T007

Chelmsford Local Plan Review

Additional Sites (Regulation 19) Highways Impact Junction Modelling Appraisal

October 2025

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Document Control Sheet

Project Title	**Chelmsford Local Plan Review: Additional Sites (Regulation 19) Highway Impact Junction Modelling Appraisal**

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Record of Issue

Issue	Status	Author	Date	Check	Date	Review	Date
1	Draft for CCC review	KS	10/10/25	JW	13/10/25	MS	13/10/25
2	Final	KS	16/10/25	JW	16/10/25	JW	16/10/25

Approved for Issue By	Date
KS	16th October 2025

Distribution

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1 Introduction

1.1 Background & Purpose

1.1.1 Introduction

The following modelling evidence contained within this technical note serves as an update to the Chelmsford Local Plan Review Pre-Submission modelling undertaken in winter 2024 and documented in the published Essex Highways report titled: *"Chelmsford Local Plan Review: Transport Impact Appraisal of Local Plan Review Pre-Submission" - December 2024 (July 2025 Update).*

Chelmsford City Council (CCC) has since identified further development sites for allocation within the Local Plan Review. These 'Additional Sites' comprise 11 housing sites, three expanded housing sites and one expanded employment site. CCC have requested that Essex Highways (EH) undertake further modelling to assess the traffic impact of these additional sites, with findings used to support the Local Plan Review through a second Regulation 19 consultation in winter 2025.

1.1.2 Development assumptions

The proposed additional sites are summarised in Table 1-1 on the following page, along with an estimate of trip generation for each site – based on trip rates used in earlier Pre-Submission modelling for the Chelmsford Local Plan. It should be noted that the following sites appear in the Chelmsford Local Plan Review: Transport Impact Appraisal of Local Plan Review Pre-Submission modelling, and it is only the additional numbers proposed at the following sites which are modelled in this appraisal:

- SGS7b – Great Leighs – Land East of London Road
- SGS9a – Waltham Road Employment Area, Boreham
- GS14b – Land south of Ford End Primary School
- SGS11c – Land west of Barbrook Way, Bicknacre

Table 1-1: Proposed additional development to include in Additional Sites (Reg 19) modelling

Location	Site Number	Residential (units)	m^2 Employment	AM Trips		PM Trips	
			General Industrial B2	Arrivals	Departures	Arrivals	Departures
Growth Area 1							
Location 1: Former Kay-Metzeler Premises, Brook Street	SGS1dd	100		9	22	22	12
Location 18: Land North West of Chelmsford (North of Hollow Lane)	SGS18a	100		9	22	22	12
Location 19: Land West of Patching Hall Lane	SGS19	200		19	43	43	23
Growth Area 2							
Location 7: Great Leighs – Land East of London Road	SGS7b	140		13	30	30	16
Location 9: Waltham Road Employment Area, Boreham	SGS9a	60		6	13	13	7
Location 9: Land to the East of 118 to 124 Plantation Road, Boreham	GS9b	22		2	5	5	3
Location 9: South of Main Road and Dukes Wood Close, Boreham	GS9c		10,500	22	11	8	15
Location 14: Land south of Ford End Primary School	GS14b	55		5	12	12	6
Growth Area 3							
Location 11: Land West of Barbrook Way, Bicknacre	SGS11c	230		22	50	49	27
Location 17: Land South of Rough Hill Complex, The Tye, East Hanningfield	SGS17c	115		11	25	25	13
Location 17: Land South and South East of East Hanningfield Village	SGS17d	150		14	32	32	18
Location 17: Land South of Windmill Farm, Back Lane, East Hanningfield	GS17e	40		4	9	9	5
Location 20: Land to East and North of Rettendon Place	SGS20	350		33	76	75	41
Location 21: Land North of Old Rectory Lodge, Main Road, South Woodham Ferrers	GS21a	15		1	3	3	2
Location 21: Land North of Congregational Church, Main Road, Woodham Ferrers	GS21b	15		1	3	3	2
Total		**1592**	**10,500**	**172**	**355**	**351**	**201**

Trip rates used in the Local Plan Pre Submission modelling are shown in Table 1-2 below with a general assumption used for the land use type for the housing and employment proposed.

Table 1-2 : Trip rates used in Local Plan Review Pre-Submission modelling

		Arrivals		Departures	
Land Use Type	**Unit**	**AM**	**PM**	**AM**	**PM**
C3 Residential Mixed Private / Affordable Houses	Per Dwelling	0.094	0.215	0.216	0.117
B2 General Industrial	Per 100sqm	0.211	0.080	0.105	0.145

Whilst it is recognised that a consistent approach to the use of trip rates is important across the Local Plan evidence base development, it is important to reiterate that the trip rates used are nevertheless more appropriate for sites with very good public transport and active travel links. If the latest development proposals do not achieve the same level of sustainable infrastructure provision, and subsequent uptake akin to larger development sites, then trip rates would be expected to be higher. ECC and CCC are, however, committed to working with developers of all Local Plan development sites to best ensure that aspirational mode share targets for active and sustainable travel are achievable. This, it is felt, provides sufficient justification for the use of lower trip rates across the wider Local Plan Review appraisal. These requirements are set out in Policy S9 and Strategic and Growth Site Policies.

Total AM & PM peak hour trip generation (1,079 trips) from the additional sites amounts to just over a 25% increase on that modelled for the earlier Pre-Submission allocation (4,025 trips). Just over half of the development comprising the additional sites is located in Growth Area 3, south of Chelmsford and the A12 corridor. Elsewhere, the largest proposed development is in Growth Area 1, to the north-west of Chelmsford (location 18a/19) with peak hour trip generation of around 100 vehicles.

1.1.3 Modelling approach

Modelling undertaken to support the Chelmsford Local Plan transport evidence base to-date has made use of the Chelmsford VISUM strategic model. An overview of the Chelmsford VISUM forecast model build can be found in the December 2024 Pre-Submission modelling report (July 2025 Update), whilst the T004 Chelmsford VISUM Model Local Validation Report 2021 can be found on CCC's Local Plan website.

With over half the proposed new development located south of Chelmsford in the non-validated area of the Chelmsford VISUM Model, it was determined that running the strategic model for this additional sites scenario was inappropriate. At the same time, it was recognised that a small volume of trip generation would be expected from proposed development spread across Growth Areas 1 and 2, with it being unlikely that strategic trip assignment patterns would change noticeably from that modelled for the Pre-Submission. Therefore, the focus of this study has been a desktop review and local junction impact appraisal of the additional sites proposed.

2 Modelling Methodology

2.1 Study Area and In-Scope Junctions

With reference to the additional sites listed in Table 1-1 the following junctions were identified as being in-scope for assessment, based on their proximity to the larger development sites and their position on the strategic route network – providing likely connectivity to/from the sites:

Growth Area 1 – North-West Chelmsford

- Chignal Road junction with A1060 Roxwell Road;
- Patching Hall Lane junction with B1008 Broomfield Road; and
- School Lane junction with B1008 Main Road, Broomfield

Growth Area 3 – South of Chelmsford

- Eves Corner, Danbury;
- Rettendon Turnpike junction with A132, South Woodham Ferrers;
- B1418 junction with Burnham Road, South Woodham Ferrers; and
- Willow Grove junction with Burnham Road South Woodham Ferrers

A12 Junctions

- Junction 17 – Howe Green
- Junction 18 – Sandon Interchange

Junctions potentially impacted by development in Growth Area 2, including A12 Junction 19 – Boreham Interchange, were not assessed, given the comparably low development flows calculated to/from the sites, and their anticipated collective impact on the strategic road network.

Figure 2-1 overleaf, shows the location of junctions included in this latest assessment alongside the indicative location of the additional sites in the north-west of Chelmsford and those to the south of Chelmsford. The arrows shown loosely illustrate the expected routing of trips to/from the additional sites, upon which the selection of junctions for assessment was based.

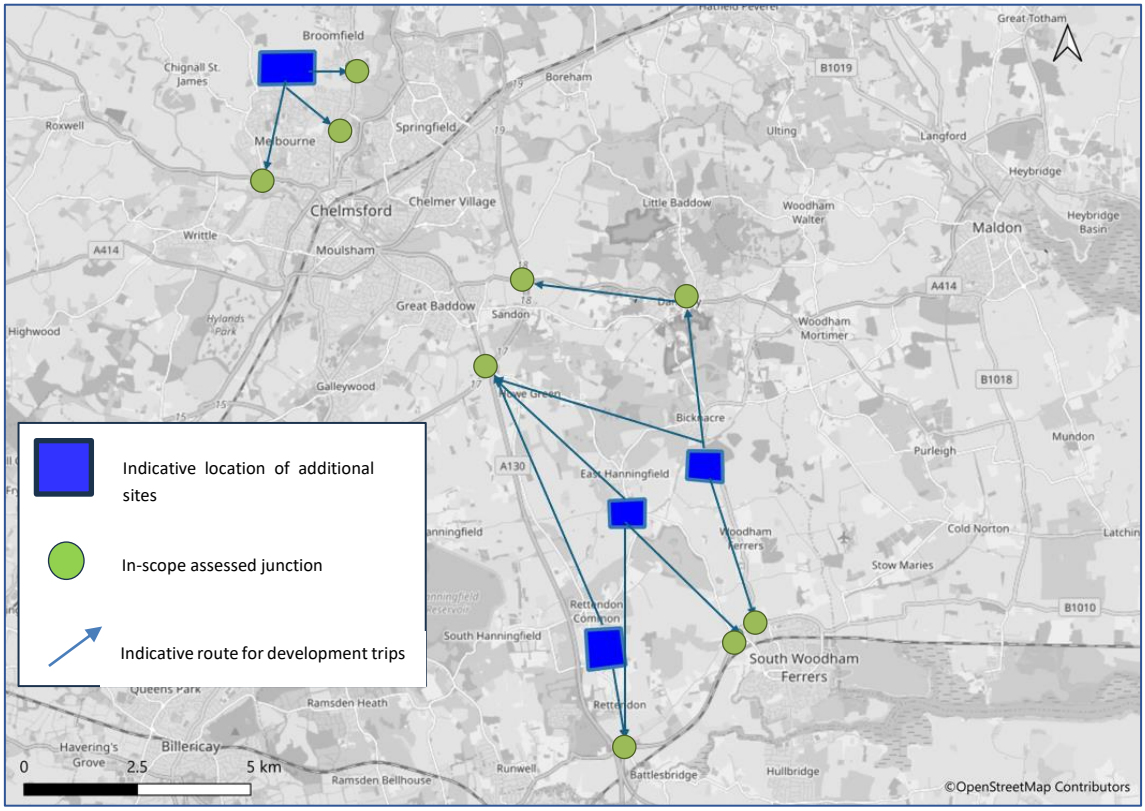

Figure 2-1: Location of assessed junctions, indicative location of additional sites, and anticipated routing to access strategic road network

2.2 Modelling Methodology

2.2.1 Calculation of new development trips at assessed junctions

To assess the traffic impact of the additional sites, trip assignment patterns to and from zones in the Chelmsford VISUM Model were reviewed using 'flow bundle' analysis and used to determine the network assignment of arrivals and departure trips at the proposed additional sites. This informed a manual assignment of traffic flows to/from the additional sites, which made it then possible to determine the proportions likely to route via the assessed junctions on the strategic road network. For this latest study, the most recent 2041 Local Plan Review Pre-Submission without A12 widening modelled scenario was used.

2.2.2 Calculation of forecast trips at junctions in Growth Area 3 - South of Chelmsford

For junctions in Growth Area 3 - South of Chelmsford, forecast flows were calculated by applying growth factors to observed traffic flows. Growth factors from 2019 to 2041 were calculated by determining average growth factors across the approach arms of each junction based on traffic growth in the VISUM model between the original 2019 base model and the latest 2041 Local Plan Pre-Submission forecast scenario.

For each junction, observed turning movements taken from September 2025 traffic counts were re-based to 2019 levels using factors calculated from TEMPro version 7.2, before an overall modelled growth factor 2019-2041 for each junction was applied to the re-based observed flows. This addressed the possibility of double-counting development trips over the period 2019-2025 in our calculations.

Manually assigned Local Plan trips from the additional sites were then added to the forecast matrices and the peak hour models run to determine overall junction capacity.

2.2.3 Calculation of forecast trips at junctions in Growth Area 1 - North-West Chelmsford

For the junctions in Growth Area 1 - North-West Chelmsford – located within the validated area of the Chelmsford VISUM model, forecast traffic flows from the strategic model were used directly to create the forecast-year matrices for the junction models. Manually assigned trips to/from the new development sites were then added to the forecast matrices and the peak hour models run to determine overall junction capacity.

2.2.4 Calculation of forecast trips at junctions on the *A12*

Findings from the recent Pre-Submission traffic impact modelling demonstrate that A12 Junctions 17 and 18 (Howe Green and Sandon) are likely to be significantly over-capacity by the end of the Plan period. With the most recent Pre-Submission development trips added to background traffic growth through to 2041, it would be expected that trips associated with the latest additional sites, if added to forecast flows through the most congested junctions on the A12, would effectively displace other trips looking to route through the junctions. This displacement could take the form of alternative routing, a shift to other modes of travel, or journeying outside of the peak hour.

Therefore, further ARCADY/LinSig modelling at these junctions has not been undertaken. Instead, an estimate of traffic increase on approaches to the junction is presented at Junction 17 and 18, and placed within the context of a percentage increase on total forecast approach arm flows. This is outlined in Section 2.4.3 of this appraisal.

Anticipated trip-displacement may also occur at the A12 Junction 19 – Boreham Interchange to accommodate trips associated with the proposed additional employment and housing sites in Boreham. The Interchange has, however, not been assessed for this latest study as calculated traffic flows through the junction from the additional sites equate to fewer than one trip per minute in the peak hours.

