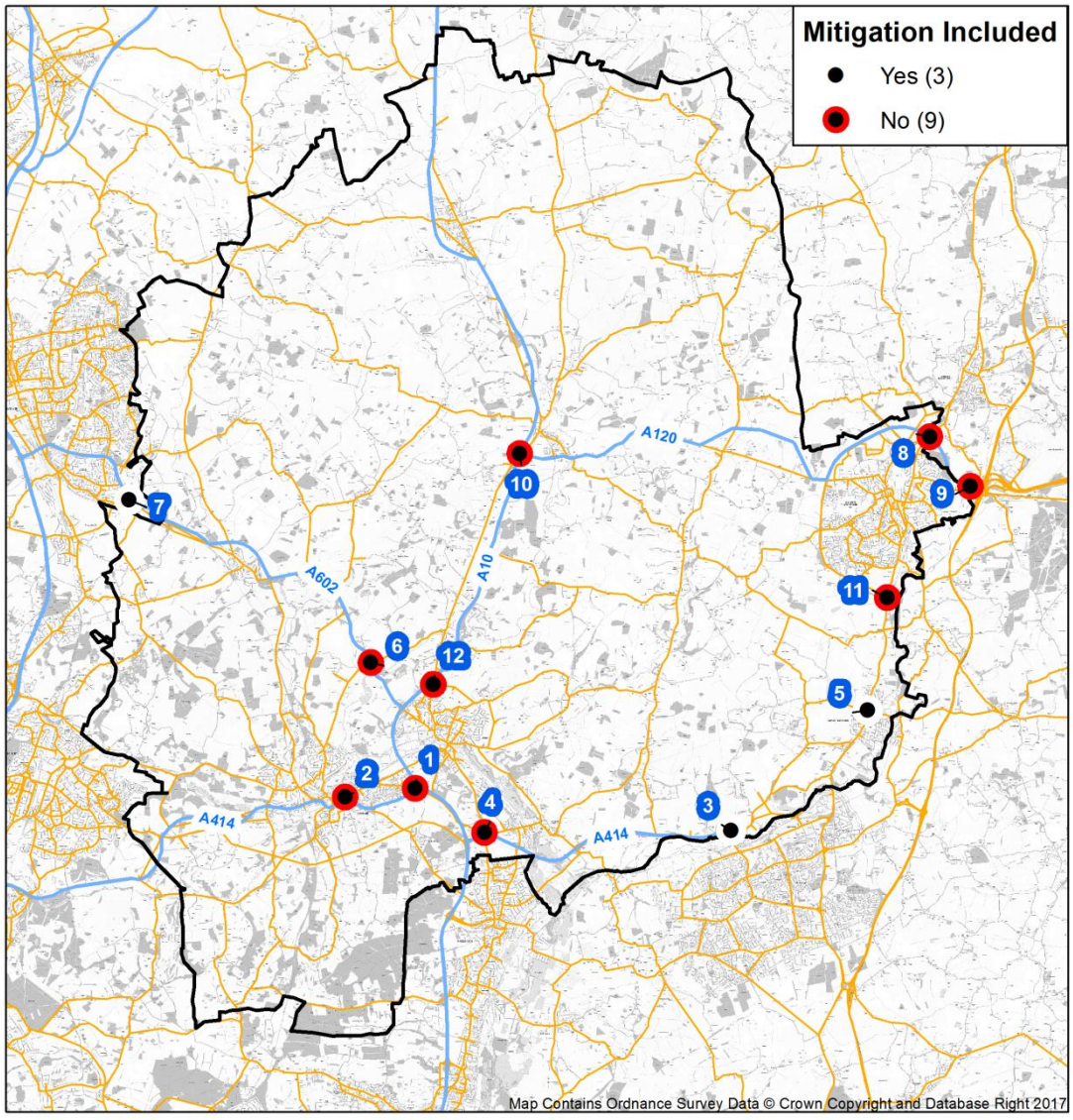

Figure 5 Selected Junctions in East Hertfordshire

3. Forecast Year (2031) Do Something Schemes

3.1.1 This section introduces the schemes in East Hertfordshire modelled in the 2031 Do Something scenario.

3.2 Schemes Included

3.2.1 The Forecast Year Do Something scenario takes the 2031 Do Minimum scenario and includes the following schemes in East Hertfordshire as specified by the District Council shown in Figure 6 and corresponding Table 1.

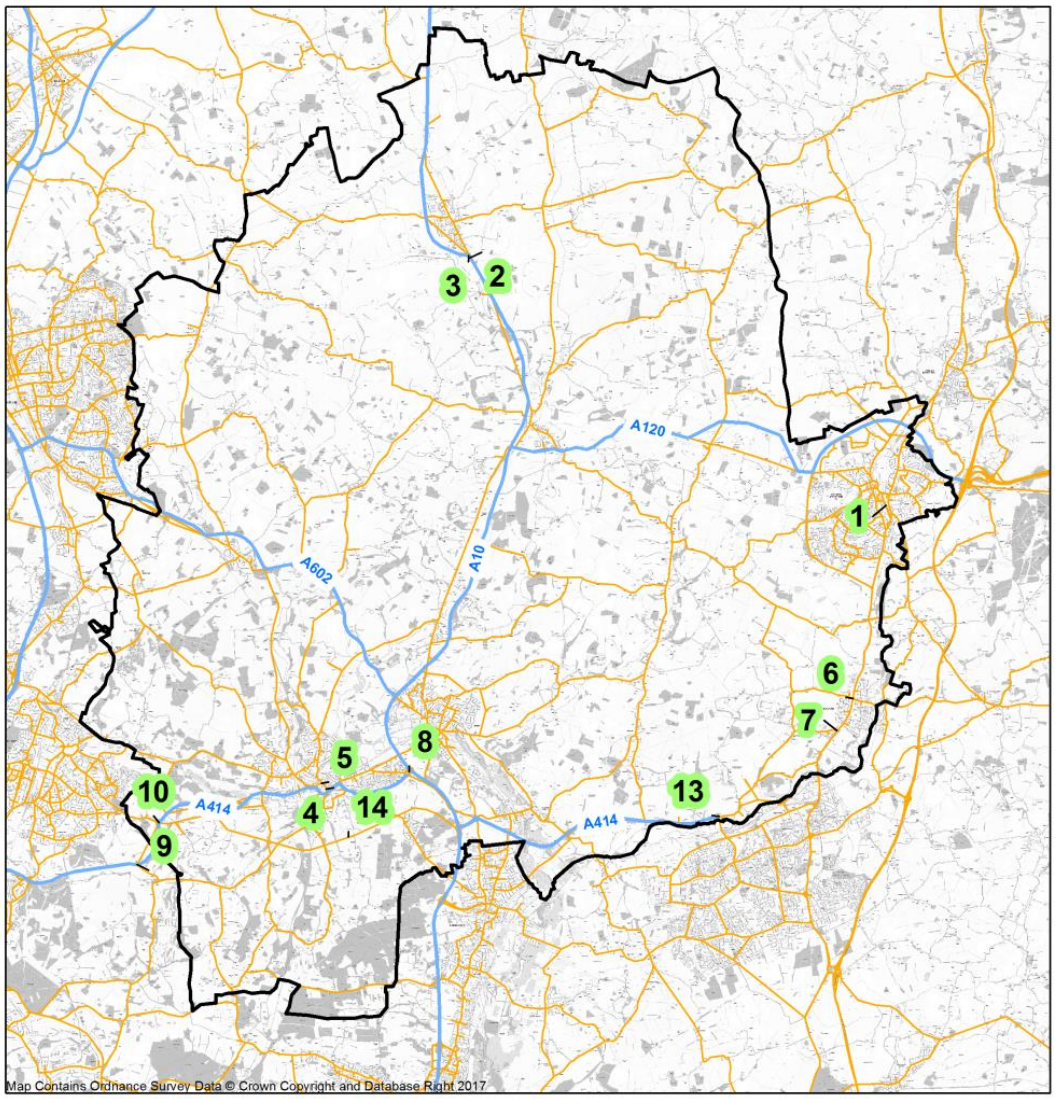

Figure 6 2031 Do Something Schemes

Table 1 Forecast Year 2031 Do Something Schemes

ID	Junction Reference	Potential mitigation
1	EH3	Passenger transport interchange and parking provision at railway station
2	EH4	Dualling of A10 southbound
3	EH5	Upgrades to A10/London Road roundabout (Slip improvement)
4	EH6	Bus priority measures along A119 and A414 following implementation of Hertford Strategic Solution
5	EH9	Old Cross junction improvements (Signal optimisation)
6	EH10	Upgrades of A1184/West Road/Station Rd junction (from 2 mini roundabouts to signalised junction)
7	EH11	Potential upgrade to A1184/High Wych Road junction (Including traffic signals)
8	EH13	Improvements to Rush Green roundabout (Lengthening of the A10 SB off-slip)
9	EH21	Alignment of A414/Holwell Lane roundabout (New development access)
10	EH22	A414/B195 Birchall Lane/Cole Green Lane roundabout improvements
11	EH23	A1(M) Junction 3 improvements (Signal optimisation)
12	EH24	A1(M) Junction 4 improvements (short term option)
13	EH28	Second River Stort crossing / Existing crossing upgrade (new dual carriageway). Coding details supplied by HCC included in Appendix A.
14	EH30	Hertford Strategic Solution

3.2.2 In addition to these schemes, the following highway interventions (of significance to East Hertfordshire) have been included in Essex:

- M11 Junction 8 short term capacity improvements;
- New M11 Junction 7a with associated link to & roundabout on B183 Gilden Way (plus localised widening of Gilden Way);
- A414 Junction upgrades through Harlow; and
- Cambridge Rd, Harlow – new access into River Way.

4. Initial Proposed Mitigation Measures

4.1 Potential Mitigation

4.1.1 As mentioned previously in section 2.4, twelve junctions were identified as locations suffering from congestion issues or have the potential to develop congestion issues in the future. These junctions can be seen in Figure 5. Table 2 below provides more details on each of these junctions. The ID column corresponds with the Junction ID in Figure 5 and if the junction has any mitigation in the Do Something scenario the ID number is shown in the last column which corresponds to the ID in Table 1.

Table 2 Selected Junctions

ID	Junction Name	Potential Mitigation	Included in DS
1	Rush Green Roundabout	Potential addition of segregated left turn lane from B1502 NB to A414. Which might improve the performance at the junction together with DS8 scheme (EH13).	✘
2	Bluecoats Roundabout (London Road – Gascoyne Way - A119) - Hertford	This junction is physically constrained, and may therefore necessitate a more strategic mitigation solution to address A414 through-traffic.	✘
3	Eastwick Roundabout A414-Eastwick Rd	Conversion to signalised junction with development access arm	✓ (DS 13)
4	Amwell Roundabout – A10-B1502-A414-B181-A1170	Potential conversion to “hamburger-style” to prioritize A414 through-traffic.	✘
5	A1184 – Station Rd – West Rd - Sawbridgeworth	Remove roundabouts and replace by signalised junction. Potential to ban right turns, although this may cause problematic re-routing.	✓ (DS 6)
6	A602 – Anchor Ln – Westmill Rd – Wadesmill Rd	Signalisation or (given relatively rural location) conversion to “hamburger-style” to prioritize A602 through-traffic.	✘
7	A602- Hertford Rd, Bragbury End	Signalisation tested in 2031 forecast indicates significant reduction in delay. (From roundabout to signalised junction)	✓
8	B1383-A120 – Bishops Stortford	Conversion to “hamburger-style” to prioritize strong A120 through-traffic.	✘
9	M11 Junction 8	Mitigation may be necessary at junction immediately to the west of M11 J8, however, this would need to be considered as part of a wider M11 J8 scheme.	✘
10	A120 – A10	Modelling does not indicate any significant issue to be mitigated at this junction.	✘
11	A1184 – Thorley St – Bishops Stortford	Modelling does not indicate any significant issue to be mitigated at this junction.	✘
12	A10 – A1170 - Ware	Modelling does not indicate any significant issue to be mitigated at this junction.	✘

4.1.2 Figure 7 shows the spatial location of the Do Something Schemes (identified in green) and the selected junctions (identified in blue) on the same map. The analysis in the next section will look to determine what the effects the Do Something Schemes have on the performance of the selected junctions.

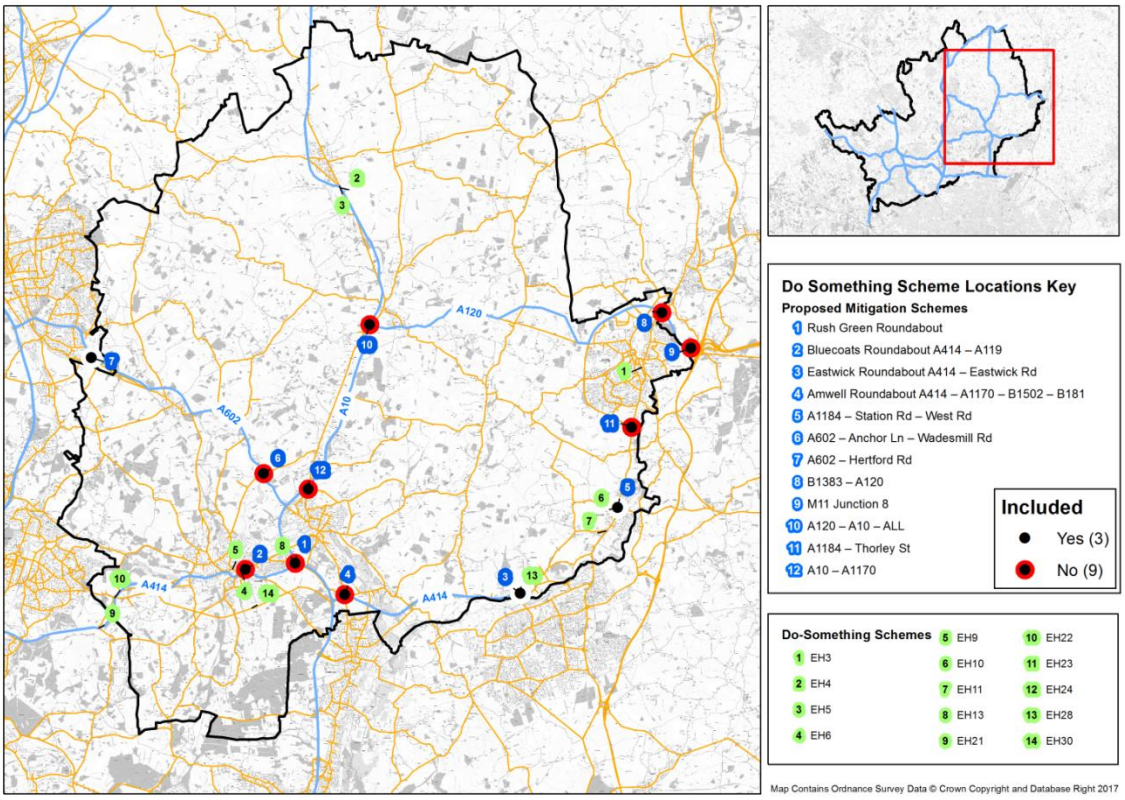

Figure 7 2031 Do Something Junction Mitigation Schemes and Selected Junctions

5. Forecast Year (2031) Do Something Key Findings

5.1 Forecast Year Network Conditions

5.1.1 This section provides the results of the 2031 Do Something scenario. Similar to the Base Year (2014) and 2031 Do Minimum scenarios, Figure 8 and Figure 9 show the congestion results in the 2031 Do Something scenario.

5.1.2 The Do Something Schemes do appear to reduce congestion in some areas, whereas in other areas they could benefit from further optimisation. The Bluecoats Roundabout in Hertford (selected Junction 1) and A602 – Anchor Lane – Westmill Road – Wadesmill Road (selected Junction 6) in the selected junctions list, for example, benefit from the Hertford Strategic Solution (Hertford Bypass) with the reduced flows through the junctions.

5.1.3 However the Eastwick Roundabout (selected Junction 3), experiences delays. This might be produced by the changes included in the Do Something on the junction layout, converting it from a roundabout in the Do Minimum, to a signalised junction in the Do Something, with an additional arm for access to the Gilston development. Those delays produce some local rat running, which might be reduced with further signal optimisation.

