West Essex and East Hertfordshire Local Plans Modelling

Essex County Council

Technical Note 6: South and West Harlow Study (September 2016)

Technical Note

23 January 2018

RINGWAY JACOBS
integrated expertise

Essex County Council

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Project no:	B3553R6A
Document title:	Technical Note 6: South and West Harlow Study (September 2016)
Document No.:	
Revision:	11
Date:	23 January 2018
Client name:	Essex County Council
Client no:	
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File name:	C:\Users\WhittlM\Documents\My_Docs\Essex\Harlow\my TN6\2017-10-13 issued\2017-10-10 TN6 v11.docx

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Document history and status

Revision	Date	Description	By	Check	Review	Approved
1	15/11/16	Draft	WR	CJ		
2	25/11/16	Following CJ review and amendments	WR		CH	
3	02/12/16	Following CH review	WR		CH	CH
4	06/01/17	Amending following client comments	WR	CH	DM	CH
5	10/1/17	Updated figures	WR			
6	17/1/17	Updated flow difference figures	WR			
7	21/04/17	Revised report (esp. consistency with other TNs)	MW			
8	14/7/17	Amended following further client comments	VC			
9	27/7/17	Amended following further client comments	WR	MW		
10	10/10/17	Model re-run and all plots updated	TA	MW	MY/MW	
11	13/10/17	Checking and making ready for issue	TA	MW	MY/MW	MW

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Limitation Statement

This report has been prepared on behalf of, and for the exclusive use of, Essex County Council by Jacobs and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and Essex County Council. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this report by any third party.

This report is part of a suite of technical notes on the WEEH Local Plans modelling project and should be read in conjunction with these other technical notes. The analysis and forecasts contained in this report make use of information and input assumptions made available to Jacobs at a point in time. As conditions change the analysis and forecasts would be expected to change. Hence the findings set out in this report should be understood as relevant to that point in time when the information and assumptions were made.

The WEEH transport model is focussed on the Harlow district but covers adjacent districts in West Essex and East Hertfordshire. The WEEH model contributes to the understanding of strategic impacts between the districts but does not intend to replace local transport models used in the districts surrounding Harlow.

Executive summary

Technical Note 6 reports on the investigation using Visum strategic modelling software of the likely highway network impacts arising specifically from three of the strategic Local Plan development sites around Harlow:

- Latton Priory (1,050 homes) – south Harlow
- West Katherine's (1,100 homes) and West Sumners (1,000 homes) – south-west Harlow

It should be noted that as Epping Forest District Council (EFDC) had yet to identify employment sites, for the purposes of this study, it was advised by EFDC that no employment development should be included on the Latton Priory site, although it has potential for business park development.

The wider network impact of the Latton Priory site would be likely to be affected by its access arrangements, of which there are three broad options:

- Option A – Access via Rye Hill Road (to the west of the site);
- Option B – Access via B1393 Epping Road (to the east of the site); and
- Option C – Access to both west and east, including a link road through the site.

The AM peak hour model was run for each of these access options and their outputs evaluated. These indicated that Option C, with both east and west network access points connected with a link road, would be likely to have the least impact on the local road network and result in Latton Priory traffic routeing via the more strategic links within Harlow. It is considered that Option A would be likely to have the most detrimental impact on the local highway network, particularly on Southern Way and the south of Harlow.

For West Katherine's and West Sumners AM and PM peak hour modelling was undertaken, and indicated that trips associated with these developments would be likely to result in some additional traffic routeing along Southern Way, although much more traffic would use Katherine's Way. Possible junction changes and traffic management measures along Southern Way were then evaluated and it was concluded that these measures would reduce the use of Southern Way by these south-western sites' traffic, that traffic would increase along Katherine's Way, and to a lesser extent along the B181 to the south of the sites.

Consideration should be given to the assumptions made in the modelling with regard to the Latton Priory link road, which was modelled as a residential low capacity distributor road rather than a higher capacity urban distributor road. A higher capacity link may result in traffic reassigning to this route in preference to other routes through the town which would be likely to reduce the flows on Southern Way and other routes.

On a general note raising a caveat to the study, the use of the Visum strategic model is a less than perfect tool to model local highway impacts, particularly as its calibration and validation on the more minor roads in the south and west of Harlow has not been assessed. Therefore, the indication from the model outputs that development traffic would be likely to reassign to other more minor routes (e.g. Harberts Road, Commonside Road etc.) may either indicate the need for further mitigation measures, or that the model itself may not be representative of likely localised assignment in this area.