2.3 Junction Base Model Build and Calibration

2.3.1 Peak hours modelled

Consistent with the VISUM strategic network modelling, peak hours for the local junction modelling were as follows:

- AM Peak (07:30 – 08:30)
- PM Peak (17:00 – 18:00)

For the purposes of this junction impact assessment, analysis of the inter-peak was not covered.

2.3.2 Assessment years modelled

To assess the local junction impact of trips associated with the Local Plan Review development, a 2041 forecast year was used. This matched the assessment year for the VISUM strategic network modelling and tied in with the end of the Local Plan Review period.

Base year junction models were calibrated using the latest available journey time data from 2024, as detailed in the following sections of this technical note.

2.3.3 Junction modelling software used

Junctions 10/ARCADY models were used for the following five assessed junctions:

- School Lane junction with B1008 Main Road, Broomfield
- Eves Corner, Danbury
- Rettendon Turnpike junction with A132, South Woodham Ferrers
- B1418 junction with Burnham Road, South Woodham Ferrers
- Willow Grove junction with Burnham Road South Woodham Ferrers.

LinSig models were developed for the two signalised junctions:

- Chignal Road junction with A1060 Roxwell Road
- Patching Hall Lane junction with B1008 Broomfield Road.

The two A12 junctions were not subject to further junction modelling.

Eves Corner in Danbury was modelled using Junctions 10 software despite part-time signals being installed on the minor arms at the junction. A review of signal data from 2022 showed that the signals were only in operation, typically, for around 5 minutes of both the AM and PM peak hours. A decision was therefore made to model the junction without signal controls. It is understood that the part-time signals at Eves Corner help to manage congestion along the A414 approach arms, and their omission from this appraisal represents a worse-case assessment of conditions at the junction. Findings from the junction capacity assessment should therefore be caveated with this in mind.

2.3.4 Base year model build

A 2022 calibrated model of Eve's Corner in Danbury, built for the most recent Pre-Submission assessment, was re-used for this latest assessment. Models for the remaining six assessed junctions were updated to a 2025 base year using models built for the 2020 Adopted Local Plan evidence base, with geometry adjustments made where required, and by calibrating to current-day journey time delay. The two A12 junctions were not remodelled.

2.3.5 Turning count data

With the exception of Eve's Corner which maintained the use of 2022 count data for consistency with the earlier Pre-Submission modelling, manual classified turning counts (MCCs) from September 2025 were provided by Essex Highways for the remaining six assessed junctions.

2.3.6 Base demand matrices build

Passenger Car Unit (PCU) factors were applied to the classified vehicle count data obtained/derived for each assessed junction to produce PCU turning movement matrices for the junction models.

The PCU conversion factors used are presented in Table 2-1 below.

Table 2-1: Calculation of Vehicles to PCU Factors

Vehicle Type	PCU Value
Pedal Cycle	0.2
Motor Cycle	0.4
Passenger Car	1.0
Light Goods Vehicle (LGV)	1.0
Medium Goods Vehicle (MGV)	1.5
Buses & Coaches	2.0
Heavy Goods Vehicle (HGV)	2.3
Articulated Buses	3.2

Base year ARCADY junction models that were built previously for the Adopted Local Plan used a 'Direct' demand type with a flat profile over 60 minutes. This has been repeated in this work for consistency and is considered to be a reasonable approach for the assessment of junctions with limited spare capacity predicted in the future. However, the Eves Corner model built for the recent Pre-Submission appraisal used a 'one hour' profile, which assumes a peak flow within the hour.

2.3.7 Base network build

Junction geometries in the existing models used were reviewed using OS mapping obtained by Essex Highways. This information was used to review the modelled lane widths, lane allocation, and turning radii, as well as other appropriate geometric features for each junction. The Chignal Road / A1060 signalised junction was specifically adjusted to reflect layout changes to the junction since the previous model was built.

2.3.8 Base Year Model Calibration

Base year ARCADY and LinSig models were calibrated using latest DfT (Teletrac) GPS journey time data from 2024. This data was used to calculate observed delay on junction approach arms, with which to directly compare against modelled delay outputs.

GPS journey time data was obtained for the following times:

- AM Peak (07:30 – 08:30)
- PM Peak (17:00 – 18:00)

Observed peak hour delay at the assessed junctions was calculated from the difference between free-flow off-peak journey times and AM/PM peak journey times.

Adjustments were then made, where necessary, to the base year modelled capacity of junctions so that modelled delay best represented observed delay on approach arms – as described below.

Lane Utilisation

A significant issue when employing ARCADY models pertains to accommodating variations in lane utilisation. By default, the ARCADY model assumes that all approaching traffic can fully occupy the entire entry width of the approach. However, in practical scenarios, this assumption doesn't hold true for many multi-lane roundabout entrances. In situations where there is an imbalance in the expected traffic flow arriving in each lane, it often leads to substantially higher delays and queues in specific lanes compared to what the model predicts.

To address uneven lane utilisation capacity adjustments were made on modelled approach arms in alignment with established best practices and industry guidelines.

The method employed to determine Intercept corrections/capacity adjustments for uneven lane usage follows the Barbara Chard method, as outlined in the paper titled "ARCADY Health Warning: Account for Lane Usage or Risk Damaging the Public Purse."

Journey Time Calibration Statistics

Table 2-2 below summarises the observed and modelled delay on junction approach arms following model calibration.

Table 2-2: Observed and Modelled delay on junction approach arms

ARM	AM Delay (s)		PM Delay (s)	
	Observed	Modelled	Observed	Modelled
Chignal Road / A1060 Roxwell Road				
Chignal Road	17.0	38.8	20.4	39.9
Roxwell Road W	10.5	35.4	5.3	30.0
Roxwell Road E	5.4	30.0	4.5	17.8
Patching Hall Lane / B1008 Broomfield Road				
Broomfield Road N	8.6	28.3	7.9	31.0
Broomfield Road S	11.4	31.8	8.4	33.5
Patching Hall Lane	4.0	35.7	4.8	40.5
School Lane / B1008 Main Road				
School Lane	Observed JT data not available			
Broomfield Road N	6.54	7.95	10.76	10.96
Broomfield Road S	Observed JT data not available			
Rettendon Turnpike / A132				
Woodham Road	Observed JT data not available			
Burnham Road	4.80	3.91	4.40	4.22
A1245	9.08	8.40	46.60	3.99
A132	15.97	15.10	28.50	26.8
Main Road	19.3	19.98	197.10	195.81
B1418 / Burnham Road				
B1418	8.37	5.65	11.68	9.02
Burnham Road E	20.52	17.45	10.49	7.68
Old Wickford Road	Observed JT data not available			
Burnham Road W	15.37	12.24	21.88	19.2
Willow Grove / Burnham Road				
Burnham Road N	6.13	7.86	3.83	5.61
Ferrers Road	27.8	29.39	3.01	5.61
Burnham Road S	1.43	4.06	2.31	5.72
Willow Grove	5.21	5.98	14.06	11.18
Eves Corner, Danbury				
Little Baddow Road	3	23	7	43
Main Road (E)	16	98	5	12
Mayes Lane	15	27	5	13
Main Road (W)	10	21	24	385

Overall, where journey time data was available, model calibration has resulted in a reasonable representation of delay on most junction approach arms in the AM and PM peak. Most modelled delay times have been calibrated to within three seconds of observed, with the exception of Chignal Road at the junction with A1060 Roxwell Road, and Patching Hall Lane junction with the B1008 Broomfield Road. Here, modelled delays are shown to be higher than observed. This is considered less of an issue than if modelled journey times were lower, and would be expected to lead to a 'robust' assessment of journey time delay in the forecast modelling. Results from the capacity modelling of the signalised junctions should nevertheless be caveated with these calibration results in mind.

A spot check of indicative queues observed on the signalised junction approach arms was undertaken using Google Maps and compared with average queue lengths modelled (and reported in Section 3 of this appraisal). Although recognised as being an 'unscientific' method, queues modelled at the two signalised junctions were nevertheless shown to be broadly representative of current conditions.

2.4 Forecast model development

2.4.1 Existing model assignment

The following sample VISUM flow-bundle plots are provided for reference and illustrate the zone-based assignment of trips from the earlier 2041 Chelmsford Local Plan Pre-Submission forecast modelling upon which a manual assignment of trips to/from the proposed additional sites is based. In other words, the routing of trips associated with the additional sites has been determined using the origin and destination trip patterns in the model zones that would contain the additional sites. The routing of the new trips associated with the additional sites therefore takes account of network impact associated with the previously modelled development in the Pre-Submission appraisal.

To manage content in the report, plots are shown for the additional sites larger than 200 housing units.

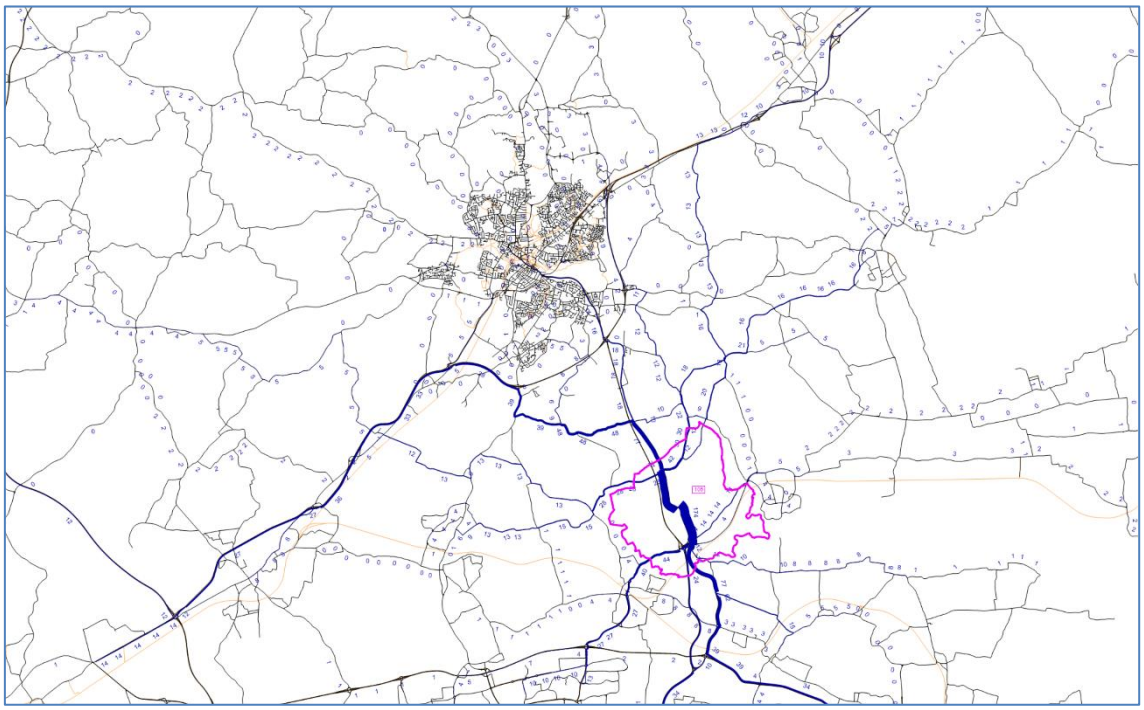

Figure 2-2: AM origin trip assignment – SGS20 - Land East and North of Rettendon Place

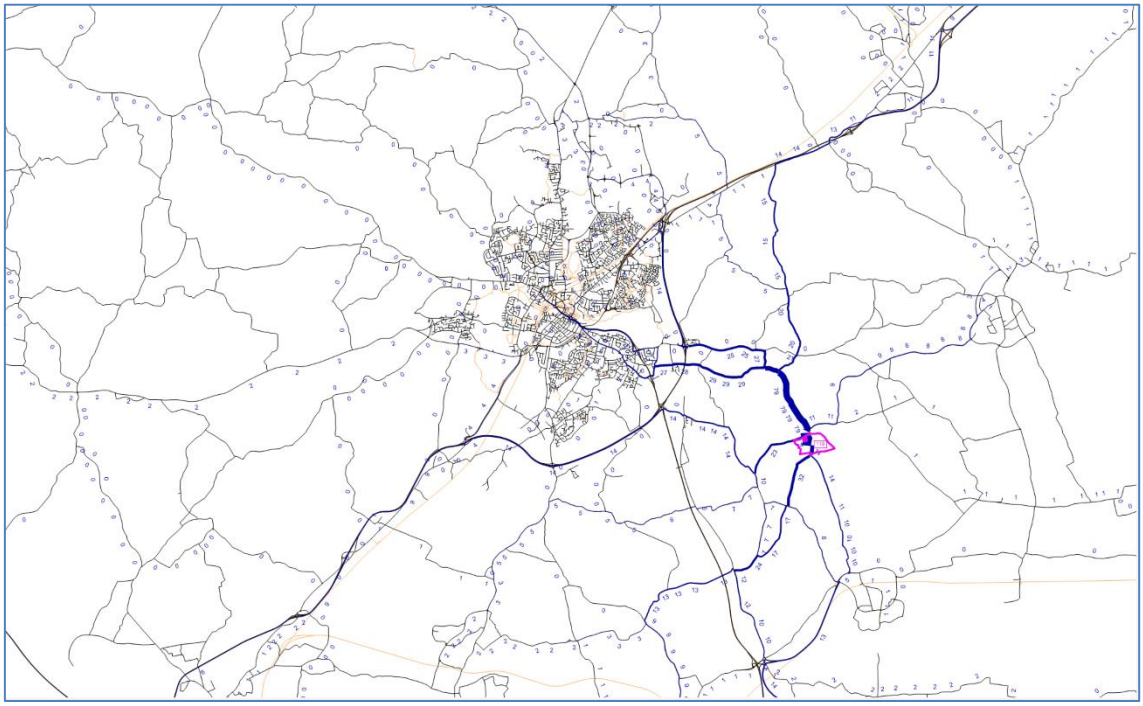

Figure 2-3: AM origin trip assignment – SGS11c - Land West of Barbrook Way, Bicknacre