5.1.4 As part of this comparison analysis, the flow differences between both 2031 Do Minimum (the one used for the previous exercise) and 2031 Do Something scenarios can be seen in Figure 10 and Figure 11. The Hertford bypass is the main producer of changes involving re-routeing, which affects trips around Ware and trips through Hertford and Hoddesdon, makingthe use of the A10 and the Hertford Strategic Solution more attractive.

5.1.5 Figure 10 and Figure 11 also show a change in route choice when comparing the 2031 Do Minimum against the 2031 Do Something scenario between Bishop's Stortford and Harlow. A significant re-routing has been identified for the trips using the A1184 between both towns in the Do Minimum scenario. These re-route to the rural network in the Do Something, probably due to schemes 6 (EH10 - Upgrades of A1184/West Road/Station Road junction - from 2 mini roundabouts to signalised junction) and 7 (EH11 - Potential upgrade to A1184/High Wych Road junction - Including traffic signals). Further optimization of these signals might reduce the delays in the Do Something and, consequenlty, reduce the re-routing from the A1184 to the rural network.

5.1.6 Although Harlow is outside of the East Herts District, trips around the area have a major impact on the A414/Eastwick Road Roundabout. A Second River Stort crossing and an existing crossing upgrade (conversion to a dual carriageway with both lanes open to general traffic) were considered as a Do Something Scheme (Scheme 13, - EH28). Further analysis has been carried out to evaluate the traffic flows using this scheme, and the impacts of the Do Something Scheme 6 and 7. Select Link Analysis have been included in Appendix A, which shows the distribution of the trips using the Fifth Avenue Stort River Crossing and the Second River Crossing, which confirms the re-routing identified between Bishop's Stortford and Harlow.

5.1.7 The following junctions also experience increases in delays of up to 30 seconds:

- A119 – Mill Road Junction (Adjacent to Bluecoats roundabout) (selected junction 2)
- B1383 – A120 (selected junction 8)
- M11 Junction 8 (selected junction 9)
- A120 – A10 – ALL (selected junction 10)

5.1.8 Elsewhere in East Herts, the following junctions experience little change:

- Amwell Roundabout (A414 – A1170 – B1502 – B181) (selected junction 4)
- A1184 – Thorley Street (selected junction 11)
- A10 – A1170 (selected junction 12)

5.1.9 The delay in Little Hadham is due to the high cycle time of the signals and with the reduced flows as a result of the bypass, there is a potential to reduce this with signal optimisation.

5.1.10 Table 3 provides a summary of the Base Year and both Forecast Year conditions at the selected junctions. For reference, the abbreviation “V/C” in the table stands for the ratio of “volume over capacity” for the specified road. Links are generally considered to be approaching capacity at 80% V/C, beyond which there is a material deterioration in operation. The symbol “~” in the table denotes “approximately”.

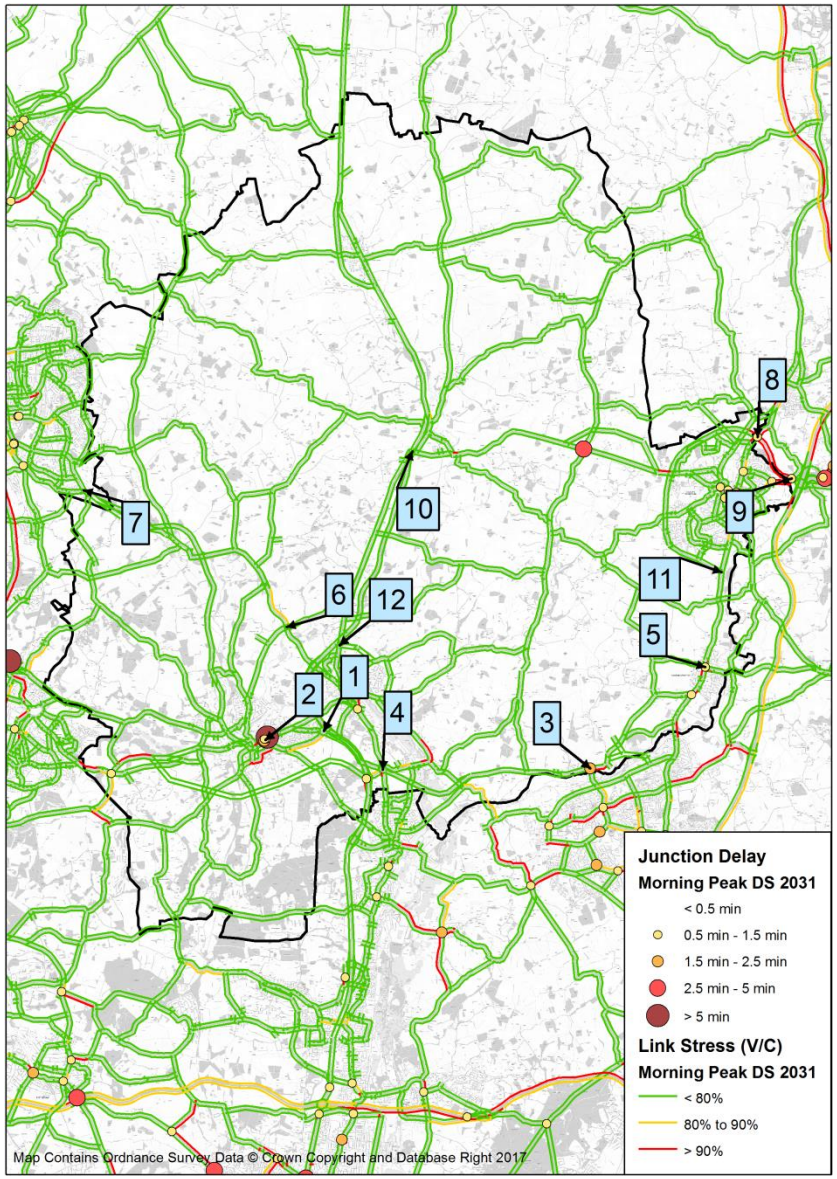

Figure 8 Morning Peak 2031 Do Something Congestion

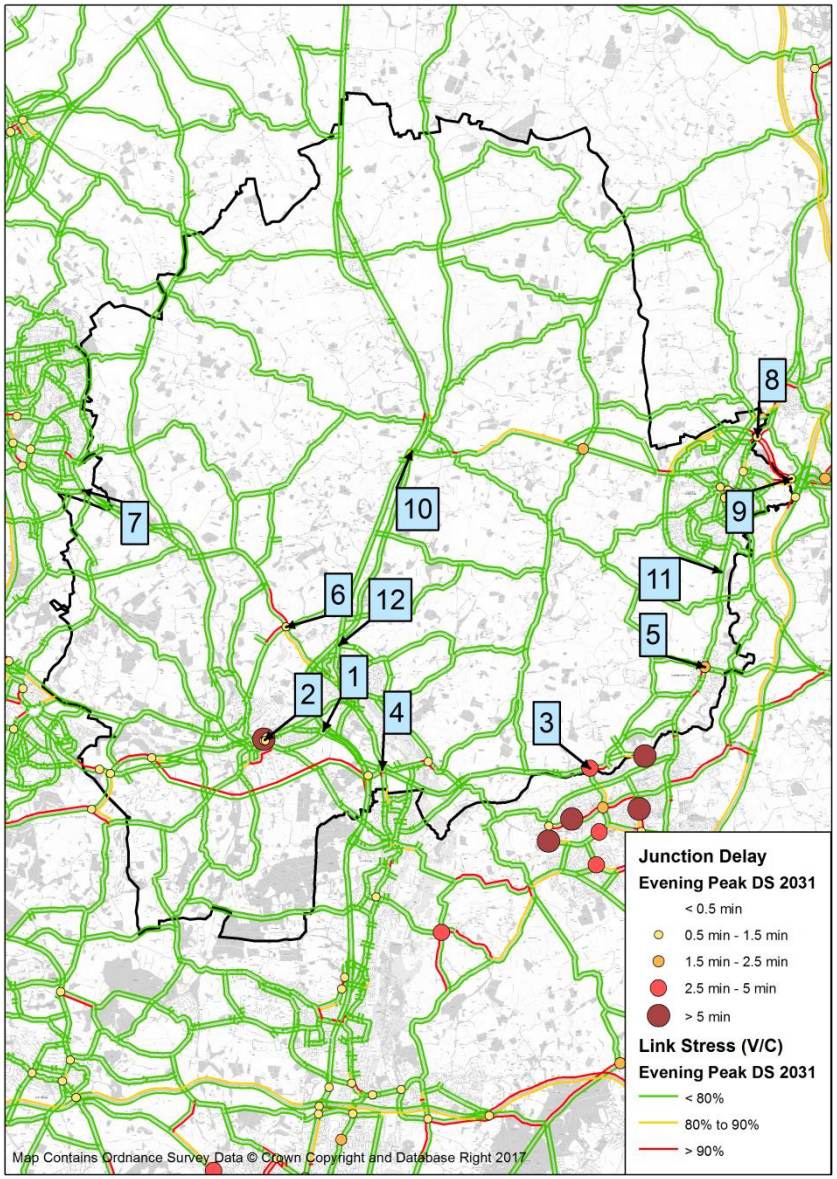

Figure 9 Evening Peak 2031 Do Something Congestion

Table 3 Selected Junctions to be monitored

ID	Junction Name & Time period	Town	COMET Base Year Congestion	COMET 2031 DM Congestion	COMET 2031 DS Congestion
1	Rush Green Roundabout	nr Hertford	***AM Peak*** V/C >90% on B1502 NB approach Delay ~2 mins	V/C >90% on B1502 NB approach Delay ~2.5 mins	V/C >64% on B1502 NB approach No delay
2	Bluecoats Roundabout A414 – A119	Hertford	***AM Peak*** V/C >90% on both A414 approaches Some sections of roundabout itself have V/C >90%.	V/C >90% on both A414 approaches Some sections of roundabout itself have V/C >90% Delay increases relative to Base Year on some approaches of up to ~1 min	V/C >100% on A414 EB approach Some sections of roundabout itself have V/C >100% A414 WB delay and V/C reduction to <~30 secs and <~40% respectively
	A119/Mill Rd junction (adjacent to Blue Coats roundabout)	Hertford	***AM Peak*** V/C >90% on both A119 approaches Delay ~5 mins	V/C >90% on westbound A119 approach Delay ~6 mins	V/C >100% on westbound A119 approach Delay ~7 mins
3	Eastwick Roundabout A414-Eastwick Rd	nr Harlow	***AM Peak*** V/C >90% A414 EB V/C >80% on other approaches Delay ~1 min	V/C >90% A414 EB and WB approaches Delay from ~1.5 mins	V/C >90% Eastwick Rd WB approach Delay from ~2 mins
4	Amwell Roundabout A414 – A1170 – B1502 – B181	nr Hoddesdon	***PM Peak*** V/C 80%-90% on A1170 and B181 approaches	V/C >90% on B181 approach V/C 80-90% on A414 EB approach The scheme in the Forecast Year to remove the bus lane on the southern A1170 approach arm does reduce link stress on this arm	V/C > 90% on A1170 NB approach V/C > 80% on B181 and A10 approach
5	A1184 – Station Rd – West Rd	Sawbridgeworth	***PM Peak*** V/C >90% London Rd & Cambridge Rd Delay ~1 min	V/C >90% on all approaches Delay ~1.5 mins	V/C > 90% on 2 approaches and > 100% on Cambridge Road approach. Delay ~2.5 mins
6	A602 – Anchor Ln – Wadesmill Rd	nr Ware	***PM Peak*** V/C >100% B158 EB Delay 2 mins	V/C >100% on A602 approaches and Wadesmill Rd V/C >80% Anchor Lane Delay ~3.5 mins	V/C >70% on Westmill Road and Anchor Lane Delay ~0.5 mins
7	A602- Hertford Rd	nr Stevenage	***PM Peak*** V/C >90% on A602 approaches Delay ~1 min	V/C >90% on A602 NB Delay <30 secs (due to signalisation scheme)	V/C >60% on A602 NB and SB
8	B1383-A120	Bishop's Stortford	***PM Peak*** V/C >90% on A120 approaches V/C 80%-90% on B1383 approaches Delay ~1.5 mins	V/C >90% on all approaches Delay ~1.5 mins Delay increases slightly between Base Year and Forecast Year (despite scheme here to add flared approaches on A120 arms)	V/C >100% on B1383 WB and A120 NB and SB approaches V/C >90% on B1383 EB approach Delay ~ 1 min Delays on the A120 approaches ~ 80 seconds

9	M11 Junction 8	Bishop's Stortford	***AM Peak*** V/C >90% on A120 approaches	V/C <80% on all approaches. However, delay ~1 min and V/C >90% at Birchanger Roundabout is likely to be having a restraining effect	Birchanger Roundabout V/C >100% on A120 EB approach V/C >90% on A1250 approach V/C >70% on other 2 approaches Delay ~ 0.5 min Delay ~ 1.5 mins on A120 SB
10	A120 – A10 – ALL	Puckeridge	No significant delay indicated in model	No significant delay indicated in model.	V/C >65% on A10 SB approach. Delay ~ 0.5 min
11	A1184 – Thorley St	Bishop's Stortford	No significant delay indicated in model	No significant delay indicated in model	No significant delay indicated in model
12	A10 – A1170	nr Ware	No significant delay indicated in model	No significant delay indicated in model	No significant delay indicated in model