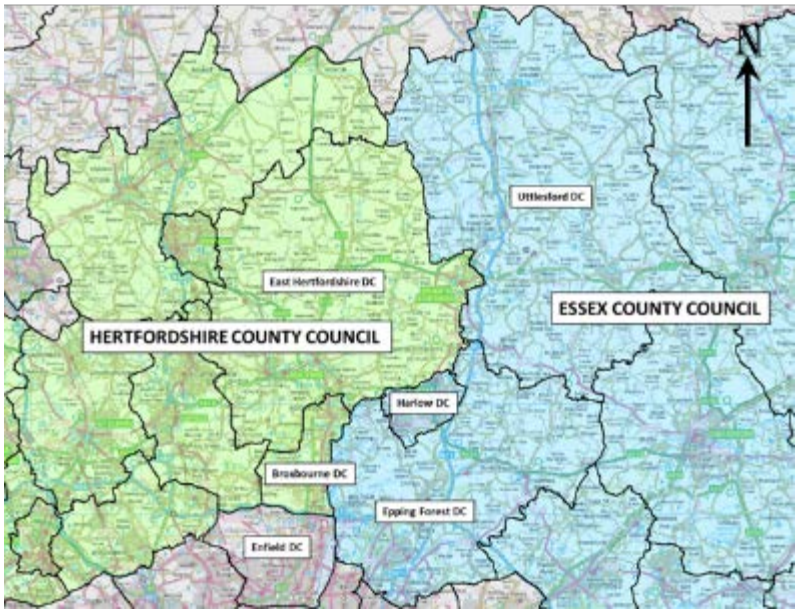
However, it is considered that the impacts that are reported in this technical note give a reasonable view of the possible consequences of strategic development and proposed mitigation measures, in the absence of more detailed micro-simulation modelling.

1. Introduction

1.1 Introduction

Essex County Council (ECC) has been providing ongoing traffic modelling support through Essex Highways and Jacobs in relation to the emerging Local Plan proposals for the four districts which comprise the West Essex and East Hertfordshire (WEEH) Strategic Housing Market Assessment (SHMA) area. This has been conducted through the Co-operation for Sustainable Development Board, which comprises officers and elected members from East Hertfordshire, Epping Forest, Harlow and Uttlesford District Councils, Hertfordshire and Essex County Councils, and Highways England.

Figure 1-1 – Local Authorities in the Vicinity of Harlow



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The WEEH transport model, which has been built using VISUM (version 14) software, is being used to assess the likely impact on the highway network of the emerging options of the WEEH Local Plans which identify strategic development sites around Harlow and associated infrastructure requirements that may result.

The WEEH modelling project has produced the following technical notes reflecting its scope of work:

- Technical Note 1: Forecasting Methodology (TN1)
- Technical Note 2: Spatial Options A-E Results (TN2)
- Technical Note 3: Spatial Option A1 Stort Crossing/Northern Bypass (TN3)
- Technical Note 4: Emerging Option (TN4)
- Technical Note 5: East Harlow VISSIM Model (TN5)
- Technical Note 6: South and West Harlow Study (TN6)

1.2 Objectives

Following option testing undertaken to evaluate various WEEH development scenarios and growth levels, ECC requested evaluation of the likely impacts of specific strategic sites to the south and west of Harlow to inform the Local Plan process. This technical note summarises the findings of this work and describes the methodology used and assumptions made. The objectives are to:

1. Identify the modelled impact on the local network of traffic from the Latton Priory strategic development site, in particular, along Southern Way using three alternative site access configurations; and
2. Consider the effect of traffic from West Katherine's and West Sumners strategic development sites on the surrounding network, particularly but not exclusively along Southern Way, and evaluate potential traffic management measures.

1.3 Report Structure

Section 2 describes the development assumptions used in the model for TN6.

Section 3 addresses and reports on Objective 1, the impact of the Latton Priory site.

Section 4 addresses and reports on the likely impact of the West Katherine's and West Sumners sites on Southern Way, while Section 5 evaluates the likely effects of a series of possible traffic management measures to influence the route used by traffic from these two sites.

A conclusion and summary of findings is given in Section 6 together with a description of the limitations of the analysis arising from the assumptions and methodology used.

2. Development Assumptions

The Emerging Option for the WEEH Local Plans is set out in the Uncertainty Log ("160914 UL 2033 Emerging Max_V2_Final") and is described in TN4. It identifies emerging Local Plan developments providing approximately 43,000 homes and 30,500 jobs across the districts, and was used as the input for the modelling reported in TN4. It should be noted that the time periods of the Local Plans are 2011-2033, while the Visum modelling time period is 2014-2033 and, therefore, the growth reported differs from the Local Plan projections.

Since finalising the Uncertainty Log, EFDC advised ECC that further work was being undertaken to establish the level of jobs and the corresponding employment sites within its district. Given the uncertainty with regard to the employment information assumptions at that time, it was considered appropriate to remove this element of the Latton Priory, Latton Park and Harlow Park Nursery sites for the modelling reported in TN6.