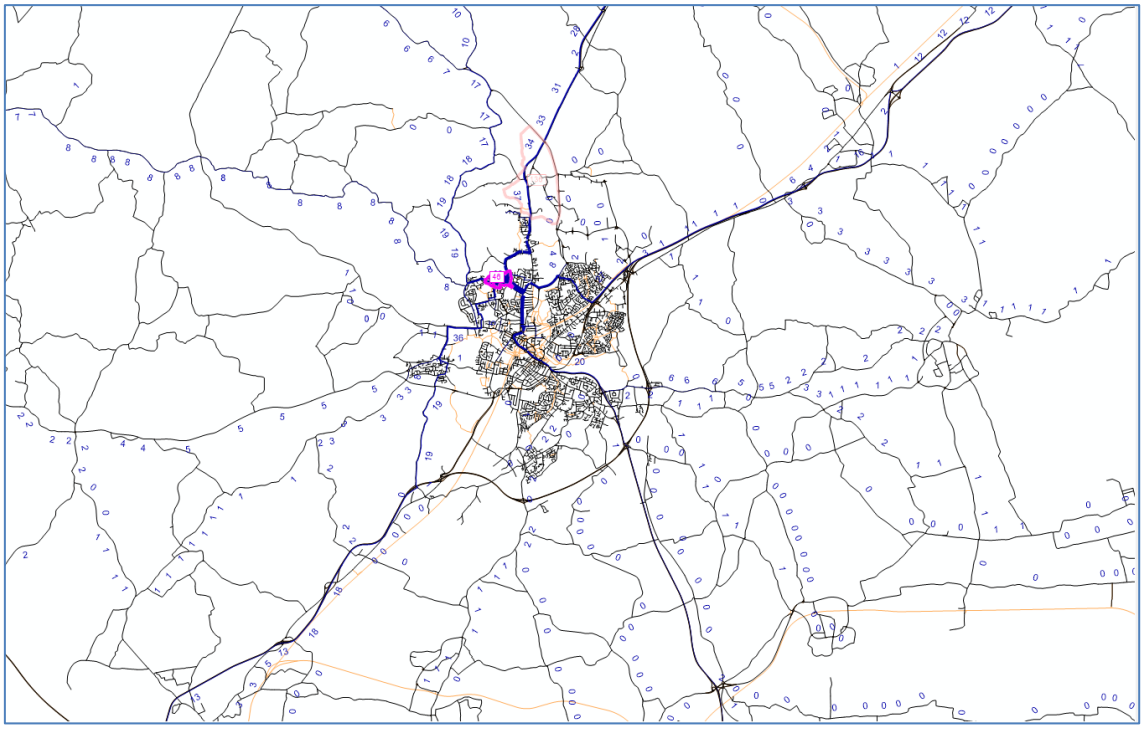

Figure 2-4: AM origin trip assignment – SGS19 - Land West of Patching Hall Lane

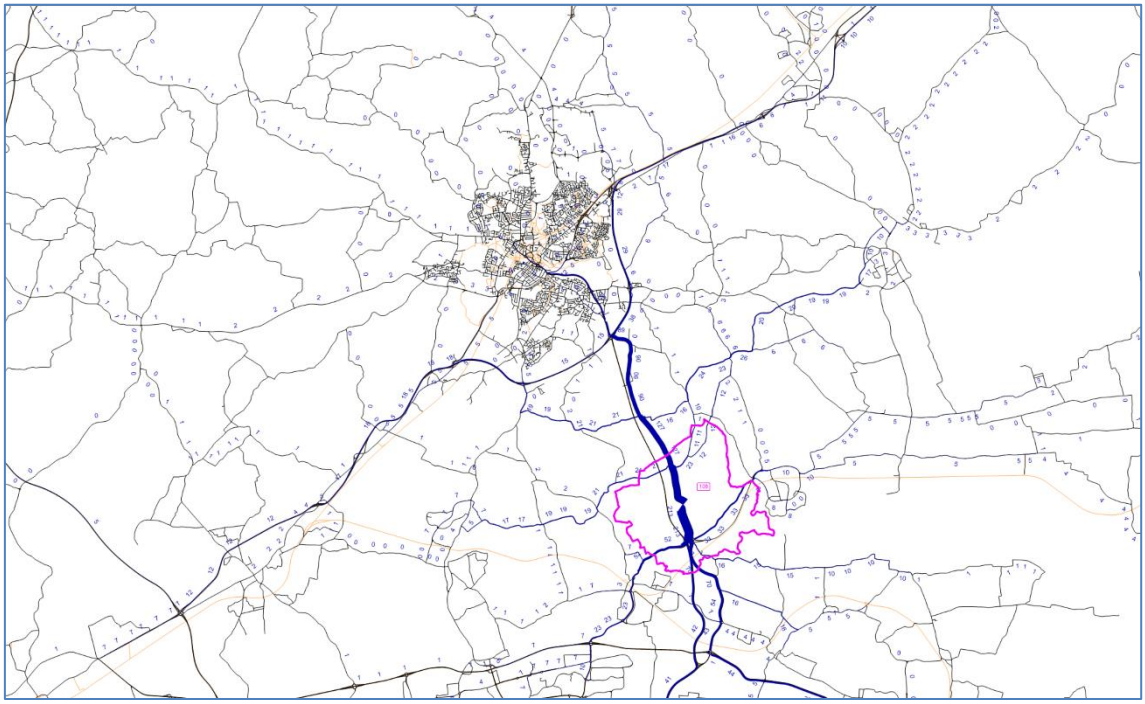

Figure 2-5: AM destination trip assignment – SGS20 - Land East and North of Rettendon Place

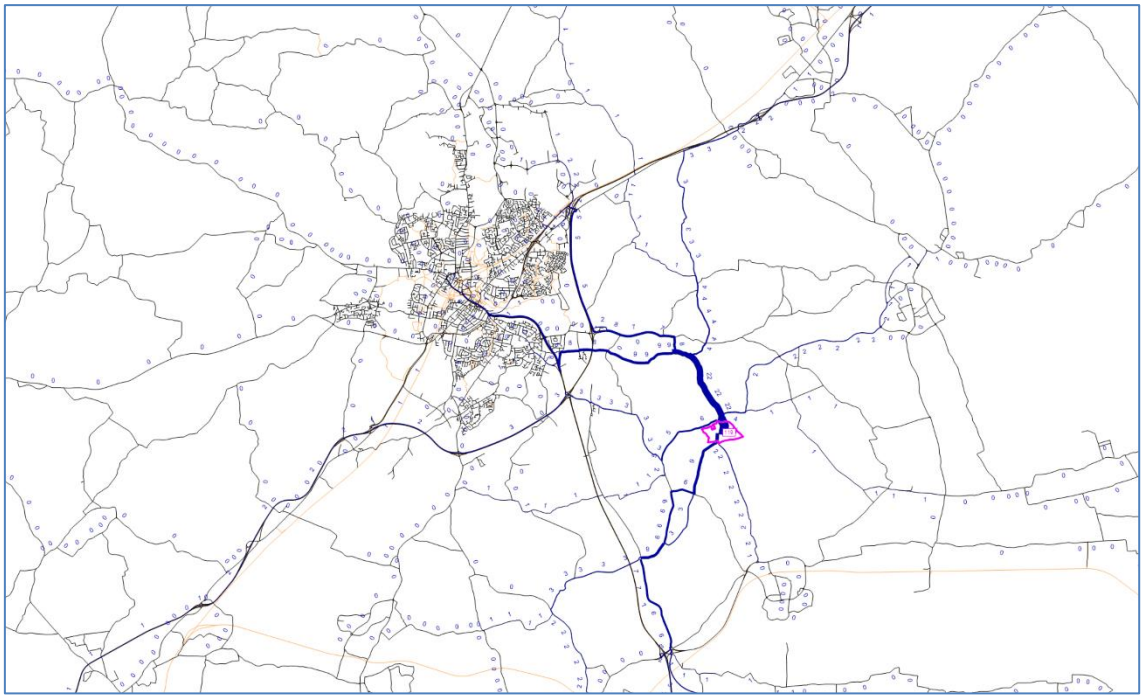

Figure 2-6: AM destination trip assignment – SGS11c - Land West of Barbrook Way, Bicknacre

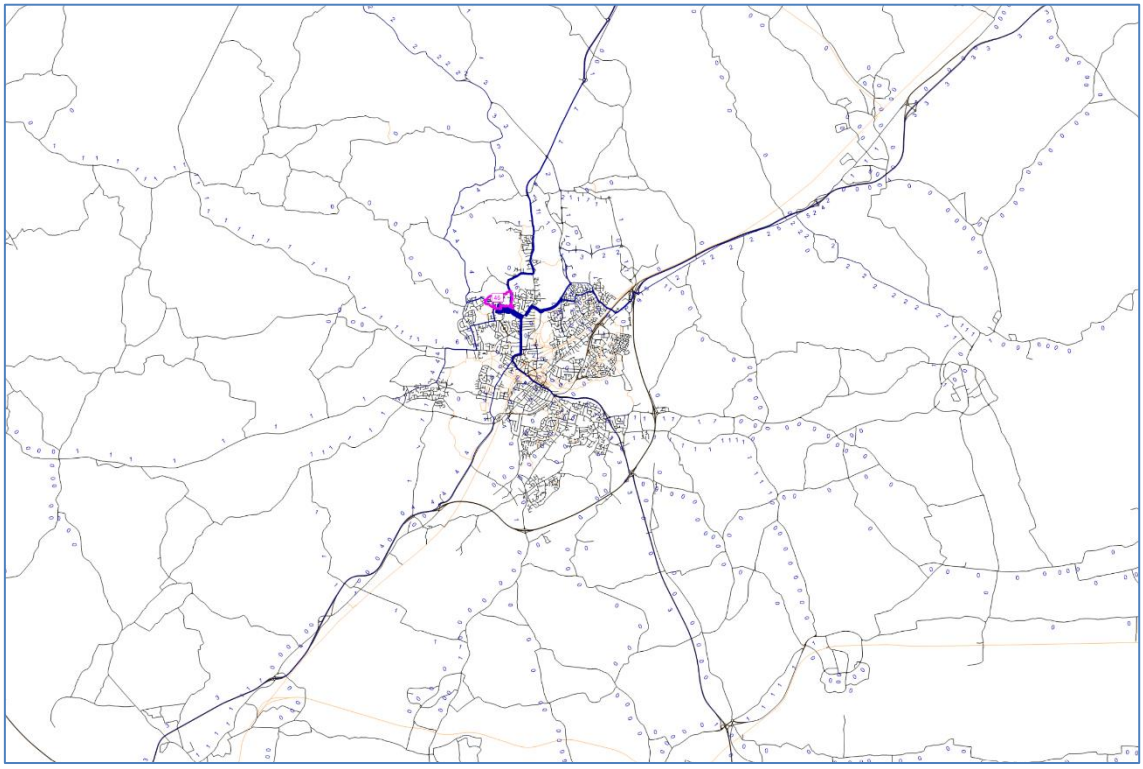

Figure 2-7: AM destination tip assignment – SGS19 - Land West of Patching Hall Lane

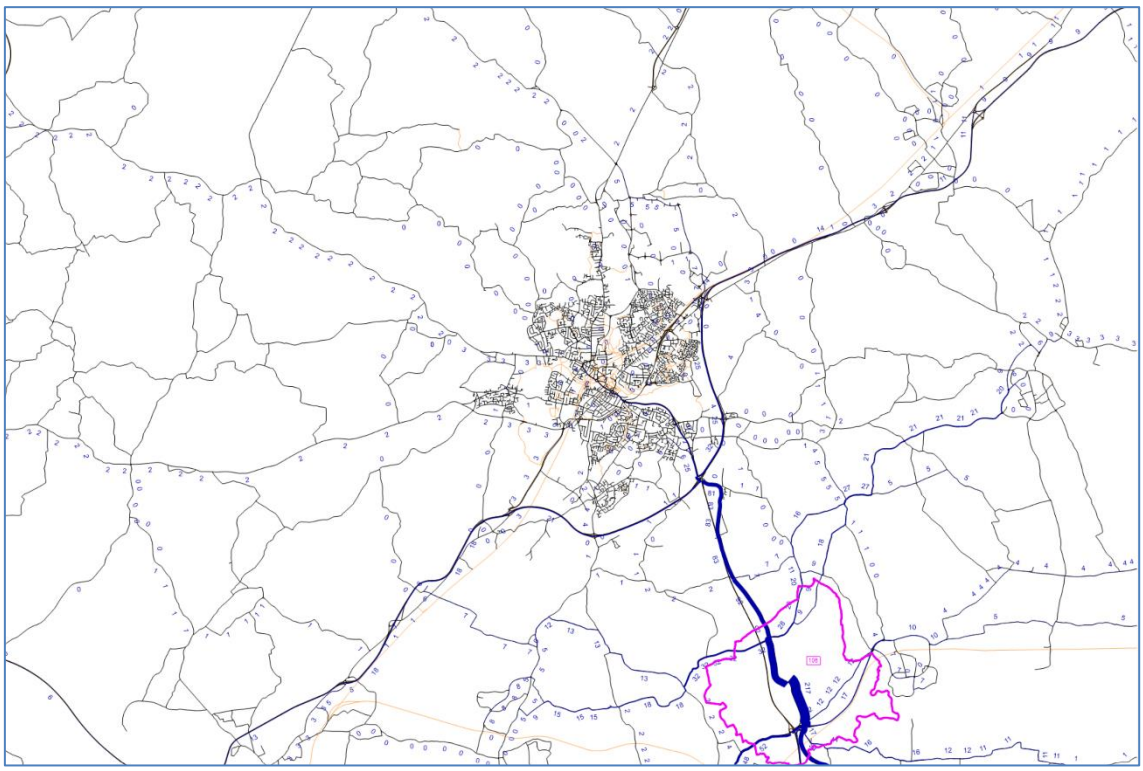

Figure 2-8: PM origin trip assignment – SGS20 - Land East and North of Rettendon Place