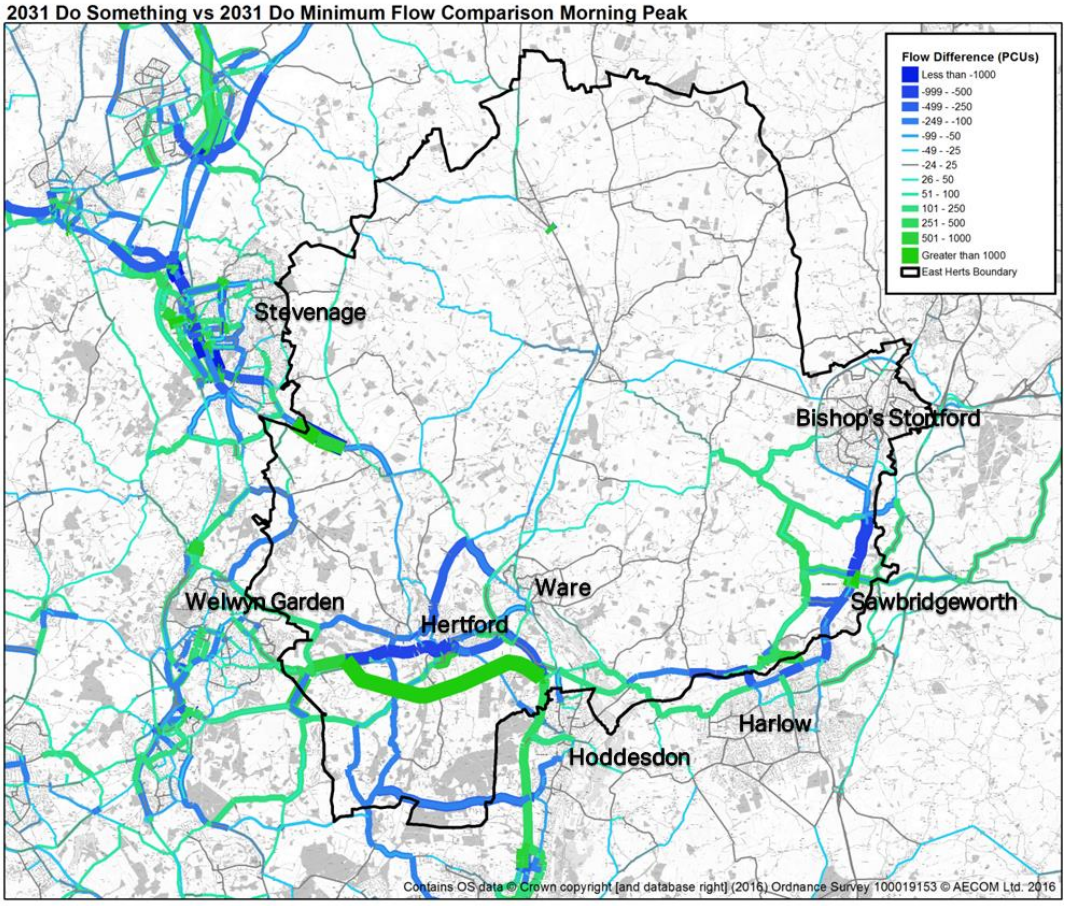

Figure 10 2031 Do Something Vs 2031 Do Minimum Morning Peak Flow Comparison

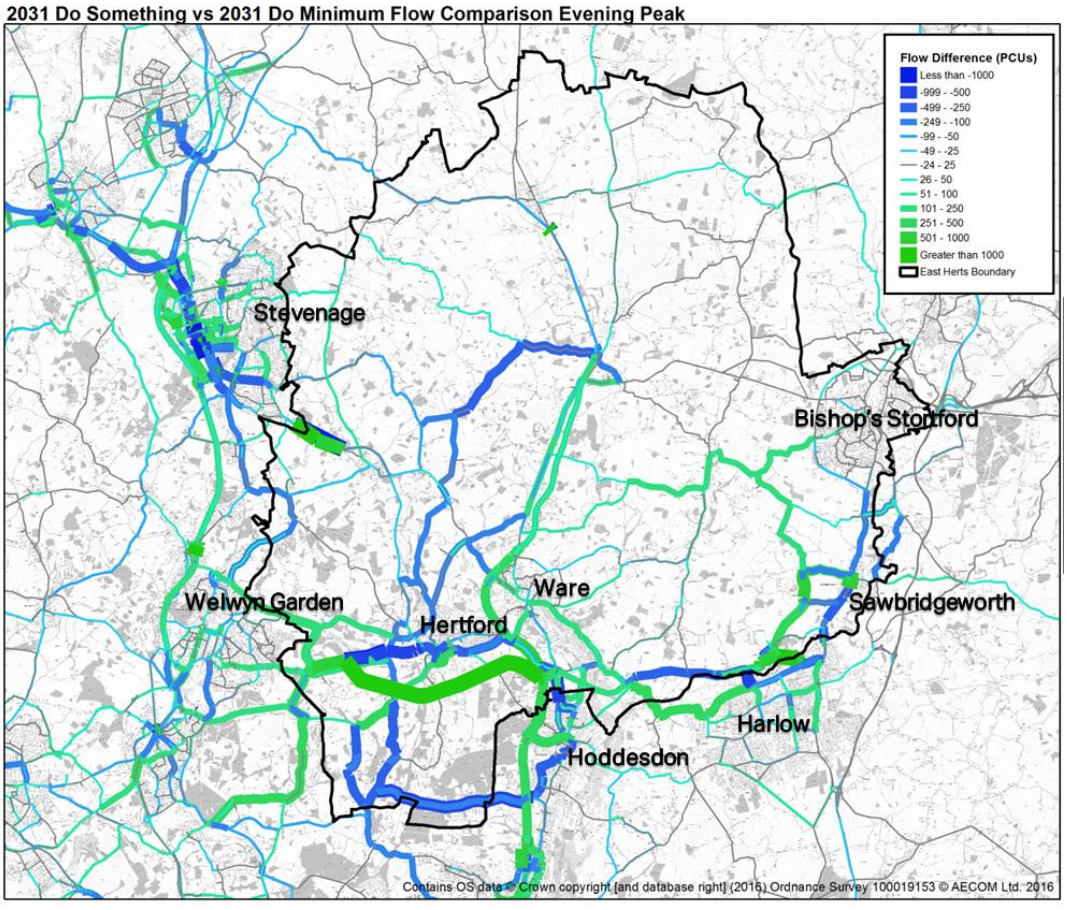

Figure 11 2031 Do Something Vs 2031 Do Minimum Evening Peak Flow Comparison

5.2 Air Quality Management Areas

5.2.1 The locations of Air Quality Management Areas (AQMAs) in East Hertfordshire are shown in Figure 12, Figure 13 and Figure 14. The COMET highway traffic assignment model is not designed to forecast air quality, however, results are provided in the following section on the likely increase in traffic flow between the Base Year and Forecast Year at these locations.

5.2.2 The roads considered in the calculation of traffic increase in the three AQMAs are as follows:

- Hertford
  - A414 southeast of Bluecoats Roundabout;
  - A414 southwest of Bluecoats Roundabout;
  - A414 adjacent to Castle Gardens; and
  - A119 Ware Rd.
- Sawbridgeworth
  - London Rd;
  - Cambridge Rd; and
  - Station Rd.
- Bishop's Stortford
  - Hockerill St;
  - Dunmow Rd;
  - London Rd; and
  - Stansted Rd.

5.2.3 Two AQMA areas experience a decrease in flows in the 2031 Do Something Scenario, with the largest decrease in traffic in Hertford (-20% in total). This is explained due to the inclusion of the Hertford Strategic Solution, with the modelling suggesting this will remove a lot of the through traffic in Hertford.

5.2.4 Sawbridgeworth's reduction in flows is due to local re-routing as a result of delays from the implementation of a signalised junction. With further optimisation of these signals we expect an increase in the flows compared to the current results of the 2031 Do Something scenario.

5.2.5 The flow increase in Bishop's Stortford is less significant, suggesting, as expected, the Do Something Schemes in East Hertfordshire have had little impact, particularly as there are a lack of schemes within Bishop's Stortford itself. Similar to the previous report, with the existing congestion in the Base Year model in these locations, future traffic growth is effectively limited by the capacity of the junction. In these congested areas, any additional vehicles added to the queues are likely to exacerbate air quality issues.

Table 4 Flow increases between Do Something and Base Year at East Hertfordshire AQMAs (2031 - 2014)

AQMA	AM Peak	Inter-peak	PM Peak	Total
Hertford	-2,354 (-32%)	-2,022 (-27%)	-26 (0%)	-4,402 (-20%)
Sawbridgeworth	-675 (-15%)	-234 (-6%)	-127 (-3%)	-1,036 (-8%)
Bishop's Stortford	103 (2%)	100 (3%)	2 (0%)	205 (2%)

* percentages are rounded to nearest percent

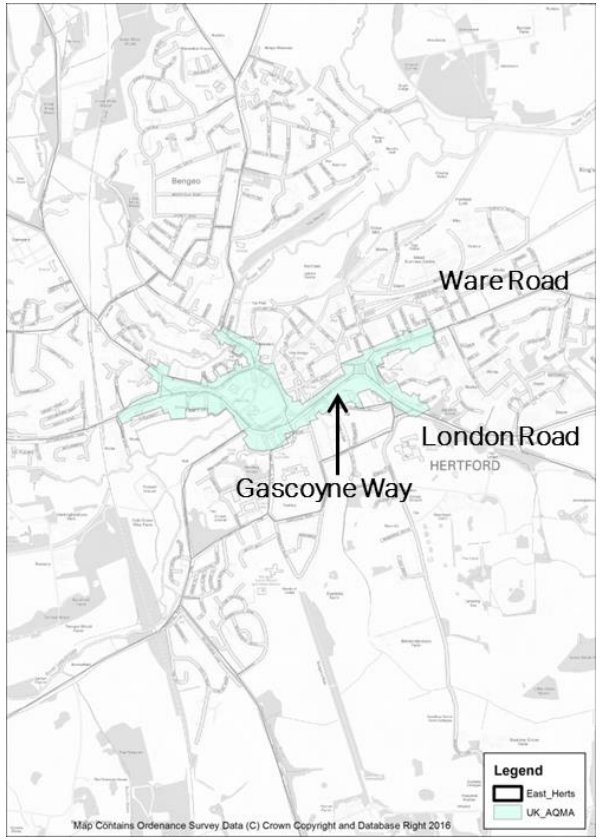

Figure 12 Hertford AQMA

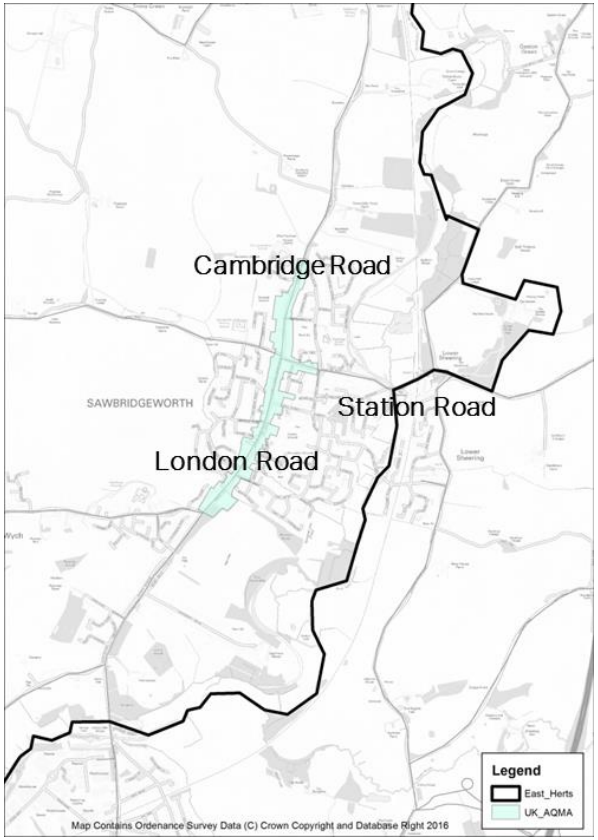

Figure 13 Sawbridgeworth AQMA

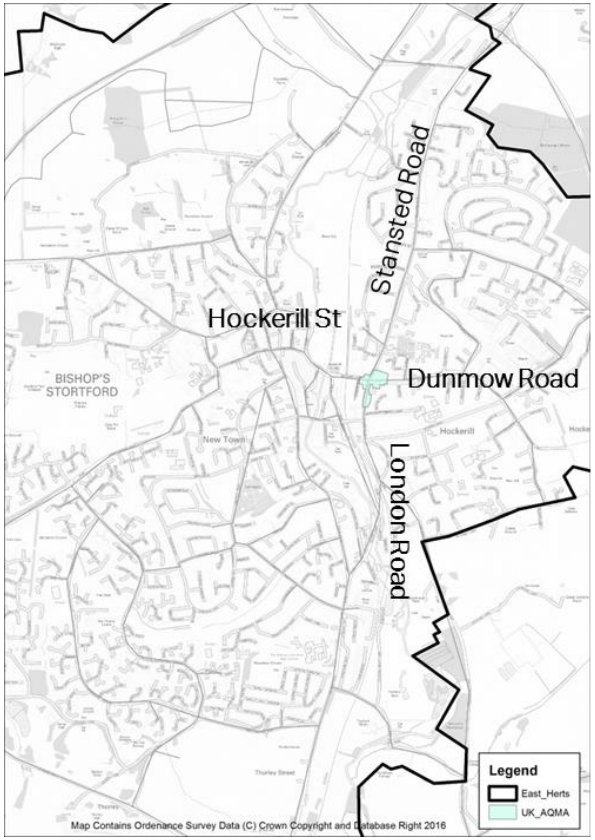

Figure 14 Bishop's Stortford AQMA

6. Major East Herts Developments

6.1.1 This section of the document considers five major proposed developments in East Herts, and provides initial analysis on the likely spatial distribution of their impacts on the highway network. The developments covered are as follows (including the assumed magnitude of growth as agreed with EHC in October 2016):

- Gilston Area (3,050 dwellings);
- Bishop's Stortford South (750 dwellings & 500 jobs);
- North and East of Ware (1,000 dwellings & 300 jobs);
- East of Stevenage (600 dwellings) and
- East of Welwyn Garden City (1,350 dwellings)

6.1.2 It is understood from EHC that the above sites will be delivered in line with the trajectory in the District Plan, which details differing delivery dates for these sites across the plan period, but provides for the total quantum of development being delivered by 2033. While the COMET model extends only as far as 2031, this report is intended to take into account the impact of strategic development over the whole plan period. Therefore, the full quantum of development that would be achieved for the five sites by 2033 has been included for modelling purposes.

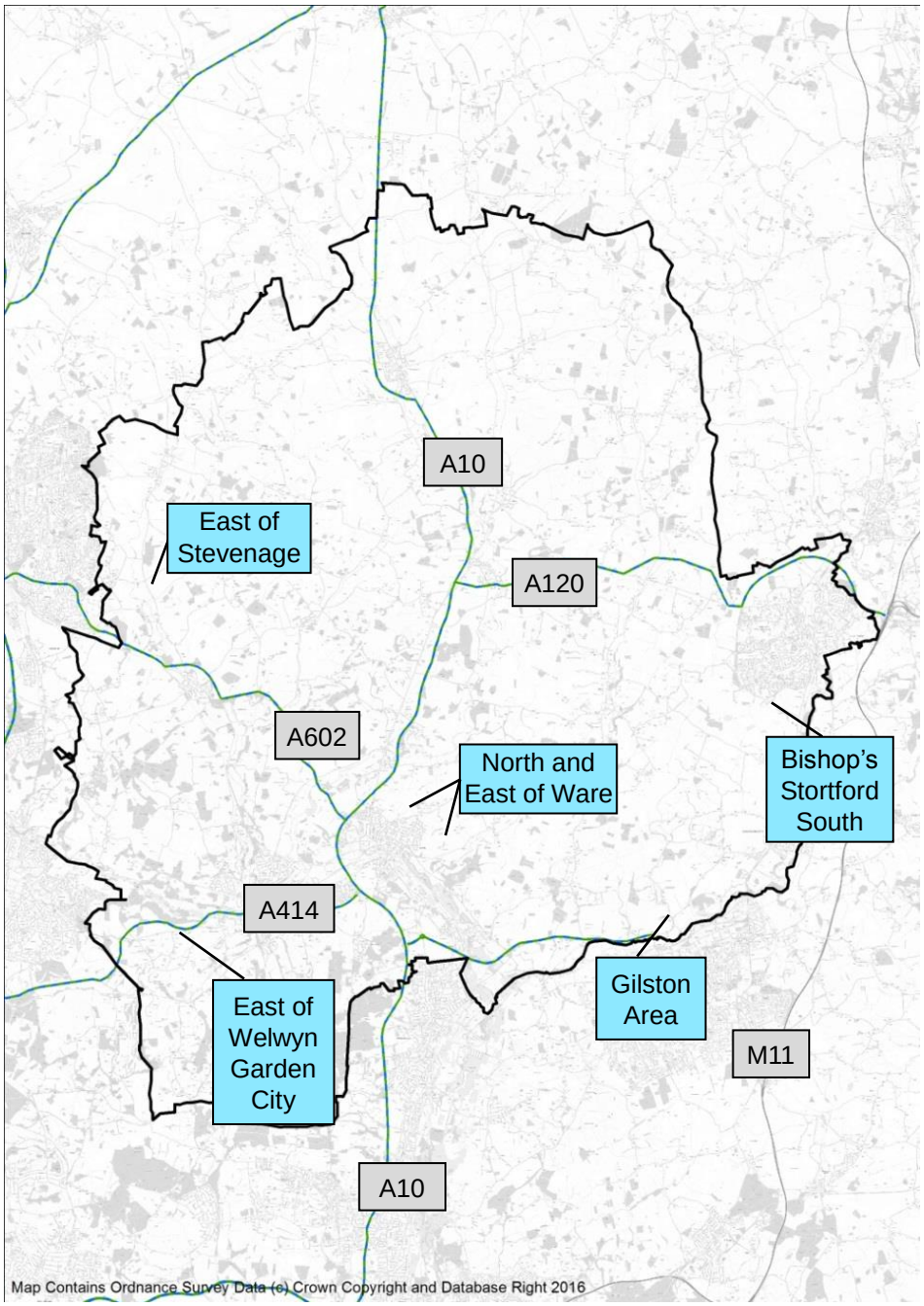

Figure 15 Proposed Major East Herts Developments

6.1.3 At this stage, this analysis (i.e. the assessment of likely impacts) is in its initial stage, as no comparison has been made with a scenario that does not contain these developments.

6.1.4 The analysis below shows the modelled volume and distribution of trips associated with the development only, as well as a local congestion plot in the development's vicinity. It should be noted that the delay/congestion indicated on these plots (Figure 17, Figure 19, Figure 21, Figure 23 and Figure 25) is wholly attributable to the development trips and illustrates where development trips would contribute to congestion in the network.

6.1.5 The diagrams provided in this section are for the worst case scenario peak. The equivalent analysis has also been undertaken for the alternative peak period, and reveals a broadly inverted trip distribution when comparing both Morning and Evening peak hours. The extent/locations of network congestion may, however, do vary slightly between the two peak hours.