In the wider Harlow area, the extent of which is shown in Figure 2-1, there are a total of 15,250 dwellings in the Emerging Option. These are listed in Table 2-1 and shown in Figure 2-1. The residential sites of relevance to this study are:

- 8 – West Katherine's
- 11 – West Sumners
- 15 – Latton Priory Farm/Riddings Lane

Table 2-1 – 2033 Development Assumptions – Wider Harlow Area Residential Sites

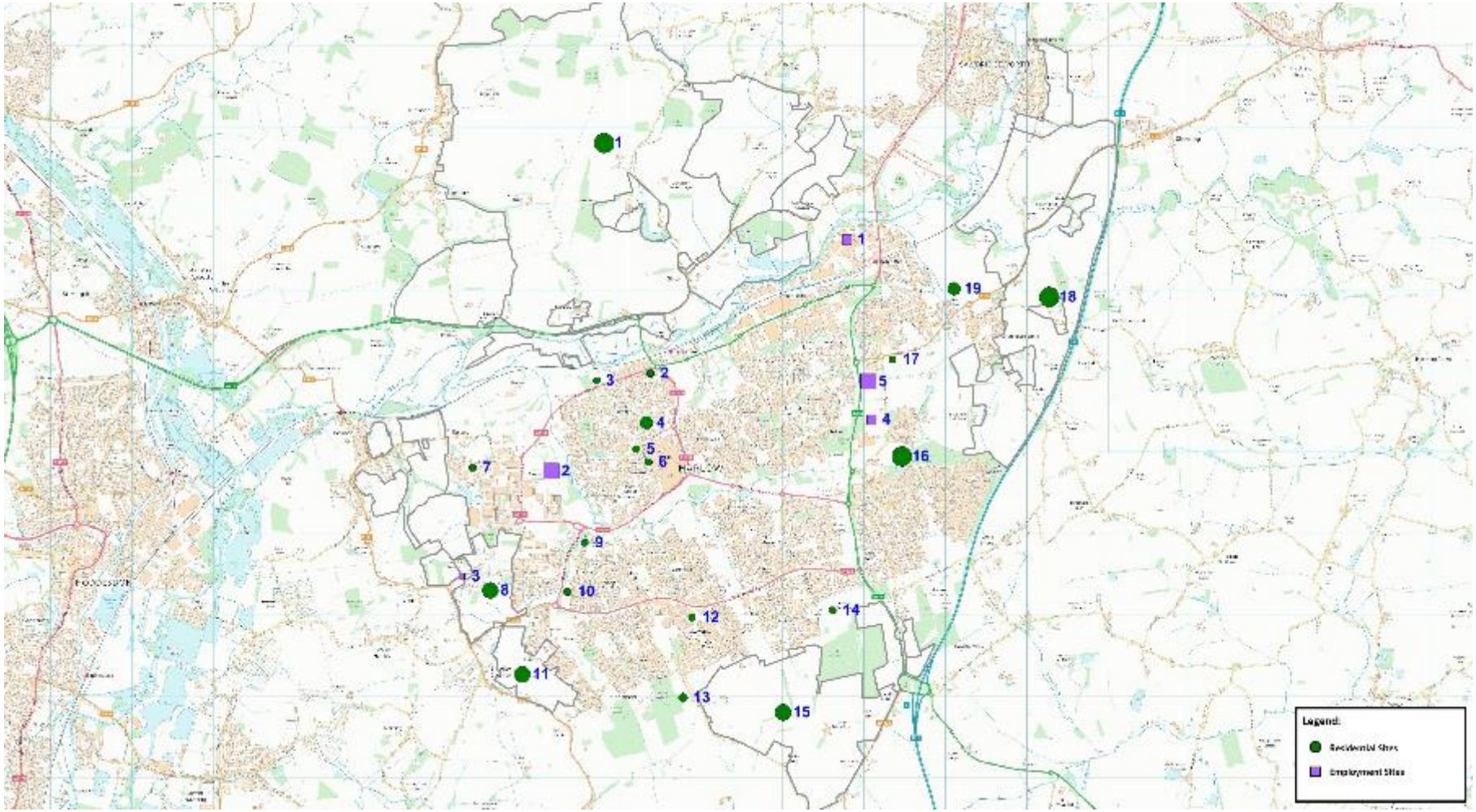
Number	Log Reference	Site	Number of Homes
1	52, 53, 65	Gilston / Terlings Park	3,242
2	307	Motorsales Site	102
3	312	Ram Gorse Site	125
4	326	Wych Elm	500
5	317	The Angle Site	69
6	299	Kitson Way Multi Storey car park	170
7	391	Greenway House	55
8	*333*	*West Katherine's*	*1,100*
9	313	Rectory Field Playing Field	70
10	314	Playing Field to the West of Deer Park	69
11	*375*	*West Sumners*	*1,000*
12	327	Barley Croft, Lower Meadow, The Briars, Copshall Close, Ayletts Field Area	125
13	311	South of Berecroft	294
14	315	Playing Field to East of Radburn Close & South of Clifton Hatch	69
15	*372*	*Latton Priory Farm/Riddings Lane*	*1,050*
16	304, 305, 305a,	New Hall	2,347
17	316	Playing Field to South of Gilden Way	67
18	325, 383	East Harlow	3,350
19	298	Land North of Gilden Way	900
-		Several small sites of fewer than 50 homes (not included on the map)	546
Total			**15,250**

The main employment sites in the wider Harlow area are listed in Table 2-2 and also plotted on Figure 2-1. Note that, as the employment elements of the Latton Priory, Latton Park and Harlow Park Nursery sites have been removed, only 8,603 jobs in the wider Harlow area are assumed for the modelling reported in this Technical Note. This compares to 15,321 jobs assumed in the Emerging Option reported in TN4.