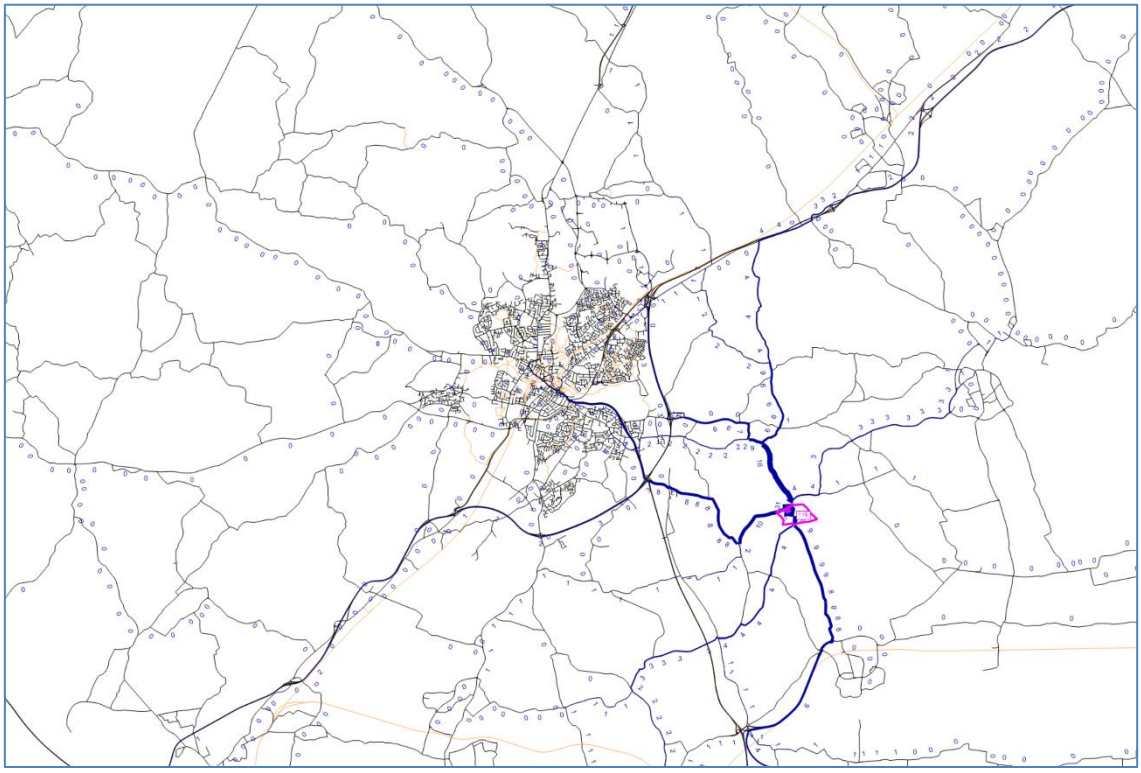

Figure 2-9: PM origin trip assignment – SGS11c - Land West of Barbrook Way, Bicknacre

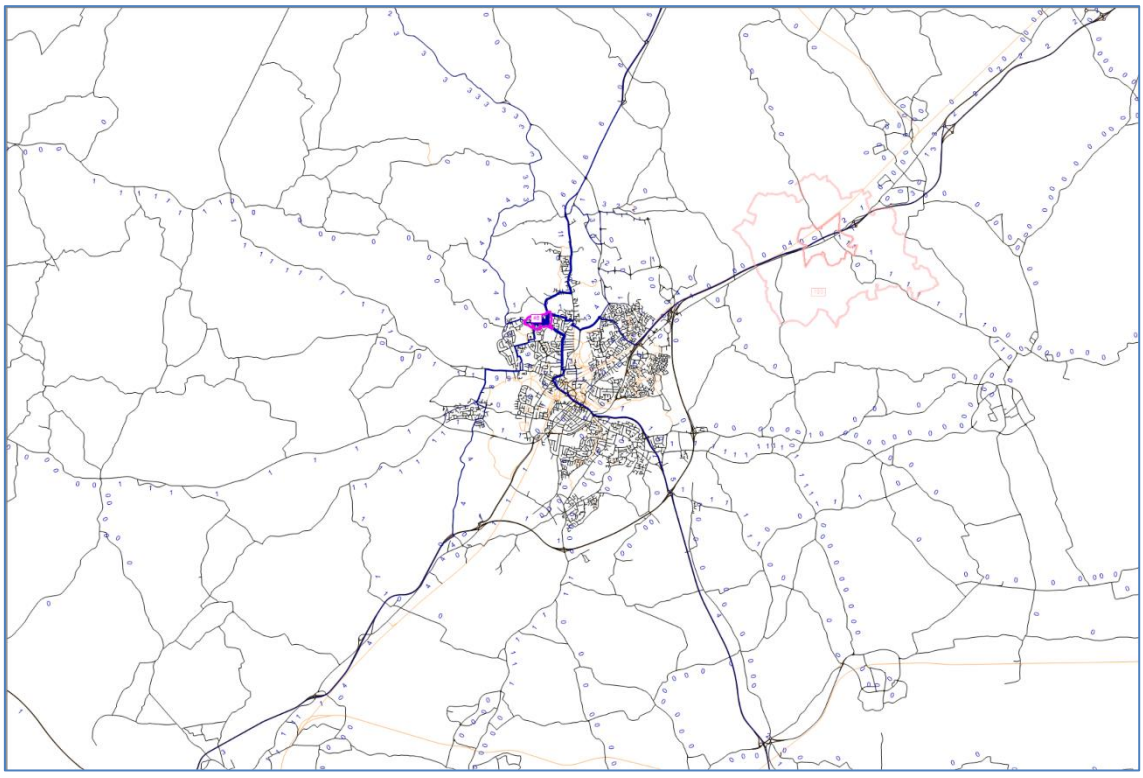

Figure 2-10: PM origin trip assignment – SGS19 - Land West of Patching Hall Lane

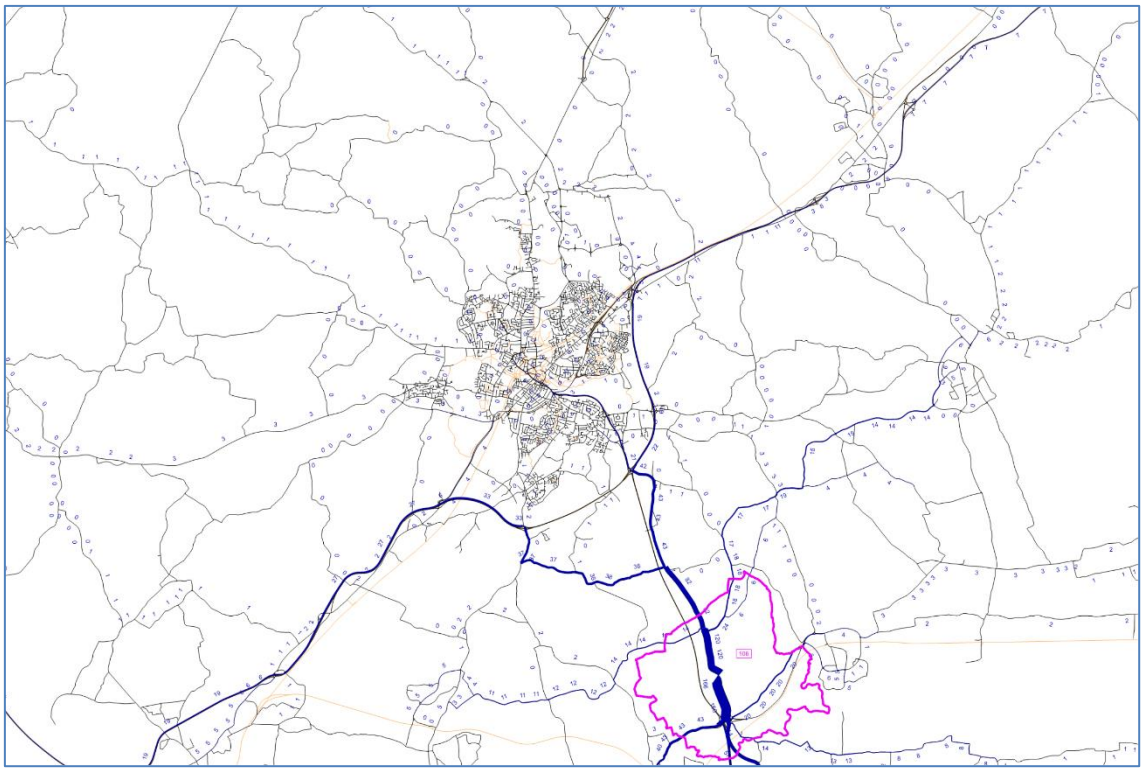

Figure 2-11: PM destination trip assignment – SGS20 - Land East and North of Rettendon Place

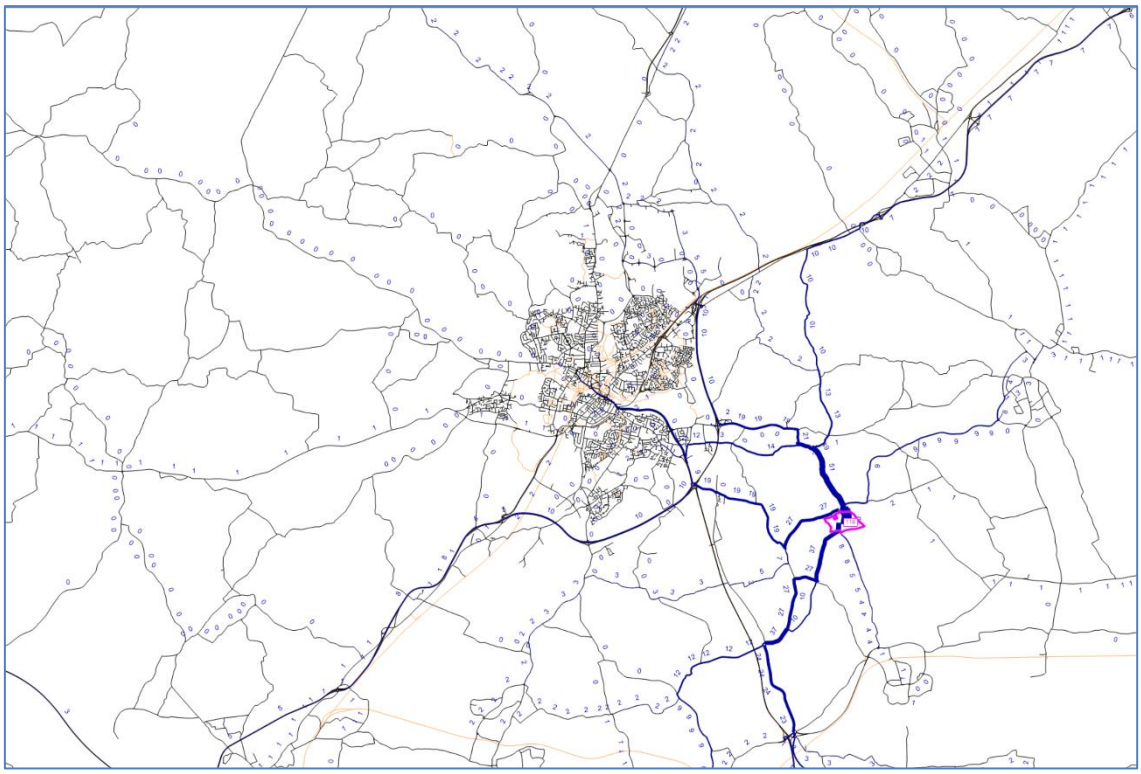

Figure 2-12: PM destination trip assignment – SGS11c - Land West of Barbrook Way, Bicknacre

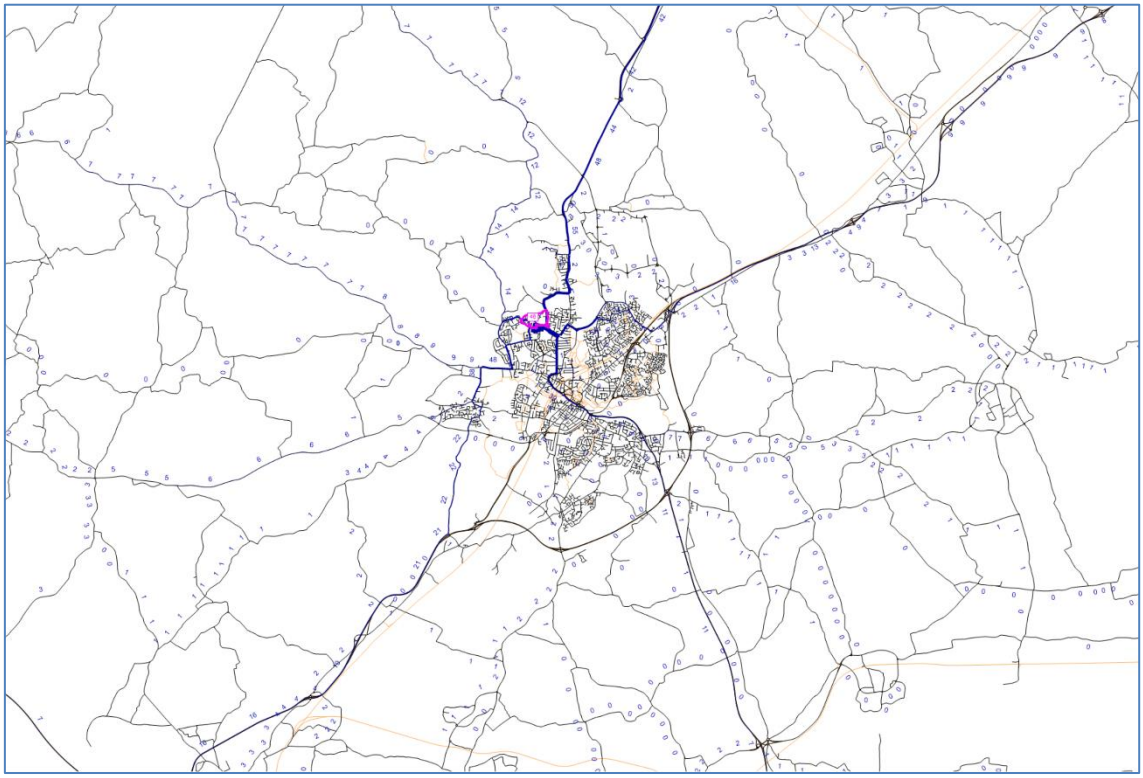

Figure 2-13: PM destination trip assignment – SGS19 - Land West of Patching Hall Lane

2.4.2 Trips from additional sites manually routed through assessed junctions

The following turning movement tables show the trips to/from the proposed additional sites calculated to route through each of the assessed junctions.