6.2 Gilston Area

6.2.1 As stated in the previous exercise, the assumed growth outside Hertfordshire in the model is derived from central government (Department for Transport) forecasts (NTEM 7) which are likely to under-represent the proposed magnitude of growth in Local Plans of neighbouring authorities. This is particularly relevant for the Gilston Area given its proximity to Harlow.

6.2.2 It was noted as well in the previous exercise, that Essex County Council's VISUM model does include Essex authorities' Local Plan growth. This VISUM model has not been reviewed as part of this work, however, its growth assumptions may mean it is a more appropriate tool in this location.

6.2.3 Figure 16 and Figure 17 show the Evening Peak trip distribution and congestion plot for the Gilston Area development. This site accesses the modelled network on Eastwick Rd and the A414 (see dashed lines in Figure 16).

6.2.4 A significant proportion of development trips use the A414 between this site and the A10 via Eastwick Roundabout and Amwell Roundabout. Beyond the A10/A414 junction, the strongest interaction is with the urban areas in Broxbourne Borough between the A414 and M25. A smaller proportion of the developments trips are to/from Hertford and Ware via the A414.

6.2.5 In addition to the A414/A10 corridors, developments trips are also modelled on the M11 via the A1184 and M11 Junction 7a (a Forecast Year scheme).

6.2.6 The following selected junctions (see Table 3 for full list) are likely to receive trips associated with this development:

- Eastwick Roundabout (selected junction 3);
- Amwell Roundabout (selected junction 4);
- Rush Green Roundabout (selected junction 1);
- A1184 – Station Road – West Road (Sawbridgeworth) (selected junction 5) and
- Bluecoats Roundabout (selection junction 2).

6.2.7 Additional analysis in the vicinity of Harlow has been undertaken in Appendix A. This completes the understanding of the zone by the breakdown of different aspects:

- Bus lanes in the area;
- Trip Analysis of vehicles going through both River Stort's crossings and
- Performance of the A414/Eastwick Road roundabout (selected Junction 3).

6.3 Bishop's Stortford South

6.3.1 Figure 18 and Figure 19 show the Morning Peak trip distribution and congestion plot for the Bishop's Stortford South development. This site accesses the modelled network on Obrey Way (see dashed line in Figure 18).

6.3.2 Some of the development trips to/from this site are internal to Bishop's Stortford, and access the town centre via Whittington Way and London Rd. Of the development trips that are not internal to Bishop's Stortford, however, the relevant corridors are the A1184 (towards Sawbridgeworth and selected junction 5 in Table 3) and the A120.

6.3.3 The shortest route between this development and M11 Junction 8 is through the town centre. Congestion within Bishop's Stortford, however, encourages modelled trips to route via Pig Lane and Church Road, instead.

6.3.4 The following selected junctions (see Table 3 for full list) are likely to receive trips associated with this development:

- A1184 – Station Road – West Road (Sawbridgeworth) (selected junction 5);
- A1184 – Thorley St (Bishop's Stortford) (selected junction 11);
- M11 Junction 8 (selected junction 9) and
- Eastwick Roundabout (selected junction 3).

6.4 North and East of Ware

6.4.1 Figure 20 and Figure 21 show the Evening Peak trip distribution and congestion plot for the North and East of Ware development. This site accesses the modelled network via a new spine road connecting the A1170, Fanhams Hall Road and the B1004 (see dashed lines in Figure 20).

6.4.2 There is a strong linkage between this development and the A10 (primarily south of Ware) via the A1170. Elsewhere, development trips are modelled as using Hollycross Road (towards B181 into Harlow), Anchor Lane, and the A602 (towards Stevenage). Trips via Wadesmill Road and the A414 to Hertford are also indicated by the model.

6.4.3 The following selected junctions (see Table 3 for full list) are likely to receive trips associated with this development:

- A602 – Anchor Lane – Wadesmill Road (selected junction 6);
- Rush Green Roundabout (selected junction 1) and
- A10 – A1170 Amwell Junction (selected junction 12).

6.5 East of Stevenage

6.5.1 Figure 22 and Figure 23 show the Morning Peak trip distribution and congestion plot for the East of Stevenage development. This site accesses the modelled network via Broadwater Lane /Benington Road (see dashed line in Figure 22)[2]. Trips to/from the A602 are therefore fed via the Broadwater Lane/Gresley Way junction.

6.5.2 The origins/destinations of trips associated with this development are primarily in Stevenage, and modelling indicates a relatively minor interaction with the East Herts network. Where this interaction exists, it is via the A602 towards the A10.

6.5.3 The following selected junctions (see Table 3 for full list) are likely to receive trips associated with this development:

- A602 – Anchor Lane – Wadesmill Road (selected junction 6);
- A602 – Hertford Rd (Stevenage) (selected junction 7) and
- Junctions on A602 between district boundary and A1(M), including A602/Monkswood Way roundabout (Stevenage).

[2] It is recognised in reality the access point will be further north on Gresley Way (opposite the White Way and Uplands). The model zone in which this development falls, however, accesses the network via Broadwater Lane/Benington Road. This is due to the strategic nature of COMET. Nevertheless, development trips to/from the A602 do route via the Broadlwater Lane/Gresley Way junction (as will happen in reality). Therefore, at a strategic level, this is not considered to be a material limitation.

6.6 East of Welwyn Garden City

6.6.1 Figure 24 and Figure 25 show the Evening Peak trip distribution and congestion plot for the East of Welwyn Garden City development. This site accesses the modelled network via the A414/Birchall Lane roundabout[3].

6.6.2 The origins/destinations of trips associated with this development are primarily in Welwyn Garden City and to the A414 east using the Herford Strategic Solution. A number of trips also head west towards A1(M) junction 4. Modelling indicates a relatively minor interaction with the East Herts network beyond Hertford and the A10 corridor. Trips to this site from East Herts predominantly use the bypass and the A414.

6.6.3 The following selected junctions (see Table 3 for full list) are likely to receive trips associated with this development:

- A602 – Anchor Lane – Wadesmill Road (selected junction 6);
- Rush Green Roundabout (selected junction 1) and
- Bluecoats Roundabout (selection junction 2).

[3] It is recognised in reality the access point will be on Birchall Ln (north/west of the A414). The model zone in which this development falls, however, means that development trips need to use the A414/Birchall Ln roundabout. While this will not be the case in reality, the strategic nature of COMET results in such minor anomalies. The overestimation of development trips through this roundabout is acknowledged; however, no significant congestion is modelled here. Therefore, at a strategic level, this is not considered to be a material limitation.