Table 2-2 – Development Assumptions – Wider Harlow Area Employment Sites

Number	Log Reference	Site	Type	Number of Jobs
1	338	Harlow Enterprise Zone – Templefields North East	Industrial Estate	1,479
2	456	Public Health England – The Pinnacles	Business Park	3,000
3	386	Southfield Nursery	Office	72
4	337	Harlow Enterprise Zone – London Road South	Office	1,052
5	336	Harlow Enterprise Zone – London Road North	Business Park	3,000
Total				**8,603**

Figure 2-1 – Development Assumptions Map – Wider Harlow Area



3. Latton Priory

The first study objective is to identify the likely impact on the local network of traffic from the Latton Priory strategic development site, in particular, along Southern Way, using three alternative site access configurations.

3.1 Development Sites

The Uncertainty Log identified Latton Priory and Riddings Lane as possible residential developments providing 1,050 new homes within the next plan period. Both sites are within EFDC but close to the southern boundary of Harlow; the indicative location of the possible development is shown in Figure 2-1 (map reference 15).

In the transport model the Latton Priory site is located within model zone 149. The three employment developments that have been excluded from this modelling would also have been located in zone 149 and were previously assumed to comprise the following levels of jobs:

- Latton Priory (3,273 jobs),
- Latton Park (1,842 jobs), and
- Harlow Park Nursery (784 jobs).

In the Emerging Option scenario, as reported in TN4, the model runs included all of the residential and employment developments as set out in the Uncertainty Log. For this assessment, not only have some employment assumptions been changed but the assignment methodology has also been varied, with forecast development trips being assigned to an empty network in order to identify the likely specific impacts of the sites being evaluated. As such the modelling is not directly comparable to that reported in TN4.

3.2 Trip Distribution

To illustrate the distribution that has been assumed for the Latton Priory development traffic, the origins and destinations of Latton Priory trips on the network can be broadly summarised as set out in Table 3-1 and illustrated in Figure 3-1 and Figure 3-2. Since Section 3 only reports on the AM peak, the distribution in the PM peak is not shown, however, in broad terms this would be reversed.

Table 3-1- Approximate AM peak hour distribution of Latton Priory trips

	From Latton Priory	To Latton Priory
Harlow	46%	94%
Epping/North Weald	17%	-
Bishop's Stortford/Stansted	34%	6%
Saffron Walden	3%	-