2041 turning flows at each assessed junction taken for the Local Plan Pre-Submission scenario modelling - which include background growth and Pre-Submission development trips are provided in Appendix A of this technical note.

When considering the development trips associated with the additional sites in relation to the total turning flows at each junction, it is apparent that the overall flow increase is small.

Table 2-3: Chignal Road junction with A1060 Roxwell Road – additional development flows

Total Trips from Additional Sites			
AM	Roxwell Road (Western arm)	Chignal Road (Northern arm)	Roxwell Road (Eastern arm)
Roxwell Road (Western arm)	0	14	4
Chignal Road (Northern arm)	6	0	0
Roxwell Road (Eastern arm)	0	0	0
PM	Roxwell Road (Western arm)	Chignal Road (Northern arm)	Roxwell Road (Eastern arm)
Roxwell Road (Western arm)	0	19	0
Chignal Road (Northern)	6	0	3
Roxwell Road (Eastern arm)	0	0	0

Table 2-4: Patching Hall Lane junction with B1008 Broomfield Road – additional development flows

Total Trips from Additional Sites			
AM	Broomfield Road (Northern Arm	Broomfield Road (Southern Arm	Patching Hall Lane (Western Arm)
Broomfield Road (Northern Arm)	0	0	10
Broomfield Road (Southern Arm)	0	0	5
Patching Hall Lane (Western Arm)	10	12	0

PM	Broomfield Road (Northern Arm	Broomfield Road (Southern Arm	Patching Hall Lane (Western Arm)
Broomfield Road (Northern Arm)	0	0	17
Broomfield Road (Southern Arm)	0	0	10
Patching Hall Lane (Western Arm)	0	10	0

Table 2-5: School Lane junction with B1008 Main Road, Broomfield – additional development flows

Total Trips from Additional Sites			
AM	Main Road (Southern Arm	School Lane (Western Arm)	Main Road (Northern Arm)
Main Road (Southern Arm)	0	0	0
School Lane (Western Arm)	0	0	13
Main Road (Northern Arm)	0	4	0

PM	Main Road (Southern Arm	School Lane (Western Arm)	Main Road (Northern Arm)
Main Road (Southern Arm)	0	0	0
School Lane (Western Arm)	0	0	7
Main Road (Northern Arm)	0	15	0

Table 2-6: Eves Corner, Danbury – additional development flows

Total Trips from Additional Sites				
AM	Little Baddow Road (Northern Arm)	Maldon Road (Eastern Arm)	Mayes Lane (Southern Arm)	Main Road (Western arm)
Little Baddow Road (Northern Arm)	0	0	2	0
Maldon Road (Eastern Arm)	0	0	0	0
Mayes Lane (Southern Arm)	0	7	0	0
Main Road (Western arm)	0	0	0	0

PM	Little Baddow Road (Northern Arm)	Maldon Road (Eastern Arm)	Mayes Lane (Southern Arm)	Main Road (Western arm)
Little Baddow Road (Northern Arm)	0	0	5	0
Maldon Road (Eastern Arm)	0	0	0	0
Mayes Lane (Southern Arm)	4	1	0	0
Main Road (Western arm)	0	0	0	0

Table 2-7: Rettendon Turnpike junction with A132, South Woodham Ferrers – additional development flows

Total Trips from Additional Sites					
AM	Woodham Road (Northeast arm)	Burnham Road (Southeast arm)	A1245 (Southern arm)	A132 (Western arm)	Main Road (Northern arm)
Woodham Road (Northeast arm)	0	0	0	0	3
Burnham Road (Southeast arm)	0	0	0	0	0
A1245 (Southern arm)	0	0	0	0	8
A132 (Western arm)	0	0	0	0	8
Main Road (Northern arm)	3	1	27	10	0

PM	Woodham Road (Northeast arm)	Burnham Road (Southeast arm)	A1245 (Southern arm)	A132 (Western arm)	Main Road (Northern arm)
Woodham Road (Northeast arm)	0	0	0	0	5
Burnham Road (Southeast arm)	0	0	0	0	0
A1245 (Southern arm)	0	0	0	0	21
A132 (Western arm)	0	0	0	0	20
Main Road (Northern arm)	1	2	15	6	0

Table 2-8: B1418 junction with Burnham Road, South Woodham Ferrers – additional development flows

Total Trips from Additional Sites				
AM	B1418 (Northern Arm)	Burnham Road (Eastern Arm)	Old Wickford Road (Southern Arm)	Burnham Road (Western Arm)
B1418 (Northern Arm)	0	2	0	3
Burnham Road (Eastern Arm)	2	0	0	0
Old Wickford Road (Southern Arm)	1	0	0	0
Burnham Road (Western Arm)	1	0	0	0

PM	B1418 (Northern Arm)	Burnham Road (Eastern Arm)	Old Wickford Road (Southern Arm)	Burnham Road (Western Arm)
B1418 (Northern Arm)	0	1	0	4
Burnham Road (Eastern Arm)	2	0	0	0
Old Wickford Road (Southern Arm)	0	0	0	0
Burnham Road (Western Arm)	1	0	0	0

Table 2-9: Willow Grove junction with Burnham Road South Woodham Ferrers – additional development flows

Total Trips from Additional Sites				
AM	Burnham Road (Northern Arm	Ferrers Road (Southeast Arm)	Burnham Road (Southern Arm)	Willow Grove (Northwest Arm)
Burnham Road (Northern Arm)	0	0	0	1
Ferrers Road (Southeast Arm)	0	0	0	0
Burnham Road (Southern Arm)	0	0	0	0
Willow Grove (Northwest Arm)	13	4	0	0

PM	Burnham Road (Northern Arm	Ferrers Road (Southeast Arm)	Burnham Road (Southern Arm)	Willow Grove (Northwest Arm)
Burnham Road (Northern Arm)	0	0	0	1
Ferrers Road (Southeast Arm)	0	0	0	0
Burnham Road (Southern Arm)	0	0	0	0
Willow Grove (Northwest Arm)	2	5	0	0

2.4.3 Additional Development Flows at A12 Junctions 17 & 18

A12 Junction 17 – Howe Green: A proportion of trips from the additional sites at Rettendon and East Hanningfield has been calculated to route through A12 Junction 17 at Howe Green via Southend Road. This totals 20 trips entering the junction and 12 exiting in the AM peak and 29 trips entering the junction and 18 trips exiting in the PM peak. AM peak assignment plots show a significant volume of new development trips taking alternative routes in the VISUM model to avoid travelling through the Howe Green junction during the morning peak.

The trips associated with the additional sites represent an approximate 11% increase over the previously modelled Pre-Submission forecast flows approaching the junction via Southend Road in the AM peak hour and a 6% increase in the PM peak hour. It should, however, be noted that estimates of flow increase using this manual trip assignment method, represent a worst-case scenario at the junction which does not account for the likely redistributive and/or variable demand impact on background traffic flows.

It is expected that development south of Chelmsford will increase the volume of trips looking to route through A12 Junction 17 at Howe Green. The overall impact on junction capacity is, however, likely to be small given the extent of congestion already modelled at the junction in 2041 for the recent Pre-Submission modelling appraisal. It is highly likely that the inclusion of development trips from the additional sites south of Chelmsford will lead to the displacement of background traffic, which modelling indicates could, in part, cause a small quantum of 'rat-running' through West Hanningfield, but result in little overall change to the forecast modelled capacity of the junction itself.

A12 Junction 18 - Sandon Interchange: A small percentage of trips in the existing forecast Chelmsford VISUM model from zones around the villages of East Hanningfield and Bicknacre are shown to route via A414 Maldon Road on the approach to A12 Junction 18 Sandon Interchange. This results in a total of 10 trips from the additional sites entering the junction and 6 exiting in the AM peak, and 10 trips entering the junction and 20 trips exiting in the PM peak. At most, this represents an approximate 2% increase over previously modelled Pre-Submission forecast modelled flows exiting the junction via the A414 towards Danbury in the PM peak hour. The percentage increase in entry flows through the addition of new trips from the additional sites is negligible in both morning and evening peaks.

3 Junction Modelling Outputs & Analysis

3.1 Introduction

As shown in the previous section, the manual routing of trips from the additional sites through the various assessed junctions brought into scope for this updated appraisal, represents a very low number. Therefore, reported analysis focuses on the cumulative junction impact of the existing Pre-Submission development trips along with those from the additional sites.

3.2 Growth Area 1 – North-West Chelmsford

3.2.1 Chignal Road junction with A1060 Roxwell Road

Chignal Road junction with A1060 Roxwell Road is a signalised junction and a key gateway into Chelmsford from the west. Chignal Road is a major local route providing access to/from residential areas in north-west Chelmsford.

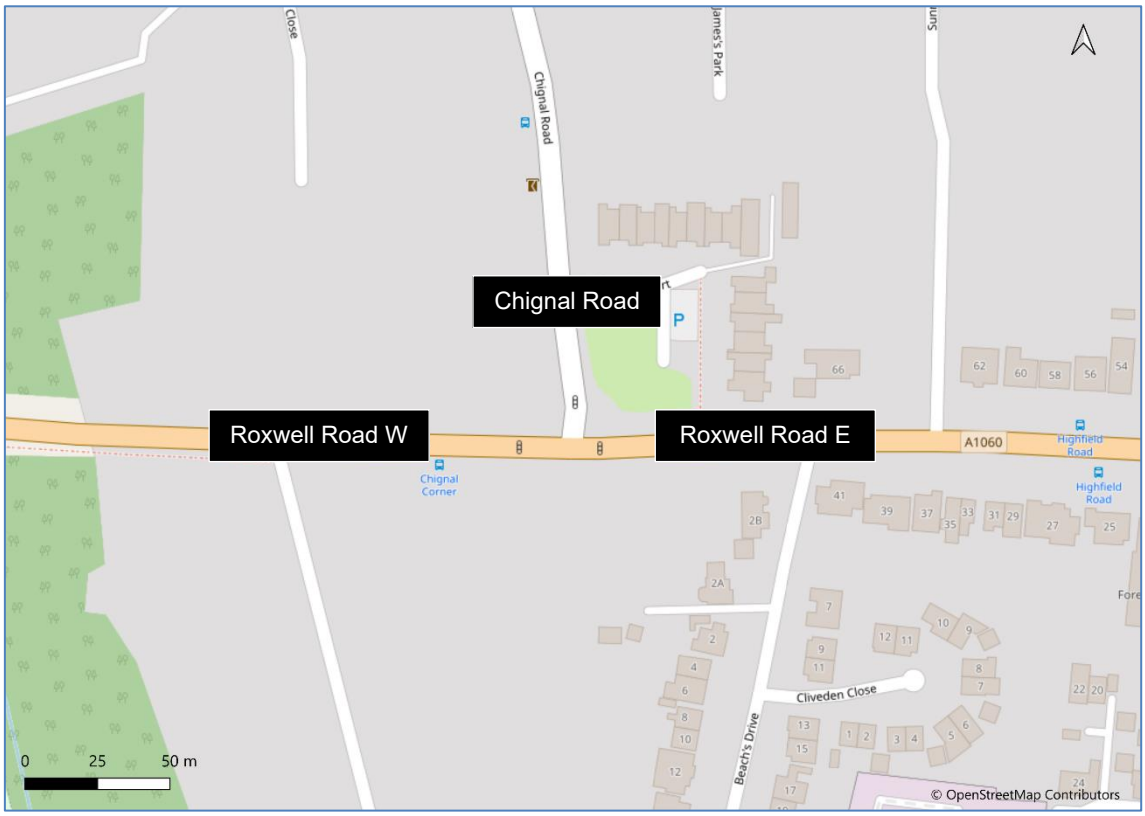

Figure 3-1: Chignal Road junction with A1060 Roxwell Road, location

Peak hour trips assigned through the junction to/from additional sites SGS18a and SGS19 are small, with 14 additional vehicles travelling from Roxwell Road west to Chignal Road in the AM peak, and 19 carrying out the same journey in the PM peak. Other approach arms see no more than 6 additional vehicles added in either peak.

Table 3-1: Chignal Road junction with A1060 Roxwell Road – 2025 & 2041 forecast capacity outputs

Layout	AM				PM			
	Mean Max Queue (PCUs)	Average Delay (s/pcus)	DoS	Total Delay (pcu hrs)	Mean Max Queue (PCUs)	Average Delay (s/pcus)	DoS	Total Delay (pcu hrs)
2025 Base								
Chignal Road	16	38.8	**87.7**	7.3	9	39.8	**83.6**	5.5
Roxwell Road East	12	30.0	**75.6**	5.5	7	17.8	**53.7**	3.2
Roxwell Road West	10	35.4	**78.1**	6.9	13	30.0	**85.0**	7.8
2041 Forecast - 'With Pre-Submission Local Plan' Scenario + Additional Sites								
Chignal Road	14	41.8	**87.8**	7.5	9	43.0	**78.3**	5.1
Roxwell Road East	14	26.1	**72.4**	4.9	20	23.4	**80.1**	6.3
Roxwell Road West	15	32.7	**81.2**	8.4	14	21.8	**70.4**	6.6

As mentioned earlier in this technical note, findings from the assessment of capacity impact at Chignal Road junction with A1060 Roxwell Road should be caveated given the difference between 2025 modelled and observed delay at the junction.