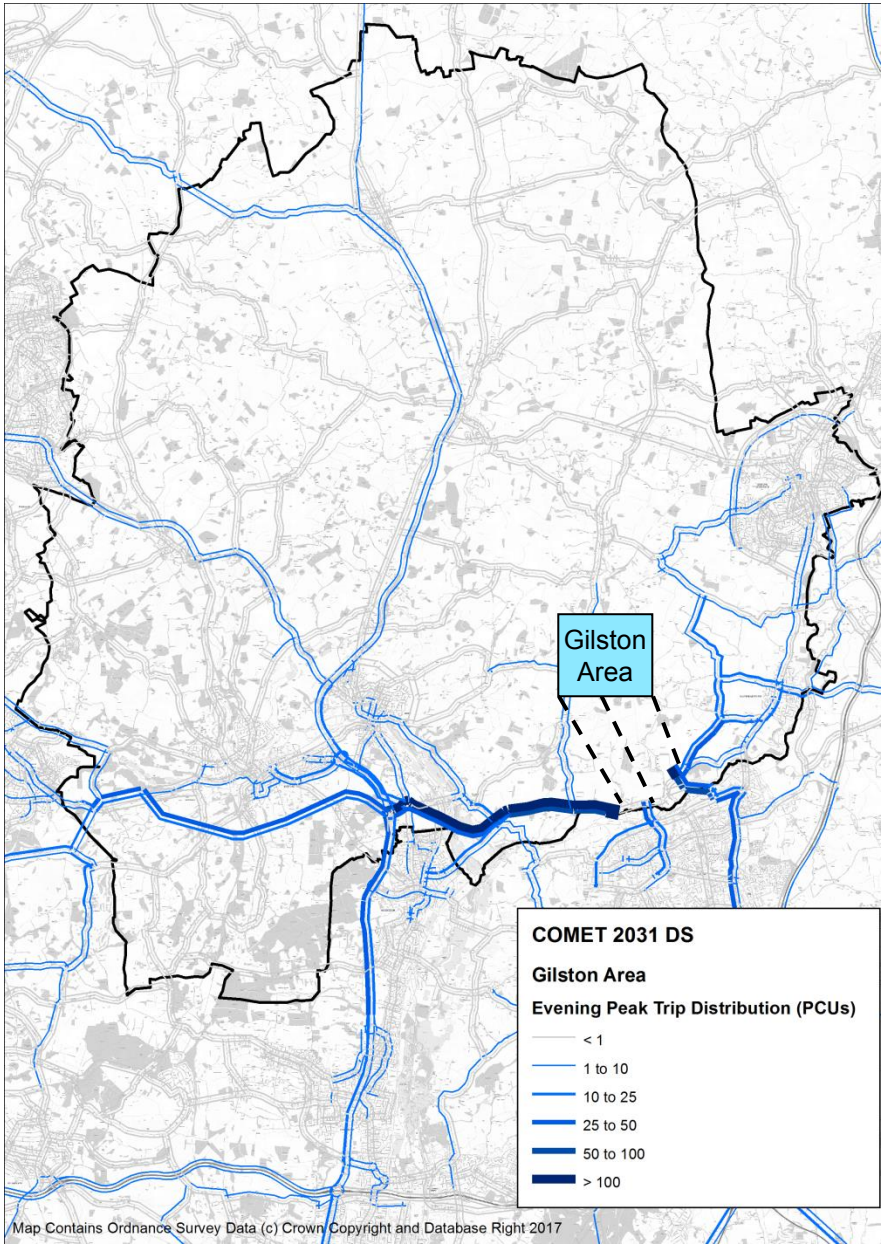

Figure 16 Gilston Area Evening Peak 2031 Trip Distribution

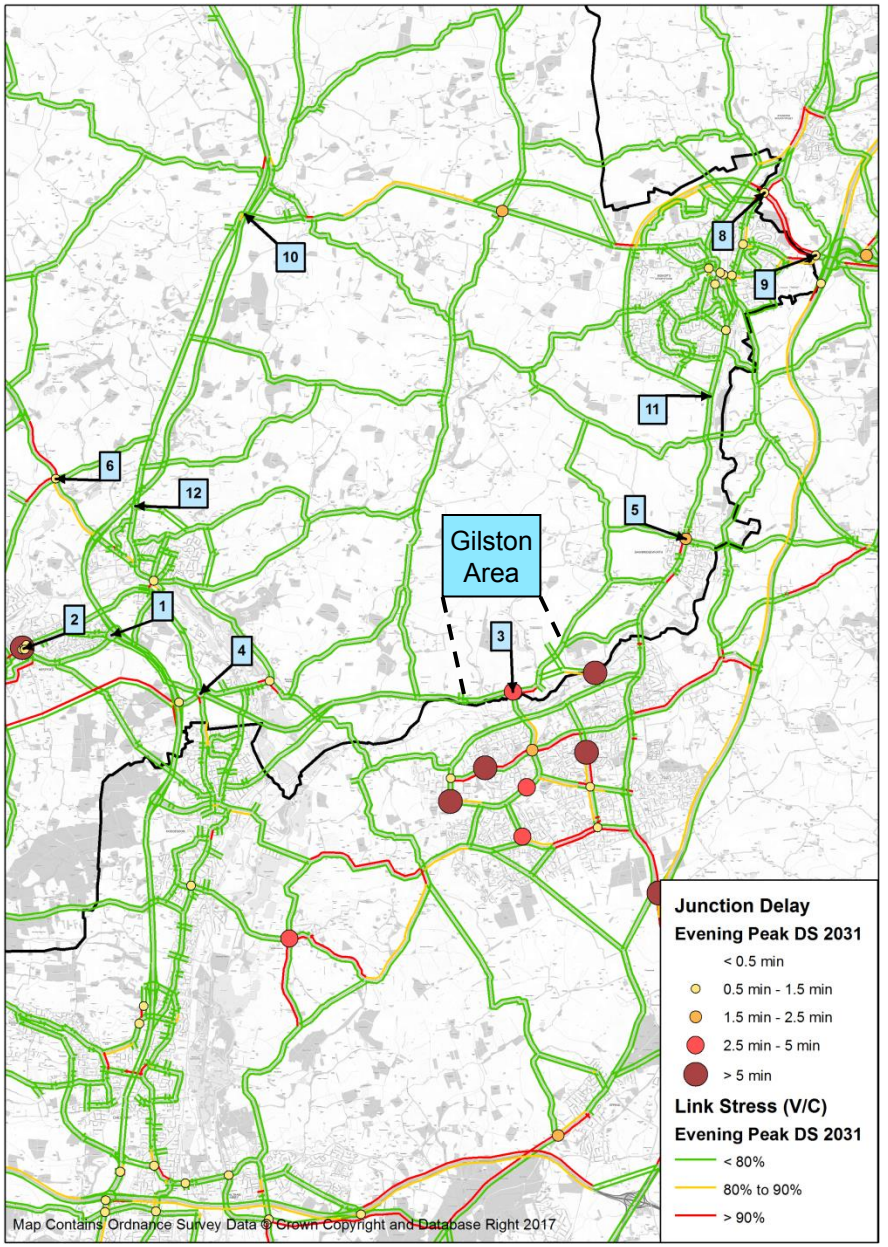

Figure 17 Gilston Area Evening Peak 2031 Congestion

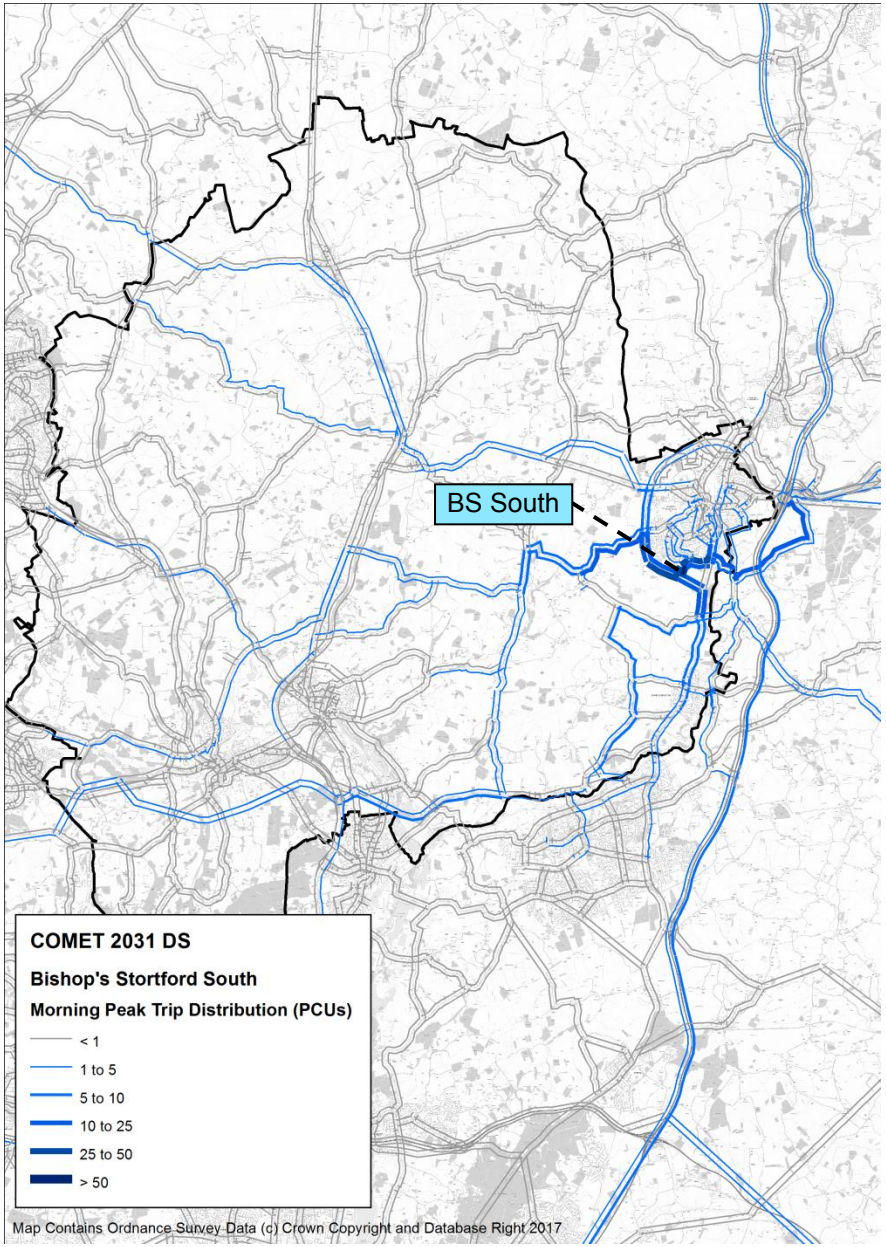

Figure 18 Bishop's Stortford South Morning Peak 2031 Trip Distribution

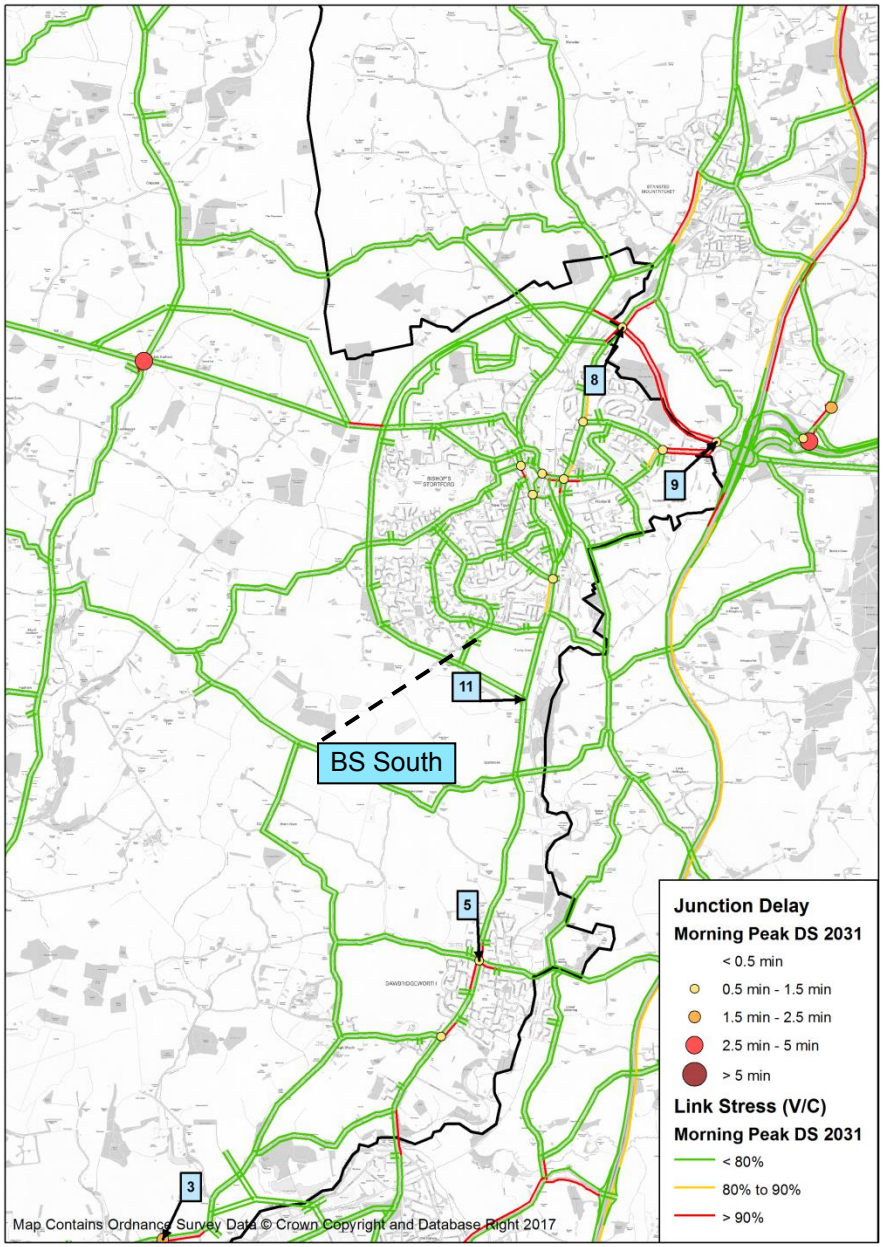

Figure 19 Bishop's Stortford South Morning Peak 2031 Congestion

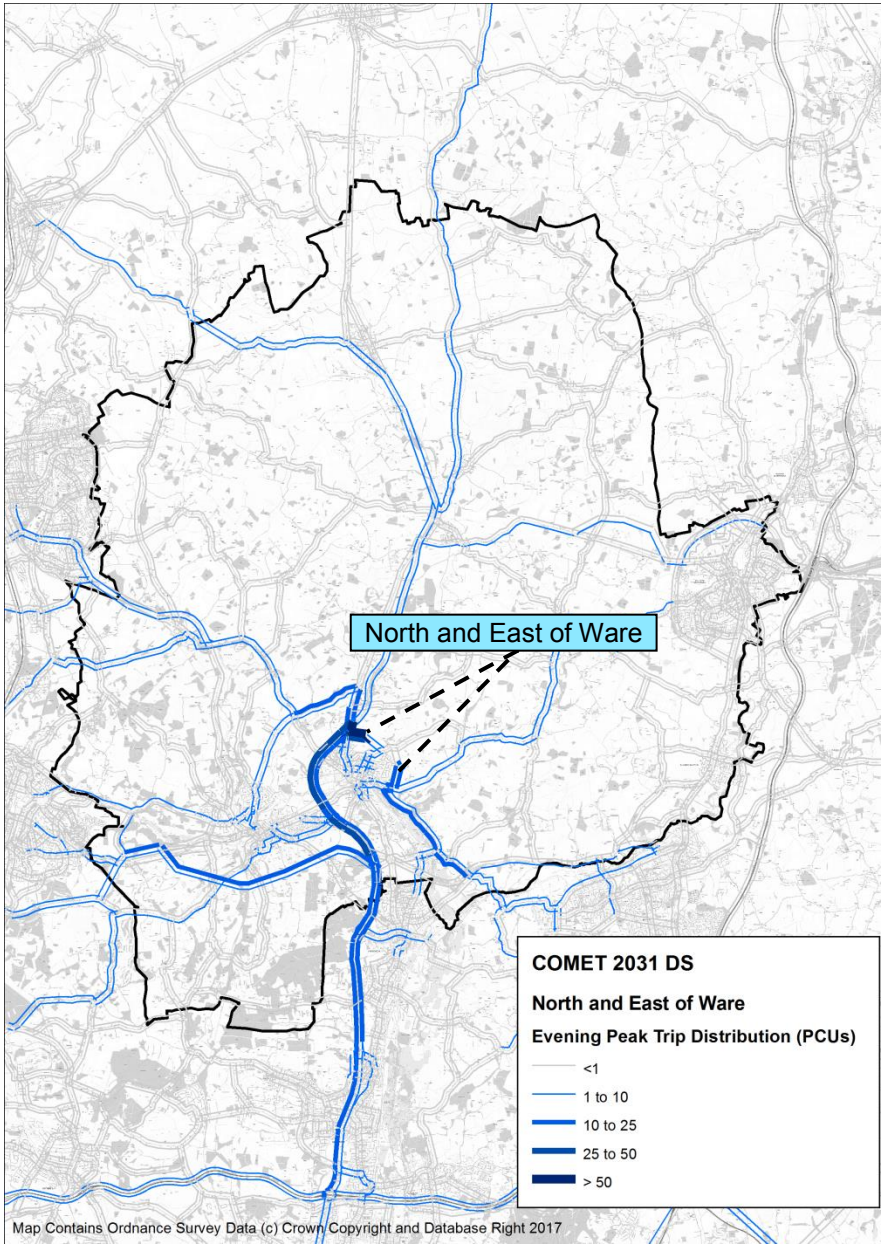

Figure 20 North and East of Ware Evening Peak 2031 Trip Distribution

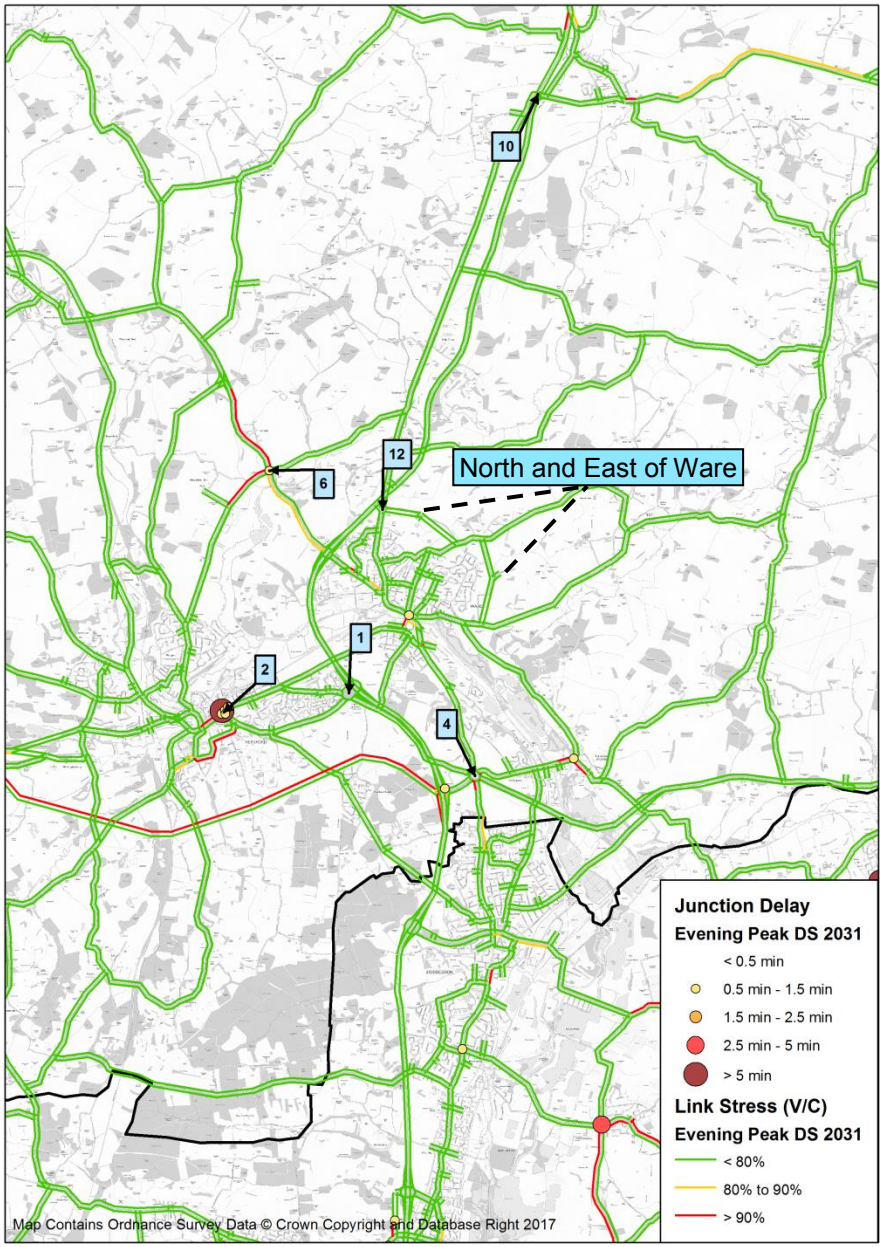

Figure 21 North and East of Ware Evening Peak 2031 Congestion

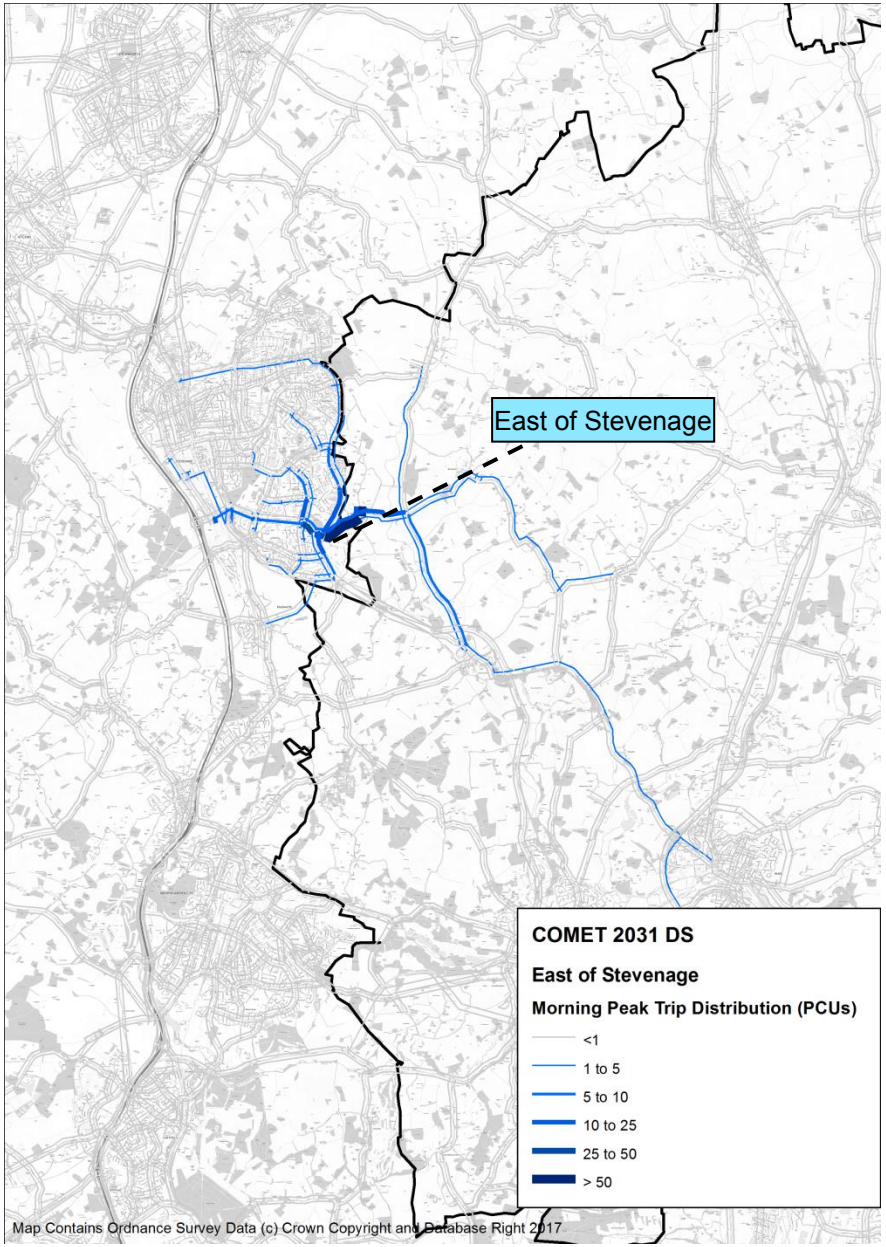

Figure 22 East of Stevenage Morning Peak 2031 Trip Distribution

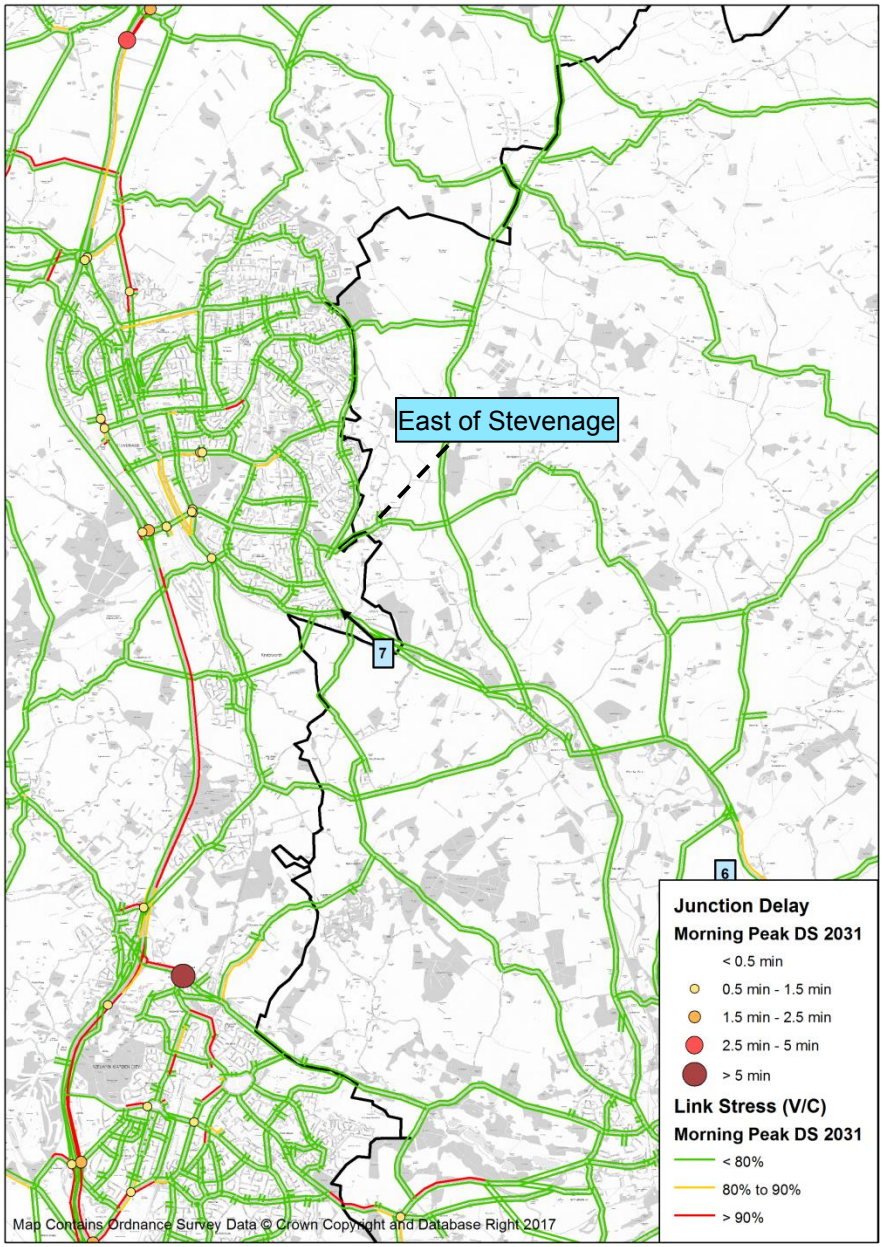

Figure 23 East of Stevenage Morning Peak 2031 Congestion

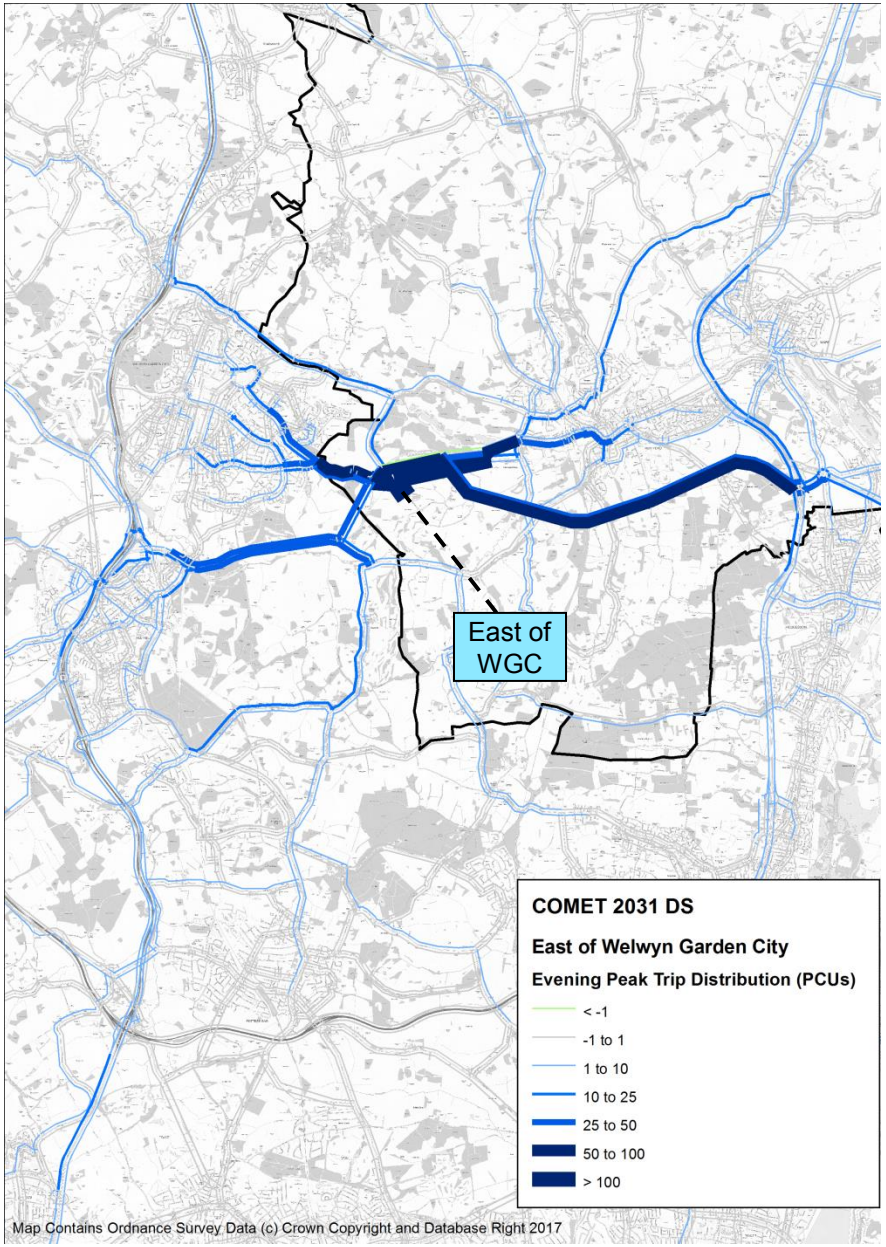

Figure 24 East of Welwyn Garden City Evening Peak 2031 Trip Distribution

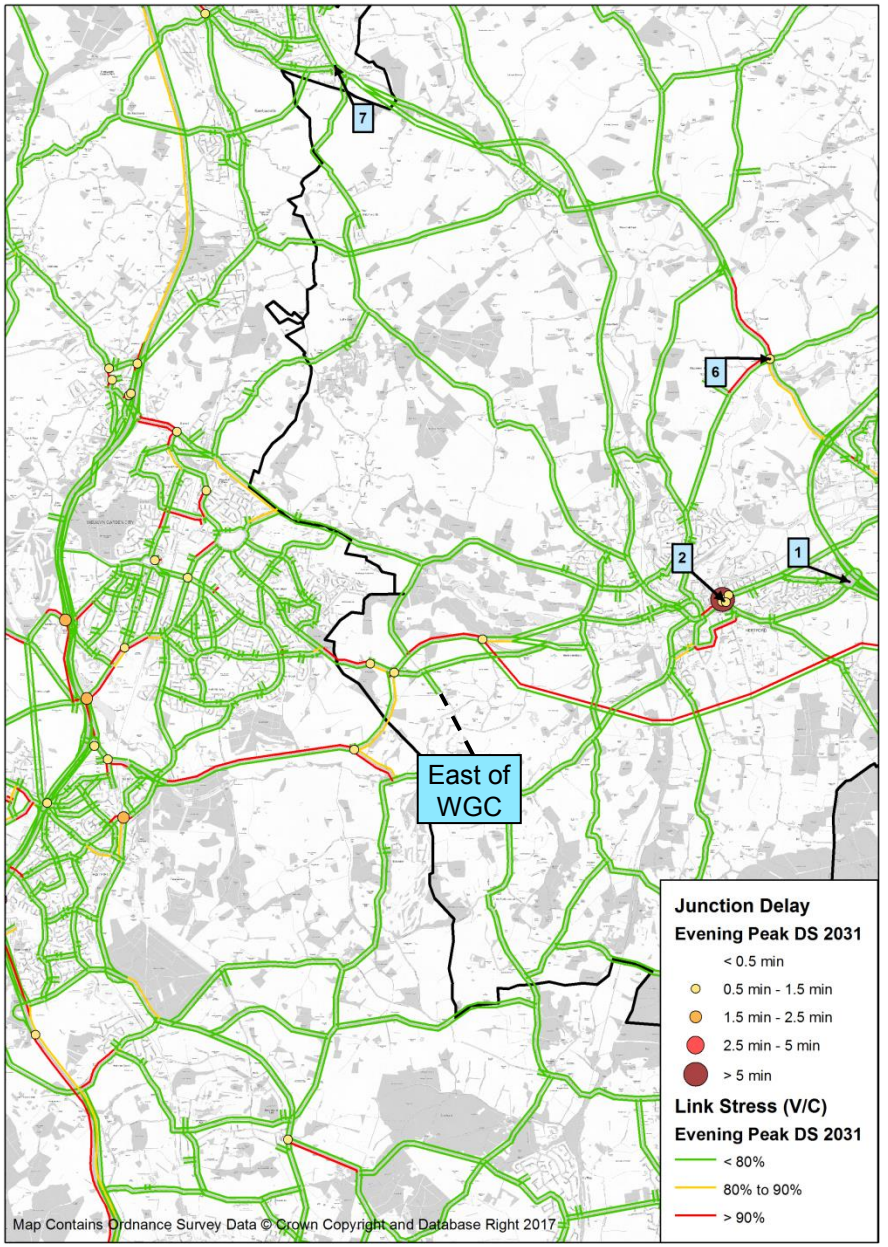

Figure 25 East of Welwyn Garden City Evening Peak 2031 Congestion

7. Further Potential Mitigation Options

7.1 Mitigation Options

7.1.1 Table 5 presents the type of potential mitigation options that the modelling work has indicated might be appropriate at the new selected locations shown in Figure 26 and Figure 27.

7.1.2 At this stage, these mitigation measures should be interpreted at a very high level, and would require further testing. In addition, it should be noted that potential assessments of any mitigation option (at a later stage, out of the present scope) should rely on a range of indicators which are not limited to congestion.

Table 5 Further Potential Mitigation Options

ID	Junction Name	Potential mitigation
13	A10 Hailey Interchange	Increase the capacity at the junction for the East/West Bypass movements. Potential additional filter lane for the left turn eastbound from the bypass.
14	High Street/ Cappell Lane/B181	Existing mini roundabout under pressure from re-reouting due to the bypass. There is potential for signalisation although it is noted that this could encourage more traffic to use this route.