Figure 3-1 – Destinations of Traffic from Latton Priory

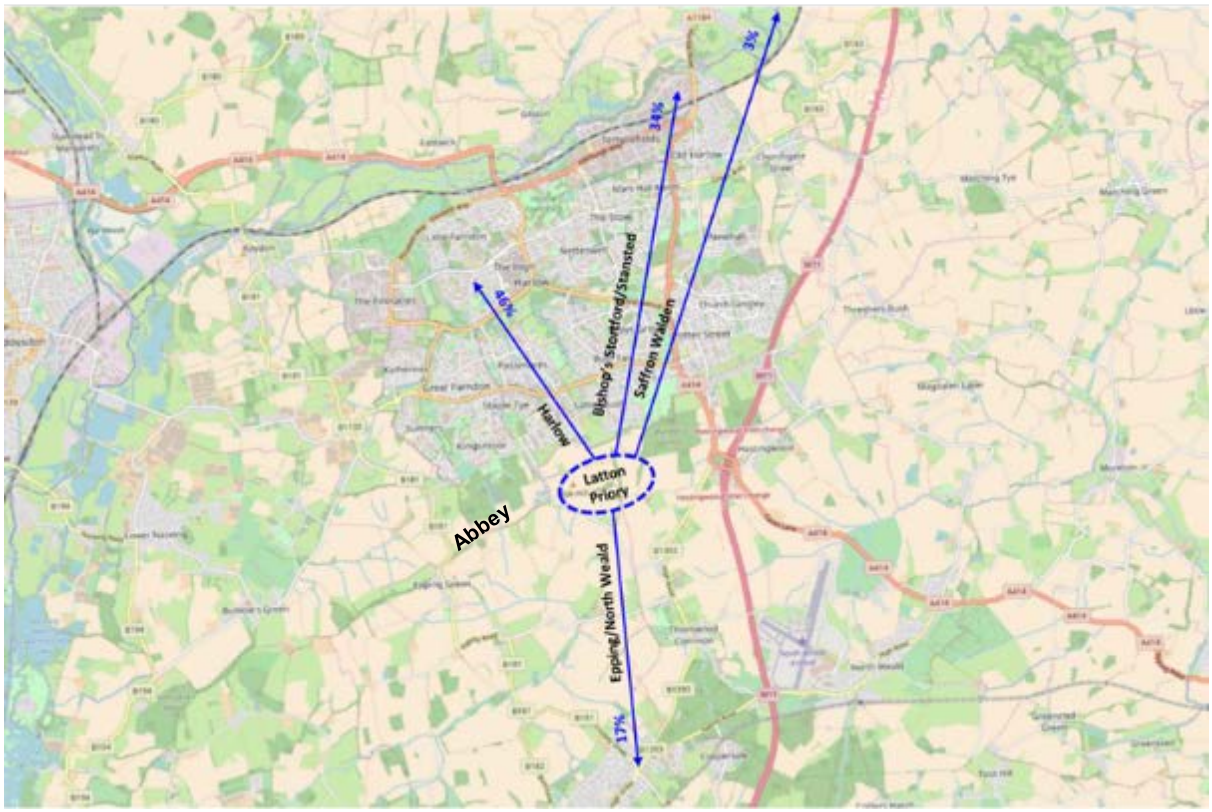
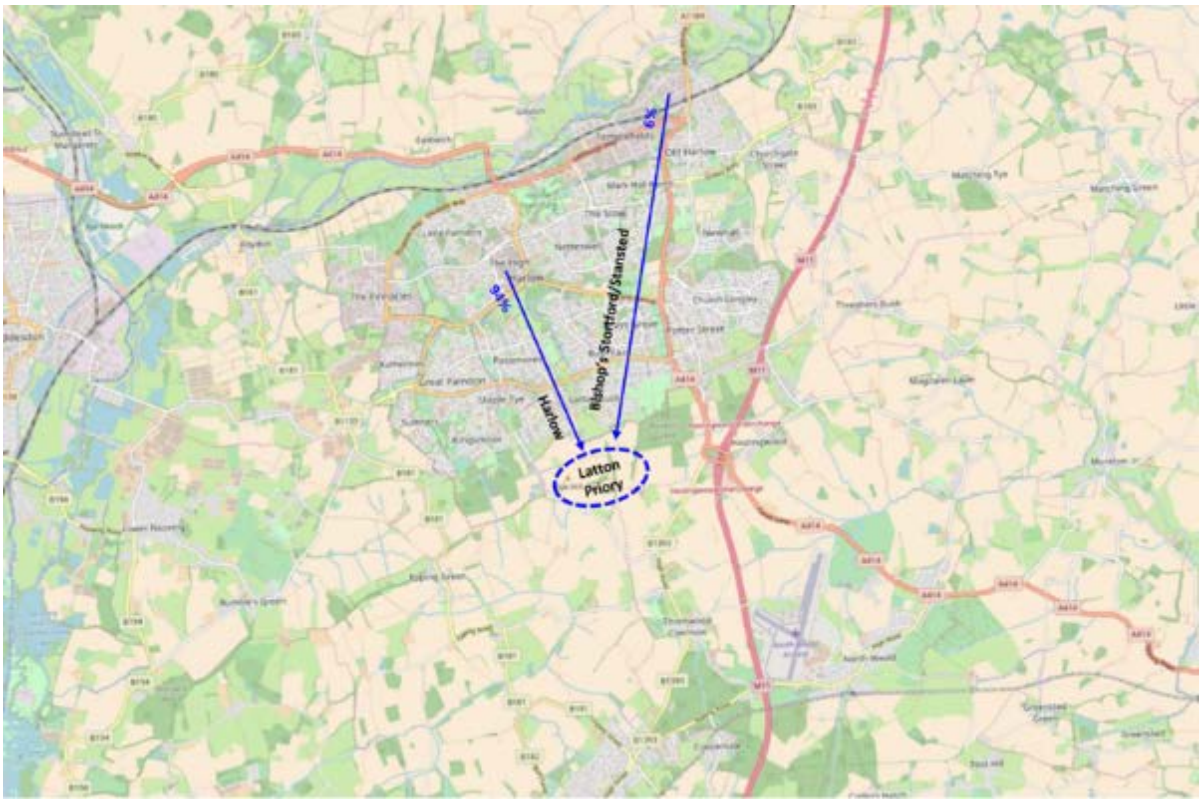


Figure 3-2 – Origins of Traffic to Latton Priory



3.3 Access Options

There are a number of potential access arrangements that could be implemented to connect the Latton Priory site with the local highway network. These include:

- Option A – Access via Rye Hill Road to the west of the site (as modelled and reported in TN4);
- Option B – Access via B1393 London Road to the east of the site; and
- Option C – Access to both west and east, including a link road through the site. It should be noted that the link road was modelled to minimise its attractiveness to through-traffic; should this site come forward, this link may be designed to more readily facilitate through-movements.