Regardless, the use of VISUM-derived 2041 forecast traffic flows with trips from the additional sites manually included, results in the junction remaining within capacity. It is likely that the slight reduction in Degree of Saturation (DoS) shown on the approach arms over the 2025 base, is the result of signal optimisation. Small changes in the peak hour modelled pattern of turning movements at the junction in the 2041 Local Plan Pre-Submission scenario with additional sites, would appear to have increased the effectiveness of signal optimisation.

3.2.2 Patching Hall Lane junction with B1008 Broomfield Road

Patching Hall Lane with B1008 Broomfield Road is a signalised junction with the B1008 serving as a key route into and out of Chelmsford from the north of the city. Patching Hall Lane is a major local route providing local access to residential areas in north-west Chelmsford and access to St John Payne School.

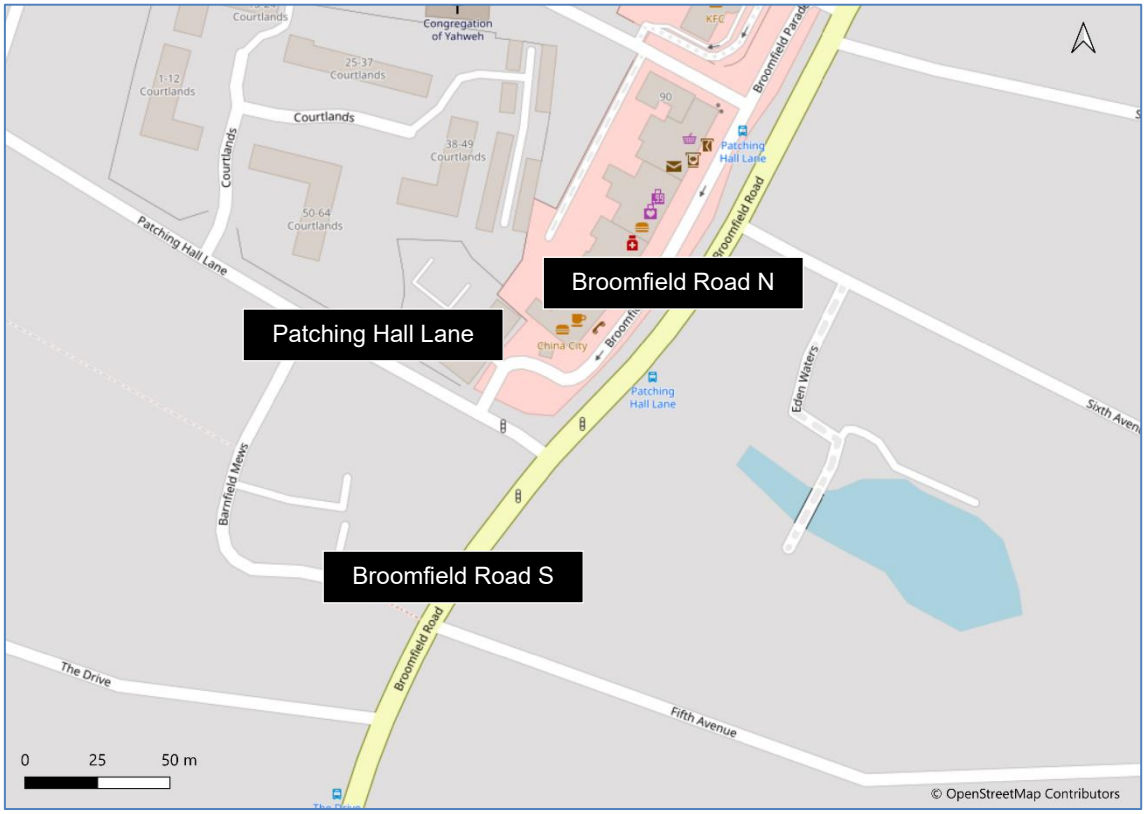

Figure 3-2: Patching Hall Lane junction with B1008 Broomfield Road, location

Peak hour trips assigned through the junction to/from additional sites SGS18a and SGS19 are small, with 22 additional vehicles arriving and 15 vehicles leaving via Patching Hall Lane in the AM peak, and 27 arriving and 10 leaving via the route in the PM peak.

Table 3-2: Patching Hall Lane junction with B1008 Broomfield Road - 2025 & 2041 forecast capacity outputs

Layout	AM				PM			
	Mean Max Queue (PCUs)	Average Delay (s/pcus)	DoS	Total Delay (pcu hrs)	Mean Max Queue (PCUs)	Average Delay (s/pcus)	DoS	Total Delay (pcu hrs)
2025 Base								
1 – Patching Hall Lane	11	35.7	**75.3**	4.3	10	40.5	**77.3**	4.4
2 – Broomfield Road N	9	28.3	**74.1**	4.8	9	31.0	**78.3**	6.0
3 – Broomfield Road S	11	31.8	**74.9**	5.0	12	33.5	**77.5**	5.4
2041 Forecast - 'With Pre-Submission Local Plan' Scenario + Additional Sites								
1 – Patching Hall Lane	10	52.5	**80.9**	5.0	7	65.9	**80.4**	3.9
2 – Broomfield Road N	10	32.1	**82.8**	6.2	10	27.1	**81.6**	5.4
3 – Broomfield Road S	18	30.4	**82.6**	6.6	21	24.5	**83.2**	6.4

Patching Hall Lane junction with B1018 Broomfield Road is shown in the forecast year modelling to remain within capacity using 2041 forecast Local Plan traffic flows from the VISUM model with trips from the additional sites manually included. There are minor increases in queues and delays shown on all arms in the peak hours, although it is again likely that signal optimisation in the LinSig model has helped to manage the growth in traffic through the junction.

3.2.3 School Lane junction with B1008 Main Road, Broomfield

Figure 3-3 below shows the triangle priority junction of B1008 Main Road with School Lane. As School Lane splits into two, this has been modelled as separate priority junctions.

Figure 3-3: School Lane junction with B1008 Main Road, Broomfield, location

Modelling results have been presented in Table 3-3 for a 2025 base year using observed data, and a 2041 forecast year with assigned trips from the Local Plan Pre-Submission and additional sites.

Trips associated with the additional sites SGS18a and SGS19 are very small at this junction. In the AM peak there are an additional 13 trips from School Lane to Main Road north with 15 trips making the reverse movement in the in the PM peak. Main Road north to School Lane shows an additional 4 trips in the AM and 7 in the PM.

Table 3-3: School Lane junction with B1008 Main Road, Broomfield - 2025 & 2041 forecast capacity outputs

Layout	AM			PM		
	Queue (PCUs)	Delay (s/pcus)	RFC	Queue (PCUs)	Delay (s/pcus)	RFC
2025 Base						
Northern Junction						
School Lane	1.5	19.22	**0.60**	0.5	9.84	**0.31**
Main Road N	2.2	7.95	**0.55**	4.4	10.46	**0.69**
Southern Junction						
School Lane	0.2	16.84	**0.16**	0.2	14.54	**0.16**
Main Road S	0.8	3.08	**0.43**	0.4	2.48	**0.29**
2041 Forecast – 'With Pre-Submission Local Plan' Scenario + Additional Sites						
Northern Junction						
School Lane	1.9	22.79	**0.66**	0.6	11.91	**0.39**
Main Road N	2.9	9.22	**0.62**	355.5	689.91	**1.38**
Southern Junction						
School Lane	0.1	15.88	**0.08**	0.0	14.27	**0.02**
Main Road S	0.5	2.67	**0.34**	0.5	2.67	**0.34**

Results show that while the junction currently operates within capacity, it is modelled to be over capacity on the Main Road north arm in the 2041 PM peak. This is almost certainly the result of right-turn movements into School Lane blocking southbound flows along Main Road in the future. These findings are consistent with those highlighted in the evidence base at junctions along the B1008 for the Adopted Local Plan.

The inclusion of a small volume of trips to/from the additional sites in north-west Chelmsford, might be expected to contribute slightly to the right-turn issue at the School Lane junction. However, this would not be expected to impact on previous conclusions around the future capacity of junctions along the B1008 as stated in the Adopted Local Plan transport evidence base. Several mitigation measures have been considered in the past to alleviate the future impact of congestion at the junction, and these are highlighted in Section 5 of this report.

3.3 Growth Area 3 – South of Chelmsford

3.3.1 Eves Corner, Danbury

As shown in Figure 3-4 below, Eves Corner features a pair of mini roundabouts. A pedestrian crossing can be found on the eastern approach arm of A414 Main Road, along with part-time signals on the north arm (Little Baddow Road) and south arm (Mayes Lane). However, as previously mentioned, these have not been modelled in LinSig due to the limited time they are in use during the AM and PM peaks. It has, however, been shown that the part-time signals help to manage delays along the A414 approach arms. As such, the capacity modelling undertaken for the both the Local Plan Review Pre-Submission and assessment of additional sites, presents a worse-case scenario and findings from the analysis should be caveated as such.

Figure 3-4: Eves Corner, Danbury, location

Trips from the additional sites south of Chelmsford are minimal, with an additional 7 vehicles travelling from Mayes Lane to Main Road east and 2 from Little Baddow Road to Mayes Lane in the AM peak, with 1 and 5 vehicles respectively in the PM peak.

Table 3-4: Eves Corner, Danbury - 2022 & 2041 forecast capacity outputs

Layout	AM			PM		
	Queue (PCUs)	Delay (s/pcus)	RFC	Queue (PCUs)	Delay (s/pcus)	RFC
2022 Base						
Mayes Lane Rbt – Main Road W (internal)	0.0	41.88	**1.00**	0.0	12.31	**0.74**
Mayes Lane Rbt – Mayes Lane	0.1	26.72	**0.08**	0.1	12.62	**0.11**
Mayes Lane Rbt – Main Road W	4.0	21.10	**0.80**	95.4	384.63	**1.19**
Little Baddow Rd Rbt – Main Road E	27.3	98.44	**1.02**	2.4	12.25	**0.71**
Little Baddow Rd Rbt – Main Road E (internal)	0.0	12.00	**0.70**	0.0	21.44	**0.87**
Little Baddow Rd Rbt - Little Baddow Road	1.7	23.30	**0.63**	2.5	43.02	**0.73**
2041 Forecast – 'With Pre-Submission Local Plan' Scenario + Additional Sites						
Mayes Lane Rbt – Main Road W (internal)	0.0.	42.91	**1.00**	0.0	31.54	**0.95**
Mayes Lane Rbt – Mayes Lane	0.2	31.07	**0.16**	0.5	29.31	**0.35**
Mayes Lane Rbt – Main Road W	3.3	18.04	**0.78**	18.6	80.71	**0.99**
Little Baddow Rd Rbt – Main Road E	163.6	654.28	**1.29**	11.3	46.84	**0.94**
Little Baddow Rd Rbt – Main Road E (internal)	0.0	10.82	**0.69**	0.0	20.78	**0.87**
Little Baddow Rd Rbt - Little Baddow Road	34.7	288.76	**1.18**	5.6	79.45	**0.89**

Table 3-4 shows that Main Road is already over capacity in the present day and Pre-Submission Local Plan growth exacerbates this further, with Little Baddow Road also operating over capacity with future growth. Nevertheless, the very small quantum of trips from the additional sites would not be expected to further impact the capacity of the junction in any significant way.

As documented in the earlier Pre-Submission modelling, it should be noted that the pre-signals at the junction have not been included in the modelling appraisal, and their increased use in the peak hours will likely help to manage queues and delays forecast along A414 Main Road (E). Additionally, model outputs along Little Baddow Road and Mayes Lane, in particular, should be treated with caution as they are likely to exaggerate the extent of queues and delays along the minor approach arms. This is because the accuracy of the forecast junction flows taken from the Chelmsford VISUM model will be impacted by the limited number of zones and connectors covering Danbury, and the concentration of vehicle trips at specific load-on points – such as along Little Baddow Road.

3.3.2 Rettendon Turnpike junction with A132, South Woodham Ferrers

Rettendon Turnpike is a roundabout on the A132 forming part of the interchange between the A132, A130 and A1245. It is a four-arm roundabout with the southern arm linked to the adjoining roundabout.

Figure 3-5: Rettendon Turnpike junction with A132, South Woodham Ferrers, location

Trips from the additional sites to the north are expected from Main Road to both the A1245 and A132, with 27 and 10 vehicles respectively in the AM peak. In the reverse direction in the PM peak, there are an expected additional 46 trips travelling north via Main Road.

Table 3-5: Rettendon Turnpike junction with A132, South Woodham Ferrers - 2025 & 2041 forecast capacity outputs

Layout	AM			PM		
	Queue (PCUs)	Delay (s/pcus)	RFC	Queue (PCUs)	Delay (s/pcus)	RFC
2025 Base						
Woodham Road	0.5	7.54	**0.35**	0.1	5.04	**0.12**
Burnham Road	0.6	3.91	**0.35**	0.6	4.22	**0.39**
A1245	3.7	8.40	**0.79**	1.8	3.99	**0.64**
A132	4.9	15.10	**0.83**	6.0	26.80	**0.86**
Main Road	1.6	17.98	**0.60**	18.0	195.81	**1.02**
2041 Forecast – 'With Pre-Submission Local Plan' Scenario + Additional Sites						
Woodham Road	0.8	10.16	**0.45**	0.2	5.34	**0.13**
Burnham Road	0.2	3.09	**0.15**	0.7	4.44	**0.42**
A1245	4.8	9.57	**0.83**	2.4	4.85	**0.70**
A132	18.7	44.62	**0.96**	18.2	63.41	**0.97**
Main Road	4.8	42.57	**0.83**	61.2	528.55	**1.25**

As was identified from the transport evidence base for the Adopted Local Plan, the Rettendon Turnpike junction is likely to operate over capacity in the future, with the Main Road arm from the north already at capacity in the present day. It is acknowledged that trips associated with the additional sites proposed in East Hanningfield, Bicknacre and Rettendon, although relatively low in number, will likely contribute to delays on the Main Road approach arm to the junction. As covered in Section 5 of this report, the Adopted Local Plan recognises the need for capacity improvements at the junction, and there is an expectation that developers of sites impacting the junction will provide financial contributions towards funding appropriate mitigation.