15	Eastwick Roundabout A414 – Eastwick Rd	Potential addition of segregated left turn lanes to remove some movements through the roundabout. In the longer term, it is likely that a more sustainable solution will be required for this junction, particularly given local growth aspirations. As part of the proposals for growth in the Gilston Area, the section of Fifth Avenue between the Eastwick Roundabout and the Burnt Mill roundabout will be widened to increase capacity. A second Stort crossing will also be provided.
16	Amwell Roundabout A414 – A1170 – B1502 – B181	Potential conversion to signalised “hamburger-style” to prioritize A414 through-traffic.

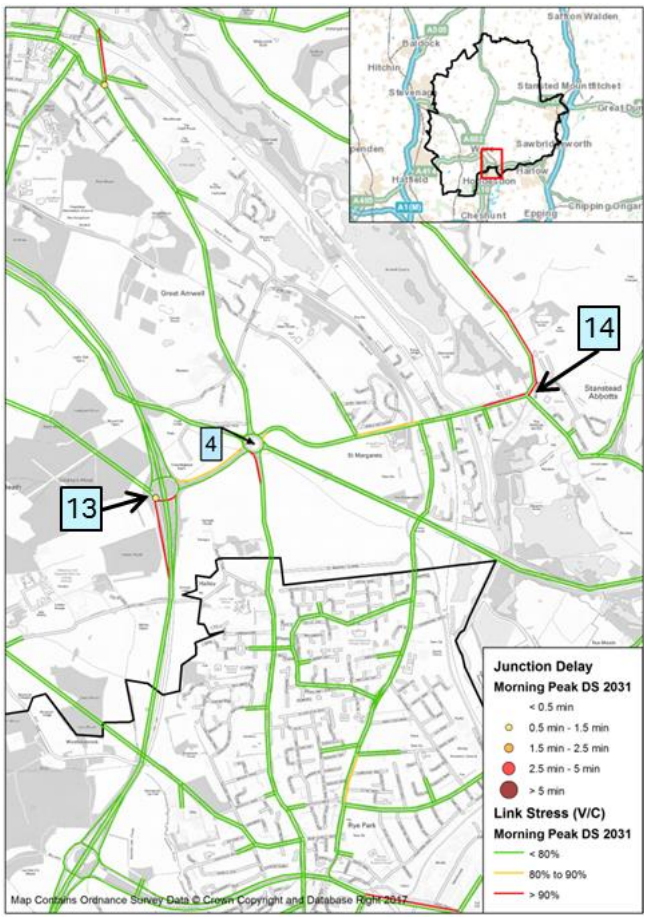

Figure 26 East of Hertford Morning Peak 2031 Congestion

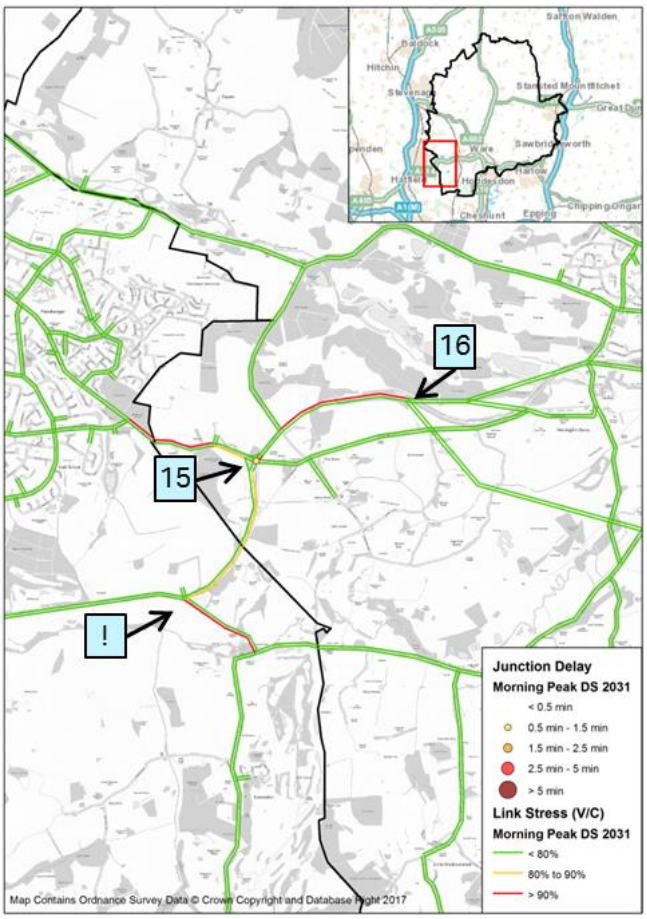

Figure 27 West of Hertford Morning Peak 2031 Congestion

7.2 Sustainable Strategies and Modal Shift

7.2.1 The mitigation options presented in Table 5 are predominantly highway-based capacity upgrade measures at certain junctions in the district where future congestion is expected. Whilst such highway-based capacity upgrades may be necessary and effective in some cases, there is an inherent risk that such measures could simply transfer the problem elsewhere in the network.

7.2.2 As an alternative approach, it is suggested that longer term and more sustainable mitigation should be achieved through transport strategies/schemes that promote modal shift (i.e. encouraging trips to be made by walking, cycling or public transport). Encouraging modal shift is of particular importance in new developments before car-dominant travel patterns are established. Potential modal shift strategies are not within the current scope, but may be investigated in further work.

8. Summary and Next Steps

8.1 Summary

8.1.1 This document provides strategic level analysis of the highway network performance in East Hertfordshire in support of the District Plan submission in March 2017. The analysis presented here makes use of HCC's COMET 2031 Do Something model.