Figure 3-3 shows the indicative location of the possible link road within the Latton Priory site and its connections to Rye Hill Road and B1393 London Road. In the transport model used for this study, this link has been added, with an option to sever it, depending on which access arrangement is being evaluated, as set out above.

It should be noted that in the Emerging Option evaluation (TN4) trips relating to Zone 149 were also loaded onto the network at three other locations, to reflect the three separate proposed employment developments within the zone. As these sites have been excluded from this evaluation, these other loading points have not been utilised.

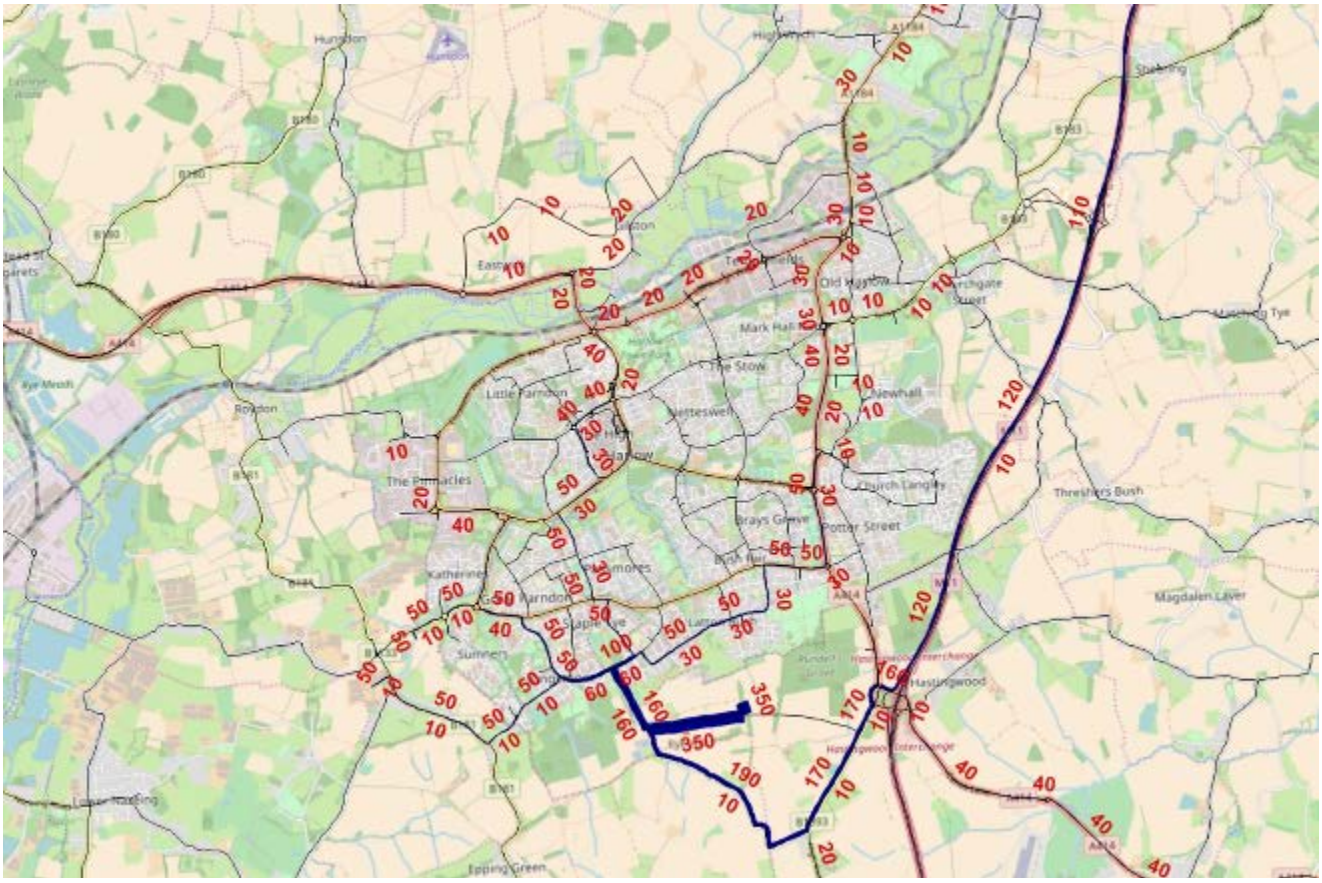
Figure 3-3 – Latton Priory Development Indicative Network Connections

The following sections evaluate each of the access options in turn and compare the likely differences.