3.3.3 B1418 junction with Burnham Road, South Woodham Ferrers

The B1418 junction with B1012 Burnham Road in South Woodham Ferrers is a large roundabout with four approach arms. Old Wickford Road to the south provides access to a residential area, while Burnham Road serves as a perimeter route around South Woodham Ferrers.

Figure 3-6: B1418 junction with Burnham Road, South Woodham Ferrers, location

Trips modelled to/from the additional sites are minimal with an increase of 2 vehicles at most on any one approach arm.

Table 3-6: B1418 junction with Burnham Road, South Woodham Ferrers - 2025 & 2041 forecast capacity outputs

Layout	AM			PM		
	Queue (PCUs)	Delay (s/pcus)	RFC	Queue (PCUs)	Delay (s/pcus)	RFC
2025 Base						
B1418	0.8	5.65	**0.45**	1.2	9.02	**0.55**
B1012 Burnham Road E	5.9	17.45	**0.86**	1.7	7.68	**0.63**
Old Wickford Road	0.1	8.38	**0.10**	0.1	5.23	**0.06**
B1012 Burnham Road W	3.4	12.24	**0.77**	7.5	19.20	**0.89**
2041 Forecast – 'With Pre-Submission Local Plan' Scenario + Additional Sites						
B1418	1.1	6.87	**0.53**	2.9	16.39	**0.74**
B1012 Burnham Road E	32.5	65.35	**0.99**	4.3	15.18	**0.81**
Old Wickford Road	0.2	10.87	**0.14**	0.1	6.63	**0.09**
B1012 Burnham Road W	7.0	21.78	**0.87**	189.4	237.39	**1.12**

Modelling results shown in

Table 3-6 suggest that the recent Local Plan Pre-Submission scenario is likely to have an impact on the junction on the Burnham Road arms, with Burnham Road west operating noticeably over capacity in the PM peak in 2041. However, trips from the additional sites to the north of the junction would not be expected to impact junction capacity further.

3.3.4 Willow Grove junction with Burnham Road South Woodham Ferrers

The Willow Grove with Burnham Road junction is located to the west of the B1418 junction. It is a four-arm roundabout with Willow Grove a semi-rural route to West Hanningfield that additionally provides the exit from the Petrol Station and shops adjacent to the roundabout. Ferrers Road provides access into South Woodham Ferrers.

Figure 3-7: Willow Grove junction with Burnham Road South Woodham Ferrers, location

Few trips from the additional sites to the south of Chelmsford are expected to route through this junction, based on assignment patterns in the forecast VISUM model. 13 additional vehicles from the additional sites are determined to travel from Willow Grove to Burnham Road north in the AM peak, and 4 to Ferrers Road. In the PM peak, this is shown to be 2 and 5 trips respectively.

Table 3-7: Willow Grove junction with Burnham Road South Woodham Ferrers - 2025 & 2041 forecast capacity outputs

Layout	AM			PM		
	Queue (PCUs)	Delay (s/pcus)	RFC	Queue (PCUs)	Delay (s/pcus)	RFC
2025 Base						
Burnham Road	3.2	7.86	**0.76**	1.5	5.61	**0.60**
Ferrers Road	5.6	29.39	**0.85**	0.8	5.61	**0.45**
A132 Burnham Road	1.5	4.06	**0.59**	2.7	5.72	**0.73**
Willow Grove	0.4	5.98	**0.28**	1.3	11.18	**0.57**
2041 Forecast – 'With Pre-Submission Local Plan' Scenario + Additional Sites						
Burnham Road	5.4	11.92	**0.84**	2.2	7.20	**0.68**
Ferrers Road	30.5	108.05	**1.01**	1.1	6.66	**0.52**
A132 Burnham Road	1.9	4.77	**0.65**	4.3	8.11	**0.81**
Willow Grove	0.6	7.15	**0.35**	3.1	22.80	**0.76**

Results show that the junction generally operates within capacity, albeit with Ferrers Road approaching capacity, in 2025. By 2041, the addition of background growth, Pre-Submission Local Plan development and a small increase in trips from additional sites, results in Ferrers Road exceeding capacity in the AM Peak. Again, however, the small volume of trips from additional sites to the north is unlikely to impact the junction.

4 Cross Boundary Impact

To assess the comparative cross-boundary impact of the latest Local Plan Review development – specifically Pre-Submission Local Plan plus the additional sites, a review has been undertaken of the forecast flows on key routes travelling in and out of neighbouring Districts and Boroughs.

To undertake this assessment, origin and destination flow bundle analysis has been carried out for all zones in the 2041 Local Plan Pre-Submission VISUM model within which the new additional sites are located. For each development zone, the percentage of assigned trips in the model on eight key routes crossing the Chelmsford administrative boundary, inbound and outbound, was noted. The relevant percentage was applied to the total number of trips calculated for each additional site in its representative model zone in order to derive the inbound and outbound flows at the administrative boundary.

Figure 4-1 shows the points at which data has been extracted.

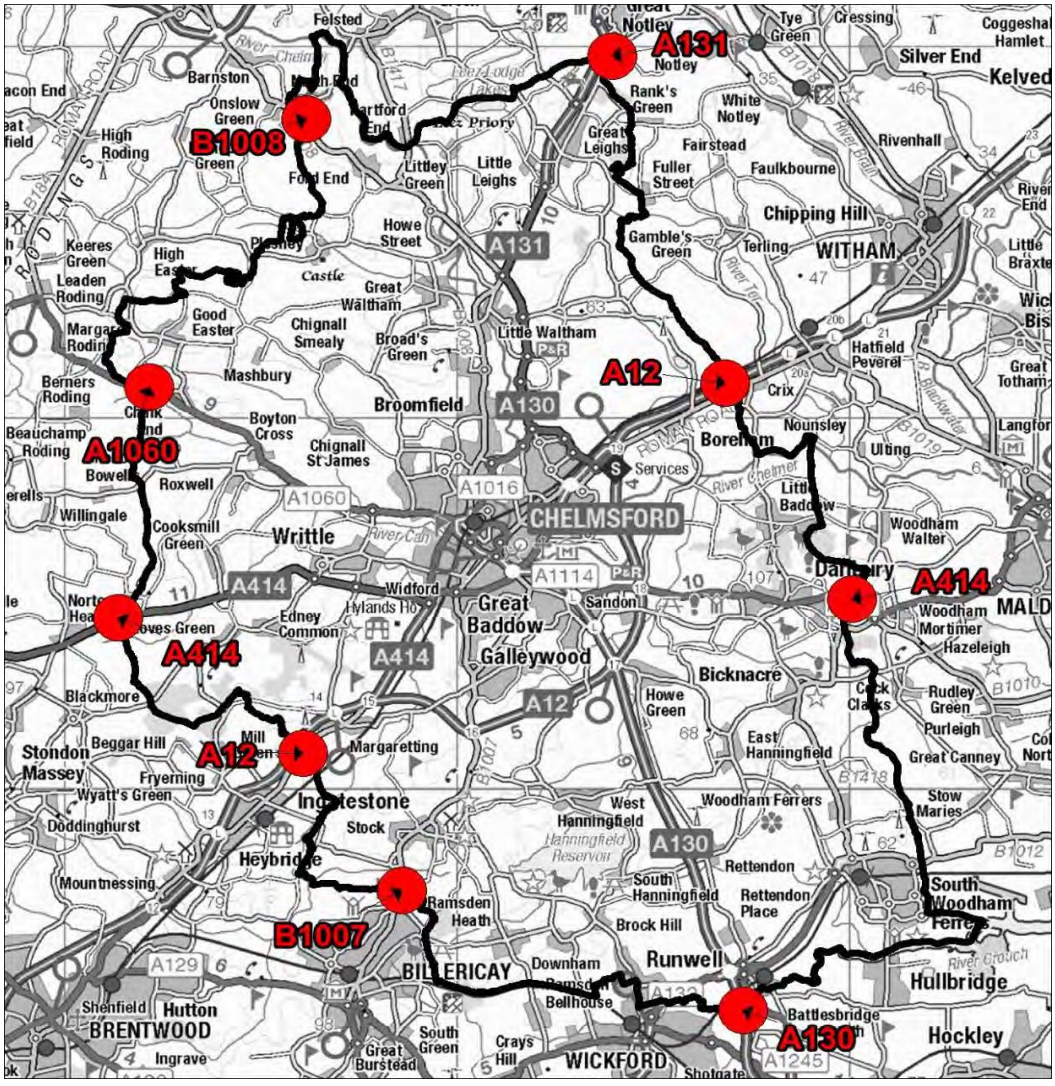

Figure 4-1: Location of cross boundary flows on key routes between Chelmsford and neighbouring authorities

Table 4-1 below details the directional vehicle flows from the additional sites determined on these key corridor routes crossing the Chelmsford administrative boundary in a 2041 forecast year alongside existing Pre-Submission Local Plan development.

With reference to the analysis previously reported for the Pre-Submission traffic impact appraisal without A12 widening sensitivity test, Table 4-2 provides updated modelled flow differences between the previously assessed 2041 baseline and the 2041 Local Plan Pre-Submission scenario – now with the inclusion of trips from the additional sites.

'Inbound' refers to flows travelling from neighbouring areas into the Chelmsford administrative boundary, and 'Outbound' refers to flows travelling out of the Chelmsford administrative boundary into neighbouring areas.

Table 4-1: Flows on key routes crossing the Chelmsford administrative boundary to/from additional sites

	AM Peak		PM Peak	
	Additional Site trips IB flow	Additional Site trips OB flow	Additional Site trips IB flow	Additional Site trips OB flow
A131	6	8	10	6
A12 NE	10	6	8	11
A414 E	6	10	2	0
A130	10	14	13	12
B1007	1	4	3	3
A12 SW	12	24	21	12
A414 W	2	4	4	2
A1060	2	3	3	1
A1008	3	9	7	9

Table 4-2: Modelled flow comparisons and % change between the Update Local Plan Scenario (including both Pre-Submission and Additional Sites) and Baseline Scenario on key routes crossing the Chelmsford administrative boundary

		Local Plan Review (Pre-Submission + Additional Sites) without A12 DCO Scenario							
		AM Directional Flow				PM Directional Flow			
Road	Neighbouring authority	IB Flow	% change	OB Flow	% change	IB Flow	% change	OB Flow	% change
A131	Braintree	1387	1.4%	1127	2.2%	1099	-1.0%	1310	0.4%
A12 (north)	Braintree	4485	-6.3%	4438	1.1%	4412	1.1%	4383	0.2%
A414 (east)	Maldon	737	-0.5%	569	2.5%	628	1.3%	711	-2.5%
A130 (south)	Basildon	2392	-0.3%	2290	0.7%	2602	0.8%	2041	-0.3%
B1007	Basildon	970	0.9%	738	4.2%	1012	2.4%	681	-1.0%
A12 (south)	Brentwood	3550	-0.2%	4213	0.6%	4216	1.6%	3553	-0.5%
A414 (west)	Epping Forest	525	-0.4%	713	0.6%	781	1.8%	528	-1.7%
A1060	Uttlesford	394	-0.8%	419	1.2%	436	3.6%	398	-1.0%
B1008	Uttlesford	564	-1.6%	696	2.1%	638	2.9%	672	0.0%

Note: Colour scale indicates level of change from Baseline

In summary, the addition of development trips associated with the latest proposed Local Plan housing and employment sites – including the previous Pre-Submission plus the additional sites, is likely to have a very minor impact on overall cross-boundary flows when viewed alongside the percentage changes reported as part of the earlier Pre-Submission modelling.

5 Mitigation

5.1 Introduction

It is not expected that further mitigation need be considered to address the highway impact of trips associated with the additional sites considered alongside the Local Plan Pre-Submission. However, it is recommended that developers of these sites should consider relevant mitigation measures in current planning documentation and/or schemes proposed as part of the latest Plan Review evidence base, with a view towards providing a funding contribution towards their implementation.

This section therefore provides a summary of potential schemes currently under consideration for implementation – subject to available funding - near to the proposed additional sites and which might be expected to mitigate the collective impact of all proposed development associated with the Local Plan Pre-Submission and additional sites, at the latest junctions brought within-scope of the latest highway impact modelling.

For the junctions already assessed as part of the previous Pre-Submission modelling – specifically A12 Junction 17 at Howe Green, Junction 18 at Sandon, and Eves Corner in Danbury, discussion around mitigation is covered in the December 2024 Pre-Submission report (July 2025 Update). This remains unchanged.

5.2 Schemes identified in policy documents for mitigation consideration in North-West Chelmsford

5.2.1 Chelmsford Local Cycling and Walking Infrastructure Plan (LCWIP)[1]

The LCWIP allows ECC to apply for local and central government funding to build new infrastructure along the routes, such as segregated cycling paths, dropped kerbs, new or upgraded road crossings and wider pavements. A number of key routes have been identified in north-west Chelmsford for improvements (below). However, they have not yet undergone and route feasibility or design and funding has not been identified or secured.

Developer contributions to mitigate the collective impact of proposed sites, should be sought to provide sustainable transport options, where appropriate.

- Cycling route 5, the longest at 6.2km runs from Chelmsford Railway Station to Ralph's Farm via B1008 to Broomfield Hospital and north of Broomfield housing site.
- Cycling route 5A, covers a total of 5.6km, with a section from Broomfield Road (St John Payne Catholic School) to Broomfield Hospital ring road via Scotts Green & Broomfield Cycleway, a section from ARU Student Village to Broomfield Road via Alan Cherry Drive

[1] https://letstalkessexsustainabletravel.co.uk/chelmsford-walking-and-cycling

and The Avenues, a section from Parkway to New Street via Marconi Road and a section from Chelmsford Railway station to Broomfield Road via Railway Street.