8.1.2 The analysis covers:

- Key selected junctions in East Herts;
- Five proposed major developments in East Herts and
- Air Quality Management Areas.

8.1.3 The available model scenarios indicate that highway network congestion in East Herts is likely to rise between the present day and 2031, particularly at key junctions where delay is already evident. The mitigation of this delay may be achieved through the introduction of new transport infrastructure schemes, such as the ones considered in the 2031 Do Something Scenario, the potential mitigations identified in the 2031 Do Minimum analysis, and some additional potential options, as shown in Table 5.

8.2 Next Steps

8.2.1 The mitigation options outlined in this document have been tested at a strategic level to assess their potential impacts. If they are to be developed / investigated further there is a need for more detailed modelling work.

8.2.2 Notwithstanding the pursuit of highway-based mitigation schemes, it is critical that any transport strategy explores the development of sustainable transport and modal shift. These schemes should encourage travel though modes such as walking, cycling and public transport.

8.2.3 As stated in section 1, the 2031 COMET Forecast Year includes Local Plan growth in all 10 Hertfordshire districts. Outside Hertfordshire, growth projections are taken from central government (Department for Transport) forecasts (NTEM 7). Given the proximity of East Herts to Essex authorities (which have Local Plan assumptions that are different to current central government forecasts), it may be necessary to produce a 2031 Forecast Year that reflects the Local Plan growth of these neighbouring authorities. In this way, a higher level of cumulative growth (and therefore potential highway impact) can be assessed.

Appendix A – Gilston Area Analysis

As requested in the meeting held with East Herts and Hertfordshire County Council officers on March 20th, the following analysis has been included in Appendix A:

- Select Link Analysis of the Fifth Avenue (Eastwick) Stort River Crossing and the Second River Crossing scheme (Figures from Figure 28 to Figure 35).
- Plot to show modelled bus lanes in Harlow (Figure 36).
- Plot to show the modelled Eastwick Roundabout in the 2031 Do Something scenario (Figure 38).

Where referenced in this section, selected junctions can be found in Table 2, and Do Something schemes can be found in Table 1.

River Crossings Select Link Analysis

Following on from the analysis in the main body of the report from the Do Something Scenario results, specifically the delays around selected junction 3 (Eastwick Roundabout) and selected junction 5 (Signalised junction in the centre of Sawbridgeworth), the select link analysis (SLA) of the Fifth Avenue River Crossing and the Second River Crossing is intended to highlight the impact these delays are having on the routing of vehicles using these crossings.

Select link analysis shows where vehicles that have travelled on the selected link have come from and where they are going to, as well as showing the routes they have taken. In our case the two links we have selected are the Fifth Avenue River Crossing in both directions, for the morning and evening peaks, resulting in 4 figures below from Figure 28 to Figure 31. And the Second Stort River Crossing that has been modelled in the Do Something Scenario, again for both directions and for the morning and evening peaks, resulting in Figure 32 to Figure 35 below.

The Fifth Avenue northbound crossing shows the majority of trips are Harlow based looking to access the A414 to the west. It does also attract trips from the east of Bishop's Stortford using the M11 and travelling through Harlow.

Traffic travelling southbound along the Fifth Avenue is largely coming from the A414 from the west. There are also trips from Bishop Stortford being drawn onto the crossing. The majority of these trips in the morning peak have their destinations in Harlow, however there are also a notable number of trips continuing eastbound towards the east of Bishop's Stortford via the B183. The evening peak, however, shows a low number of trips using the southbound crossing. Figure 32 and Figure 33 show more trips are using the new second crossing to access the east of Harlow which could explain the lower number of trips using the Fifth Avenue southbound crossing.

Continuing with the second crossing, in the Eastbound direction there is a slight majority in trips coming from the North of Harlow (High Wych, Sawbridgeworth and Bishop's Stortfort) with the rest of the trips coming from the west via the A414. This is the case in the morning and evening peak hours. The major destination for these trips are in the east of Harlow, with few trips routing through to other destinations.

The majority of westbound trips along the second crossing also originate from Harlow. The trips are then evenly distributed between destinations towards the north and the west.

As discussed in the technical note above, there is re routing towards the rural roads between Bishop's Stortford and Harlow, this is discussed in further detail in the following paragraphs.

For the Fifth Avenue crossing, we can see for the evening peak, in the northbound direction (Figure 29) trips travelling between Harlow and Bishop's Stortford are avoiding travelling through Sawbridgeworth because of the delays on the A1184. The conditions are similar in the southbound direction for the morning peak (Figure 30).

The Second Stort River crossing SLA also shows the same re-routing patterns. Eastbound trips in the morning and evening peaks (Figure 32 and Figure 33) show those originating in Bishops Stortford are re routing along the rural roads around Sawbridgeworth instead of using the A1184 through the town.

For the Westbound direction along the Second Stort River Crossing, we are seeing the same re-routing for trips travelling between Harlow and Bishops Stortford (Figure 34 and Figure 35). We are however in this case, seeing some trips routing through Sawbridgeworth towards Bishop's Stortford. Although it is observed in the modelling, these trips are travelling east along West Road, instead of travelling along High Wych Road then north along the A1184. As highlighted in the techincal note further signal optimisations may reduce the level of re-routing.