3.4 Option A: West Access

With access to the network only permitted via Rye Hill Road in the west, Figure 3-4 shows the likely AM peak hour assignment of Latton Priory car traffic on the wider Harlow network, rounded to the nearest 10 vehicles. This shows that approximately half the traffic from Latton Priory loops south along Rye Hill Road and London Road to meet the M11 J7 roundabout. The remaining traffic heads north along Rye Hill Road and distributes itself relatively evenly towards Water Lane (to the west), along Abercrombie Way (north through Harlow) and along the A414 (northwards). This distribution may result in approximately 80-90 cars using sections of Southern Way (2-way flows).

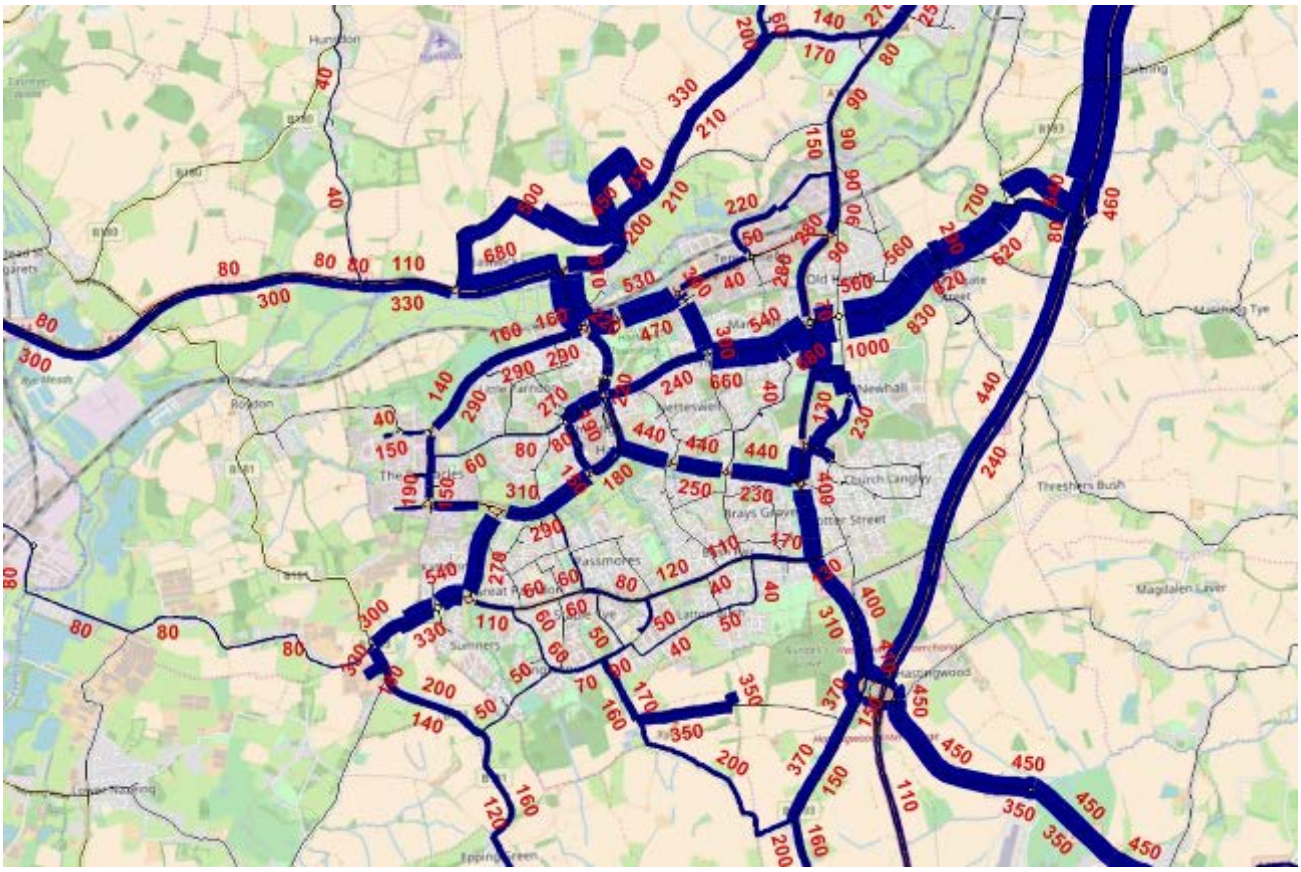
Figure 3-4 - 2033 Latton Priory Traffic Assignment Option A - West



Whilst some traffic is shown to have assigned to the minor route of Commonside Road, in reality this traffic would be expected to use Southern Way. This anomaly is likely to have arisen because Commonside Road is uncalibrated in the model. Given the strategic nature of the Visum model, and the limited extent of the data in this area, the finer detail of local network routeing carries lower confidence. However, as part of any planning application process the site promoter would be asked to investigate possible local highway impacts and put in place traffic management measures to discourage this type of routeing.