- Cycling route 5B, a 2.7km route that runs from the Chelmsford County High School for Girls to the proposed new development in West Chelmsford adjacent to Avon Road Allotments via Melbourne Avenue and Corporation Road.
- Walking route 10 is a 3.9km route including Copperfield Road to Broomfield Road via Morrisons Pharmacy, Nickleby Road, Pennine Road, Melbourne Avenue, West Avenue and Corporation Road, and a section from Kings Road to Rainsford Road via Park Avenue.

5.2.2 Chelmsford Implementation Plan[2]

Based on work that was undertaken as part of the Chelmsford Implementation Plan, sustainable transport corridors (STCs) have been highlighted in Broomfield, to encourage walking and cycling and sustainable transport along this key bus corridor, where the focus is on cycling and bus use, with the provision of cycle lanes and bus priority measures where possible. However, further work is required on this STC and funding would need to be identified and secured. Additionally, a direct high-quality route for cycling and scooting between Broomfield Hospital and the Chelmer Valley Park and Ride site has been identified as part of the Chelmsford Garden community active travel route, which could help accommodate growth in north-west Chelmsford. This is planned to be delivered by CCC and funded by developers of the Chelmsford Garden Community site.

As with the LCWIP routes, developer contributions to mitigate the collective impact of proposed sites should be sought to provide sustainable transport options, where appropriate.

5.2.3 Chelmsford Bus Service Improvement Plan (BSIP)[3]

A number of bus enhancements are highlighted in the Chelmsford BSIP for future possible implementation in north-west Chelmsford, as listed below:

- Broomfield Road southbound bus lane from Skerry Rise to Parkway
- Broomfield Road / Valley Bridge junction remodelling – bus movements facilitated through wider northbound lanes
- Improvements to Broomfield Road/Main Road/School Lane junction
- Broomfield Hospital to Skerry Road southbound bus lane
- Broomfield Hospital Roundabout northbound left slip and bus lane from Main Road into hospital access road
- Broomfield Hospital Interchange Redesign - Improving access and space for local buses

As with the Chelmsford LCWIP and Implementation Plan schemes, these BSIP schemes have not yet undergone any route feasibility or design, and funding has not been identified or secured.

[2] https://consultations.essex.gov.uk/essex-highways/better-connected-essex/supporting_documents/chelmsford-implementation-planpdf

[3] https://www.essexhighways.org/getting-around/bus/bus-strategy

Developer contributions, to mitigate the collective impact of proposed sites, should also be sought to provide sustainable transport options, where appropriate.

5.2.4 Chelmsford Infrastructure Delivery Plan (IDP)[4]

The Chelmsford IDP identifies capacity improvements to the roundabout at the junction of B1008 Main Road and Hospital Approach, linked to the planning permission for the extension of Broomfield Hospital.

5.3 Schemes identified in policy documents for mitigation consideration South of Chelmsford

5.3.1 Chelmsford Bus Service Improvement Plan (BSIP)[5]

As part of the BSIP, two schemes are highlighted that could help accommodate additional development from development in villages to the north of South Woodham Ferrers:

- Improvements to bus turning point on South Woodham Ferrers station forecourt.
- Installation of bus gate enforcement cameras on the Hullbridge Road bus gate.

However further feasibility and design work would need to be undertaken, and funding identified and secured.

Developer contributions, to mitigate the collective impact of proposed sites, should be sought to provide sustainable transport options, where appropriate.

5.3.2 Chelmsford Local Plan (Adopted)

Chelmsford's Adopted Local Plan[6] Strategic Policy S9 highlights the need for capacity improvements to the A132 between the Rettendon Turnpike and South Woodham Ferrers, including necessary junction improvements to be brought forward as early as possible in tandem with the delivery of development to mitigate its impact. The expectation would be for developers of nearby sites to fund delivery. The plan also mentions multi-user crossings across the B1012 in South Woodham Ferrers which may include a bridge or underpass. These should be funded by developers as appropriate.

The IDP notes that the planned growth in the adopted Local Plan to the north of South Woodham Ferrers is already providing some improvements to the B1418/Burnham Road Junction; increasing the extent of the taper on the A132 west of the Burnham Road/Ferrers Road/Willow Lane Junction; pedestrian and cycle crossings; potential speed limit reduction along the A132 and travel plan and other sustainable measures.

[4] https://www.chelmsford.gov.uk/media/4blbpfhp/chelmsford-city-council-idp-stage-1-report-february-2024.pdf

[5] https://www.essexhighways.org/getting-around/bus/bus-strategy

[6] chelmsford-local-plan-may-2020-includes-a1-plans.pdf

6 Summary of Findings & Conclusions

CCC has identified further development sites for allocation within the Local Plan Review. These comprise 11 new housing sites, three expanded housing sites and one expanded employment site totalling 1,592 additional houses and 10,500m^2 of additional employment space. Just over half of the additional development is located in Growth Area 3, south of Chelmsford and the A12 corridor. Elsewhere, the largest proposed development is in Growth Area 1 to the north-west of Chelmsford (sites SGS18a/SGS19).

Calculated peak hour trips from the proposed additional sites totalling 1,079 trips across both AM & PM peak hours, have been manually assigned across a selection of key junctions on the strategic road network located within reasonable proximity of the sites. This has been undertaken using assignment patterns taken from the latest 2041 Local Plan Pre-Submission modelled scenarios without A12 widening.

The manual assignment of trips calculated to/from the additional sites has shown that small numbers will likely be added to background traffic flows and Adopted Local Plan development trips at junctions on the strategic road network in a 2041 forecast year. It is therefore considered highly unlikely that trips associated with the additional sites will be of a sufficient scale to significantly impact the capacity of the junctions.

It is likely that development south of Chelmsford will increase the volume of trips looking to route through A12 Junction 17 at Howe Green. The overall impact on junction capacity is, however, likely to be small given the extent of congestion already modelled at the junction in 2041 for the recent Pre-Submission modelling appraisal. It is highly likely that trips from the additional sites south of Chelmsford will lead to the displacement of background traffic flows, potentially causing a small quantum of 'rat-running' through West Hanningfield, but resulting in little overall change to the forecast modelled capacity of the junction itself.

Several junctions assessed for this latest study of additional sites, are modelled to operate over-capacity by 2041 to a greater or lesser extent – primarily as a result of background traffic growth and flows from Adopted Local Plan development. These junctions, along with those assessed as part of the recent Pre-Submission modelling (specifically A12 Junctions 17 and 18 and Eves Corner), are the subject of various development impact mitigation measures that have either been highlighted in this appraisal and/or commented on in the December 2024 Pre-Submission modelling report (July 2025 Update).

It is not expected that further mitigation need be considered to address the highway impact of trips associated with the additional sites considered alongside the Local Plan Pre-Submission. However, it is recommended that developers of these sites should consider relevant mitigation measures in current planning documentation and/or schemes proposed as part of the latest Plan Review evidence base, with a view towards providing a funding contribution towards their implementation.

7 Appendix A: 2041 turning flows at assessed junctions taken from the Local Plan Review Pre-Submission Scenario modelling

The tables below show the 2041 turning flows at assessed junction taken from the VISUM strategic modelling of the Local Plan Review Pre-Submission Scenario undertaken in 2024.

It is important to reiterate that these flows are provided as context for comparison with the latest turning flows comprising trips to/from the additional sites assessed for this study. Link flow validation in the Chelmsford VISUM model does not extend further south and east of the A12 in the model. **Therefore, flows stated in the tables below should not be considered robust and should not be referenced outside of the intended context.**

Table A-1: Chignal Road Junction with A1060 Roxwell Road - Trips from Local Plan Review Pre-Submission Scenario

Trips from Local Plan Review Pre-Submission Scenario (Background Growth + Pre-Submission Development Trips)			
AM	Roxwell Road (Western arm)	Chignal Road (Northern arm)	Roxwell Road (Eastern arm)
Roxwell Road (Western arm)	0	213	423
Chignal Road (Northern arm)	74	0	600
Roxwell Road (Eastern arm)	373	543	0
PM	Roxwell Road (Western arm)	Chignal Road (Northern arm)	Roxwell Road (Eastern arm)
Roxwell Road (Western arm)	0	157	262
Chignal Road (Northern arm)	231	0	740
Roxwell Road (Eastern arm)	480	598	0

Table A-2: Patching Hall Lane junction with B1008 Broomfield Road - Trips from Local Plan Review Pre-Submission Scenario

Trips from Local Plan Review Pre-Submission Scenario (Background Growth + Pre-Submission Development Trips)			
AM	Broomfield Road (Northern Arm)	Broomfield Road (Southern Arm)	Patching Hall Lane (Western Arm)
Broomfield Road (Northern Arm)	0	411	203
Broomfield Road (Southern Arm)	472	0	94
Patching Hall Lane (Western Arm)	311	120	0
PM	Broomfield Road (Northern Arm)	Broomfield Road (Southern Arm)	Patching Hall Lane (Western Arm)
Broomfield Road (Northern Arm)	0	428	263
Broomfield Road (Southern Arm)	482	0	102
Patching Hall Lane (Western Arm)	296	96	0

Table A-3: School Lane junction with B1008 Main Road, Broomfield - Trips from Local Plan Review Pre-Submission Scenario

Trips from Local Plan Review Pre-Submission Scenario (Background Growth + Pre-Submission Development Trips)			
AM	Main Road (Southern Arm)	School Lane (Western Arm)	Main Road (Northern Arm)
Main Road (Southern Arm)	0	654	190
School Lane (Western Arm)	839	1	46
Main Road (Northern Arm)	280	41	0
PM	Main Road (Southern Arm)	School Lane (Western Arm)	Main Road (Northern Arm)
Main Road (Southern Arm)	0	813	188
School Lane (Western Arm)	551	0	53
Main Road (Northern Arm)	169	48	1

Table A-4: Eves Corner, Danbury - Trips from Local Plan Review Pre-Submission Scenario

Trips from Local Plan Review Pre-Submission Scenario (Background Growth + Pre-Submission Development Trips)				
AM	Little Baddow road (Northern Arm)	Maldon Roads (Eastern Arm)	Mayes Lane (Southern Arm)	Main Road (Western arm)
Little Baddow Road (Northern Arm)	0	109	5	260
Maldon Road (Eastern Arm)	92	0	8	936
Mayes Lane (Southern Arm)	8	4	0	4
Main Road (Western arm)	121	493	5	1
PM	Little Baddow road (Northern Arm)	Maldon Roads (Eastern Arm)	Mayes Lane (Southern Arm)	Main Road (Western arm)
Little Baddow Road (Northern Arm)	0	107	13	126
Maldon Road (Eastern Arm)	69	0	8	765
Mayes Lane (Southern Arm)	22	24	0	9
Main Road (Western arm)	96	673	4	2

Table A-5: Rettendon Turnpike junction with A132, South Woodham Ferrers - Trips from Local Plan Review Pre-Submission Scenario

Trips from Local Plan Review Pre-Submission Scenario (Background Growth + Pre-Submission Development Trips)					
AM	Woodham Road (Northeast arm)	Burnham Road (Southeast arm)	A1245 (Southern arm)	A132 (Western arm)	Main Road (Northern arm)
Woodham Road (Northeast arm)	1	3	150	119	12
Burnham Road (Southeast arm)	0	3	6	519	43
A1245 (Southern arm)	66	552	0	852	309
A132 (Western arm)	58	744	198	1	292
Main Road (Northern arm)	9	53	213	72	0
AM	Woodham Road (Northeast arm)	Burnham Road (Southeast arm)	A1245 (Southern arm)	A132 (Western arm)	Main Road (Northern arm)
Woodham Road (Northeast arm)	0	5	42	49	6
Burnham Road (Southeast arm)	3	2	14	528	45
A1245 (Southern arm)	131	683	1	789	156
A132 (Western arm)	98	489	119	4	125
Main Road (Northern arm)	12	34	150	64	0

Table A-6: B1418 junction with Burnham Road, South Woodham Ferrers - Trips from Local Plan Review Pre-Submission Scenario

Trips from Local Plan Review Pre-Submission Scenario (Background Growth + Pre-Submission Development Trips)				
AM	B1418 (Northern Arm)	Burnham Road (Eastern Arm)	Old Wickford Road (Southern Arm)	Burnham Road (Western Arm)
B1418 (Northern Arm)	0	140	3	444
Burnham Road (Eastern Arm)	190	1	17	1142
Old Wickford Road (Southern Arm)	10	12	0	32
Burnham Road (Western Arm)	343	764	7	1
PM	B1418 (Northern Arm)	Burnham Road (Eastern Arm)	Old Wickford Road (Southern Arm)	Burnham Road (Western Arm)
B1418 (Northern Arm)	0	252	9	359
Burnham Road (Eastern Arm)	173	0	28	812
Old Wickford Road (Southern Arm)	4	26	0	25
Burnham Road (Western Arm)	322	1339	25	1

Table A-7: Willow Grove junction with Burnham Road, South Woodham Ferrers -Trips from Local Plan Review Pre-Submission Scenario

Trips from Local Plan Review Pre-Submission Scenario (Background Growth + Pre-Submission Development Trips)				
AM	Burnham Road (Northern Arm)	Ferrers Road (Southeast Arm)	Burnham Road (Southern Arm)	Willow Grove (Northwest Arm)
Burnham Road (Northern Arm)	39	70	1378	124
Ferrers Road (Southeast Arm)	116	1	496	113
Burnham Road (Southern Arm)	985	411	4	33
Willow Grove (Northwest Arm)	101	79	72	14
PM	Burnham Road (Northern Arm)	Ferrers Road (Southeast Arm)	Burnham Road (Southern Arm)	Willow Grove (Northwest Arm)
Burnham Road (Northern Arm)	39	138	867	35
Ferrers Road (Southeast Arm)	120	2	411	40
Burnham Road (Southern Arm)	1279	577	6	20
Willow Grove (Northwest Arm)	219	176	70	8