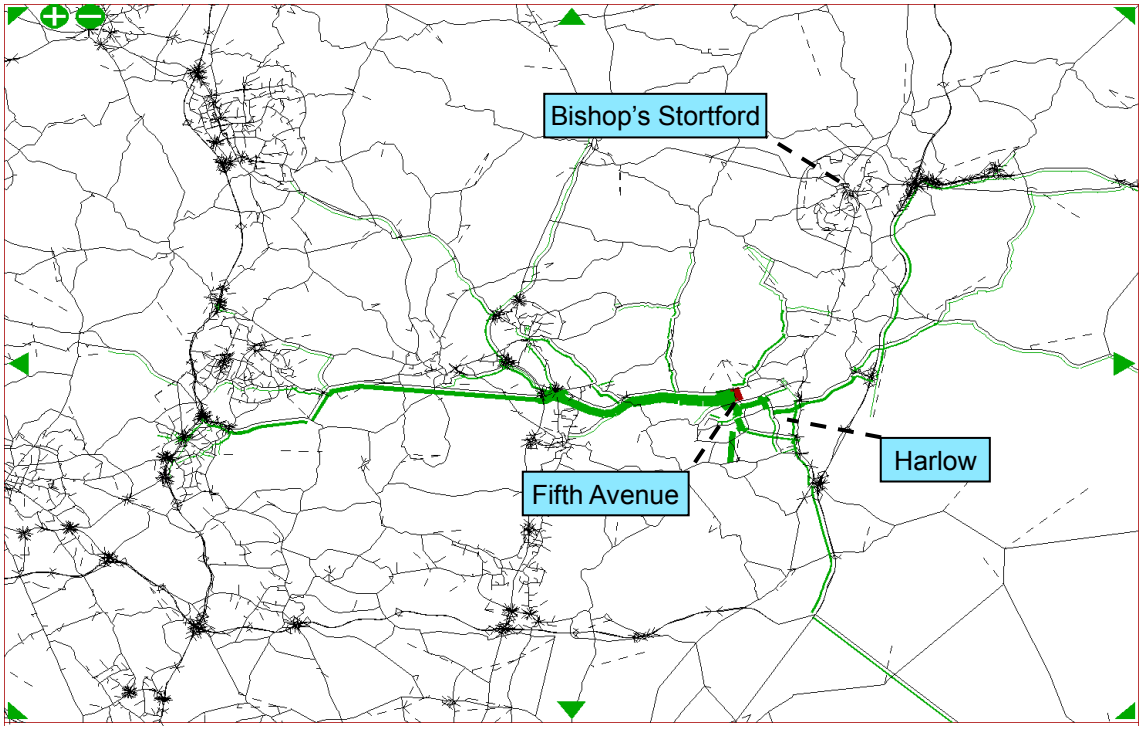

Figure 28 Fifth Avenue Morning Peak Northbound Select Link Analysis

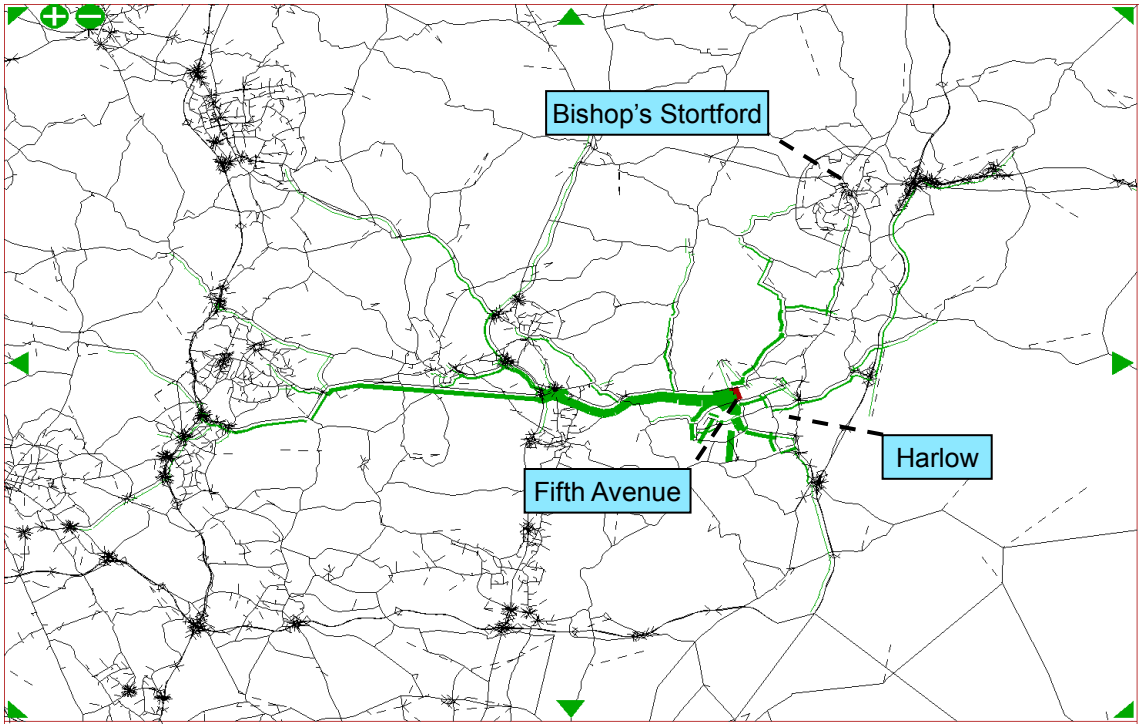

Figure 29 Fifth Avenue Evening Peak Northbound Select Link Analysis

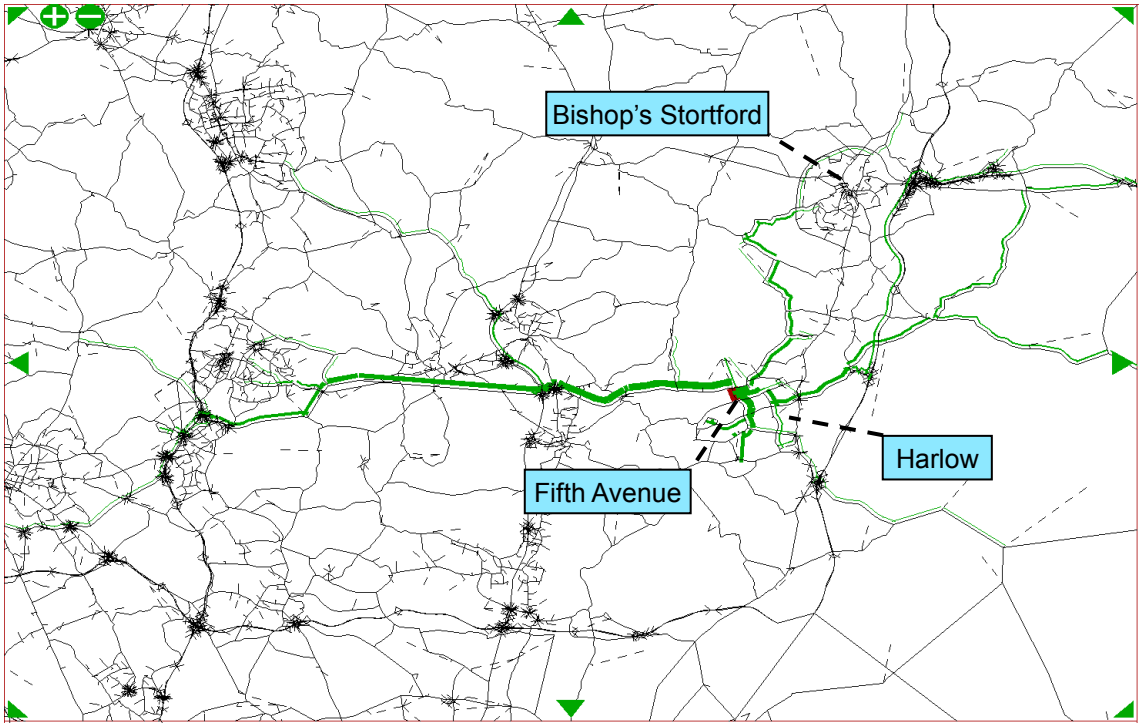

Figure 30 Fifth Avenue Morning Peak Southbound Select Link Analysis

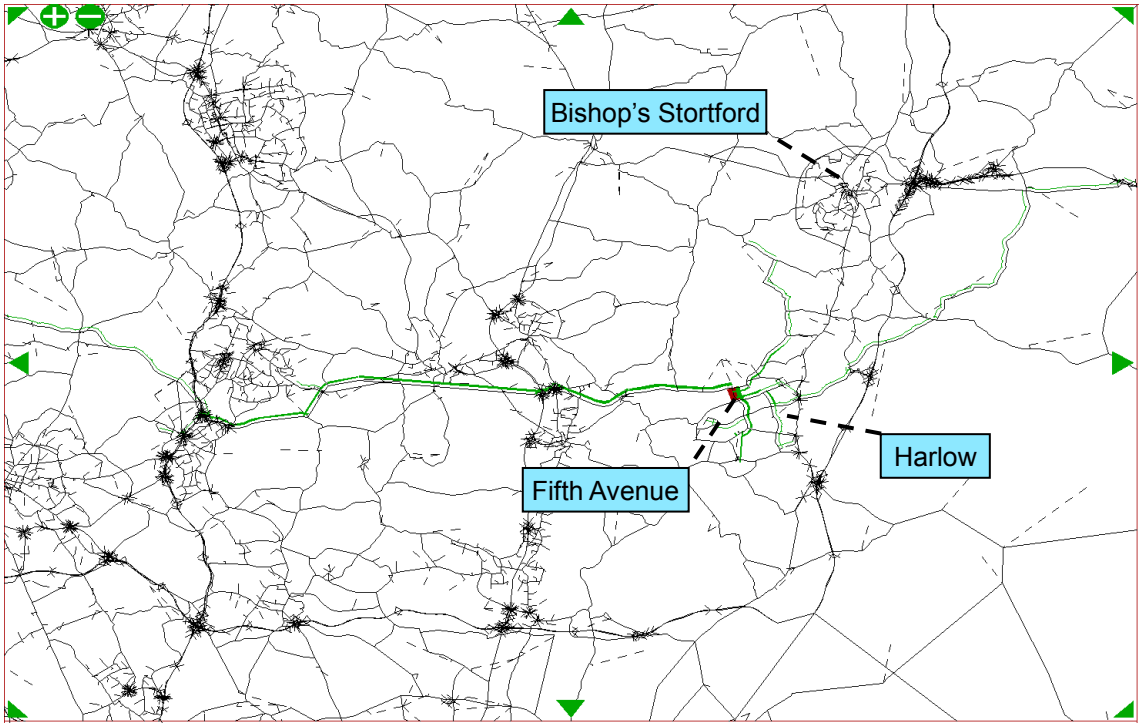

Figure 31 Fifth Avenue Evening Peak Southbound Select Link Analysis

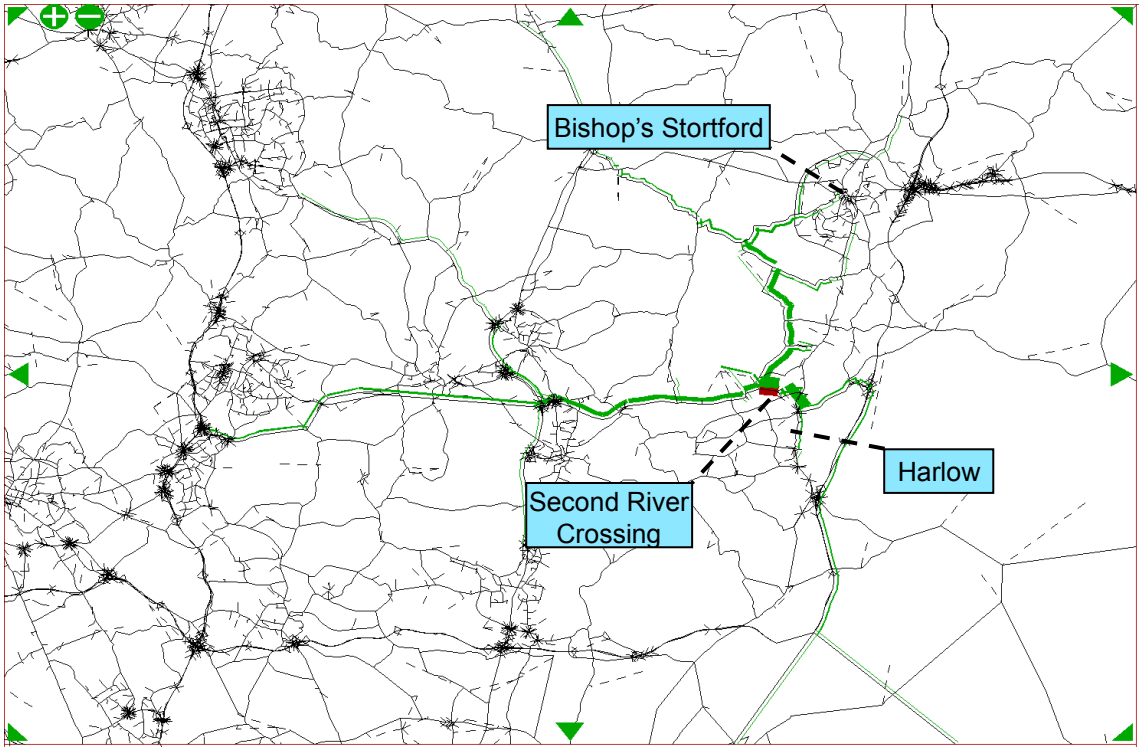

Figure 32 Second Stort River Crossing Morning Peak Eastbound Select Link Analysis

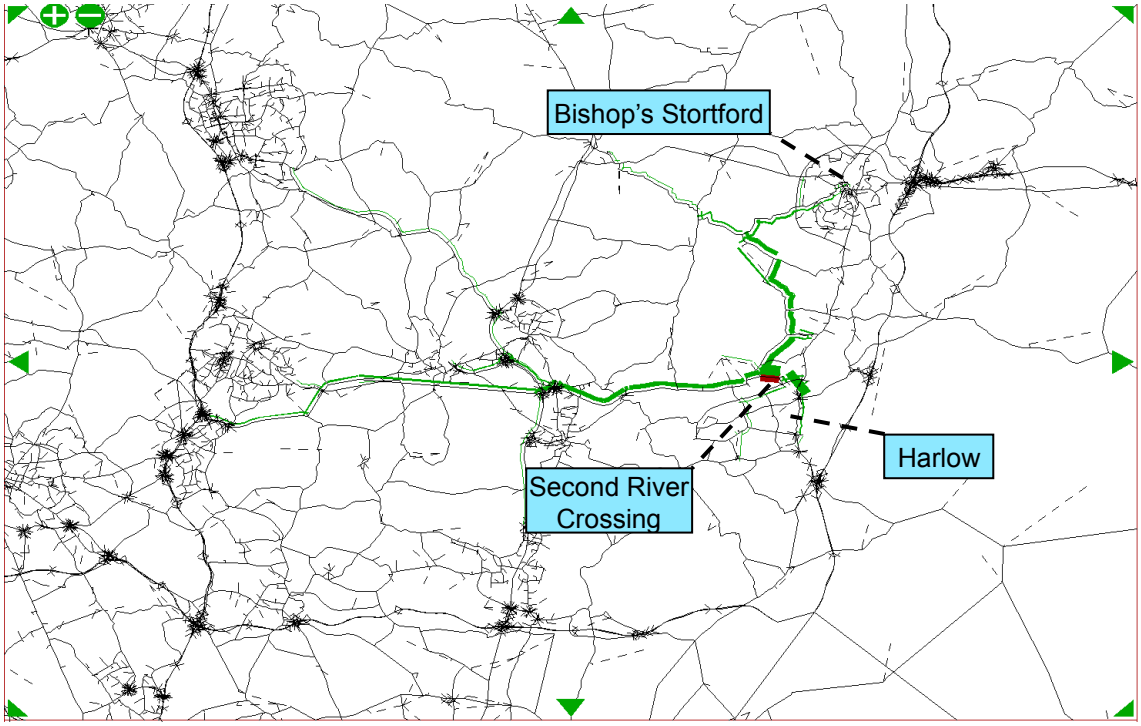

Figure 33 Second Stort River Crossing Evening Peak Eastbound Select Link Analysis

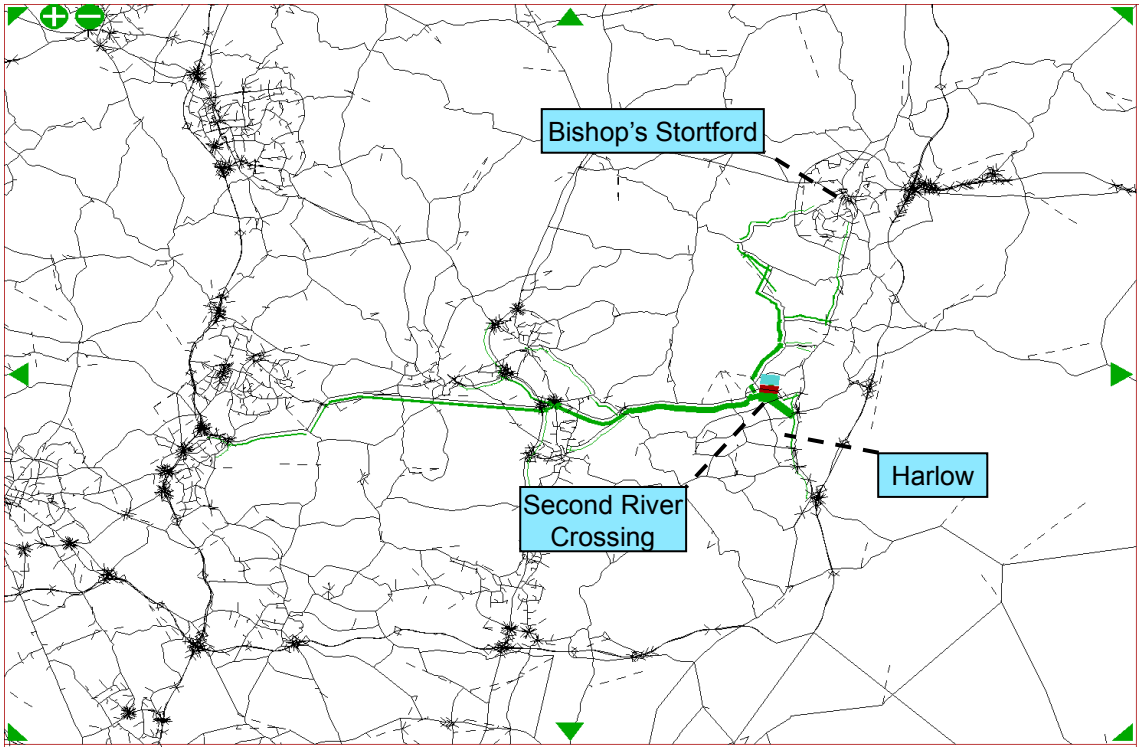

Figure 34 Second Stort River Crossing Morning Peak Westbound Select Link Analysis

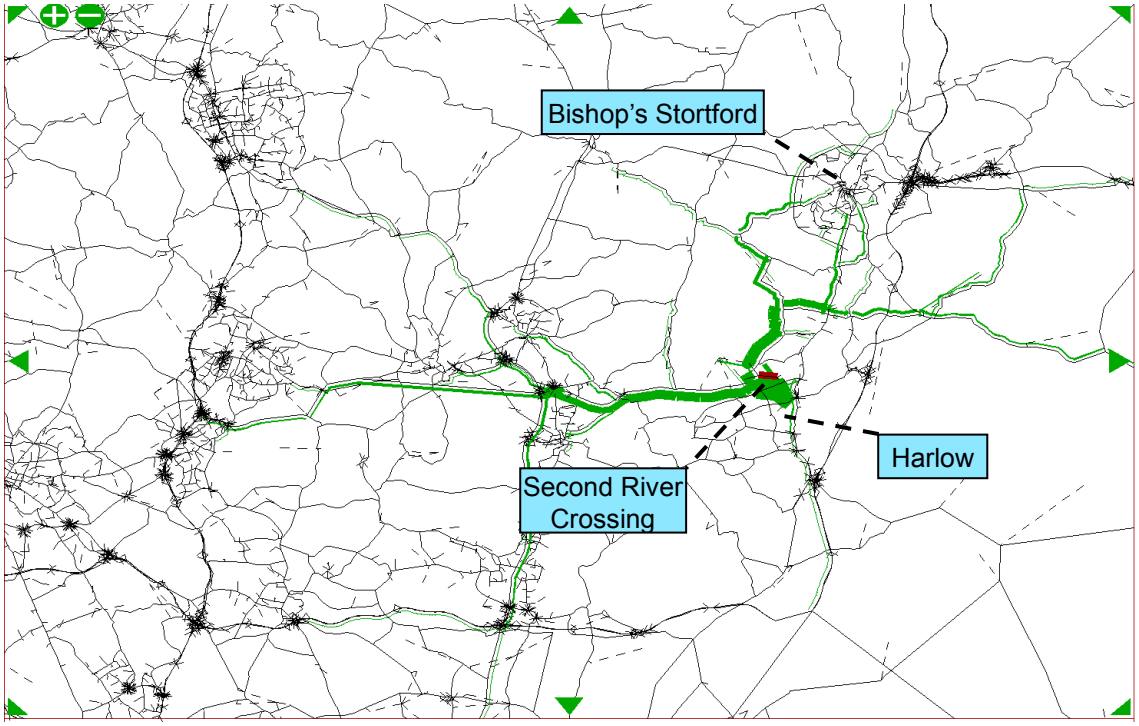

Figure 35 Second Stort River Crossing Evening Peak Westbound Select Link Analysis

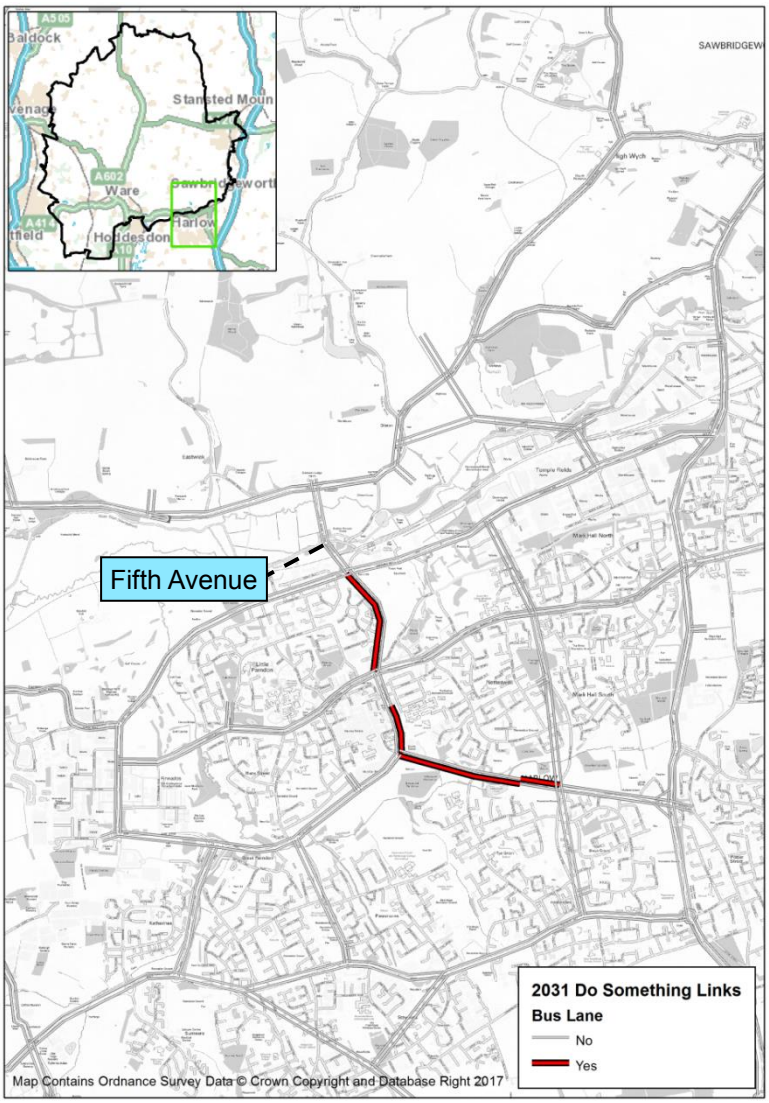

Figure 36 2031 Do Something Modelled Bus Lanes near Harlow

The Do Something scheme 13 (EH 28) was coded with information as supplied by HCC without any sustainable link considered. Figure 37 shows the eastwick roundabout as coded in the Do Minimum Scenario. Figure 38 shows the coding of the roundabout as a result of the scheme drawings received. From the south of the junction, it shows an increase to 2 lanes open to general traffic, with a flared approach at the junction for the northbound direction.

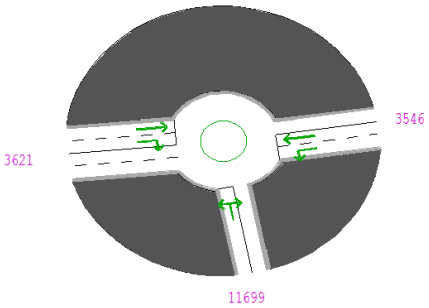

Figure 37 2031 Do Minimum Modelled Eastwick Junction

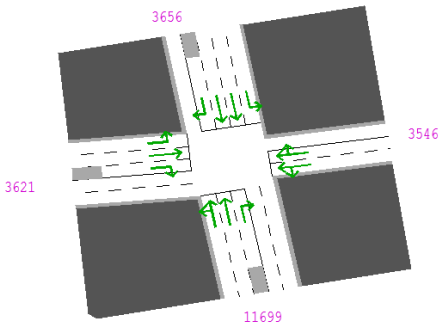

Figure 38 2031 Do Something Modelled Eastwick Junction with Northern Development Access

Appendix B – Glossary of Terms

WebTAG
WebTAG stands for *Web* (i.e. online) *Transport Analysis Guidance*, and is set out by The Department for Transport (https://www.gov.uk/guidance/transport-analysis-guidance-webtag). WebTAG contains guidance on the conduct of transport studies, and is considered the standard against which transport planning work in the UK is assessed. In transport modelling, the term “WebTAG compliant” means that WebTAG guidance is met in relation to that particular performance criterion.

Volume over Capacity (V/C)
This is the ratio of volume over capacity (V/C) for a given link. Links are generally considered to be approaching capacity at 80% V/C, beyond which there is a material deterioration in operation. Note that the length of the modelled queue on amber/red links in congestion plots is not related to the length of the link in the diagram. The V/C value calculated by SATURN relates to the link as a whole, however, the queue may not extend along the whole link (particularly if the link is long). The extent of the queueing should therefore also be interpreted using the junction delay circles.

GEH
GEH is a statistic that compares the modelled flow versus observed flow, and is defined in section 3.2.7 of WebTAG Unit M3.1 – Highway Assignment Modelling.

PCU
Passenger Car Unit (used in Transport Modelling). Cars and LGVs equal 1 PCU, whilst HGVs equal 2.2 PCUs