While Figure 3-4 shows the possible routeing of Latton Priory traffic on an 'empty' network, Figure 3-5 illustrates the assignment of all wider Harlow LP development traffic, again rounded to the nearest 10 vehicles, with the Option A Latton Priory access to the west. Based on the distribution of trips associated with Latton Priory, as described above, this shows that Latton Priory traffic continues to be split between connections via J7 and those towards the town centre.

Figure 3-5 – All Wider Harlow Development Traffic - Option A Western Access



3.5 Option B: East Access

With access to the network only permitted via the B1393 London Road in the east Figure 3-6 shows the likely AM peak hour assignment of Latton Priory car traffic on the wider Harlow network, rounded to the nearest 10 vehicles. This indicates that the majority of site traffic would be likely to travel through the network via the A414 and A1025 Second Avenue towards Harlow with only limited traffic using Southern Way to reach the Sumners area. Accordingly, the distribution for this option may result in considerably fewer trips on Southern Way when compared with Option A.

Figure 3-6 - 2033 Latton Priory Traffic Assignment Option B - East

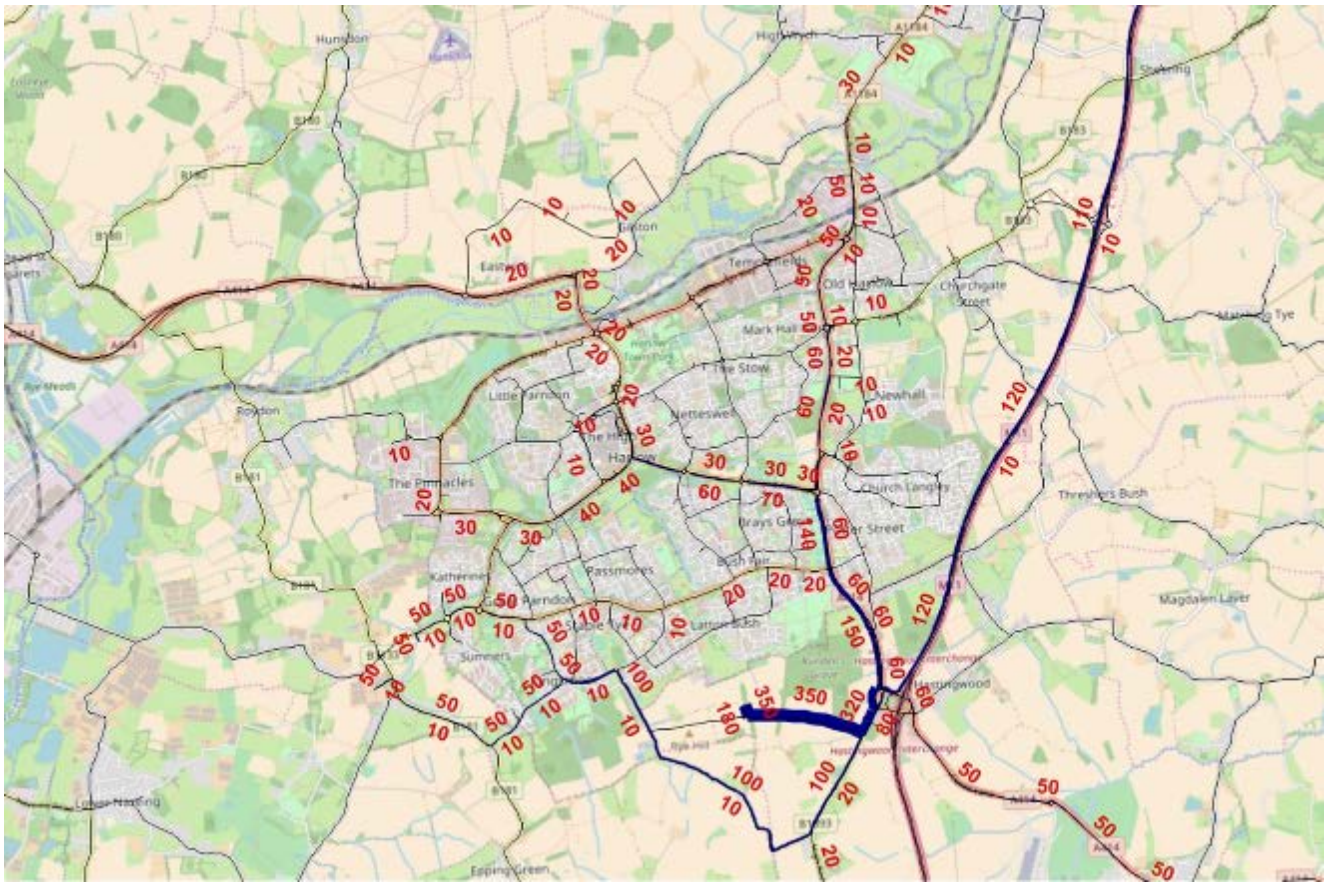
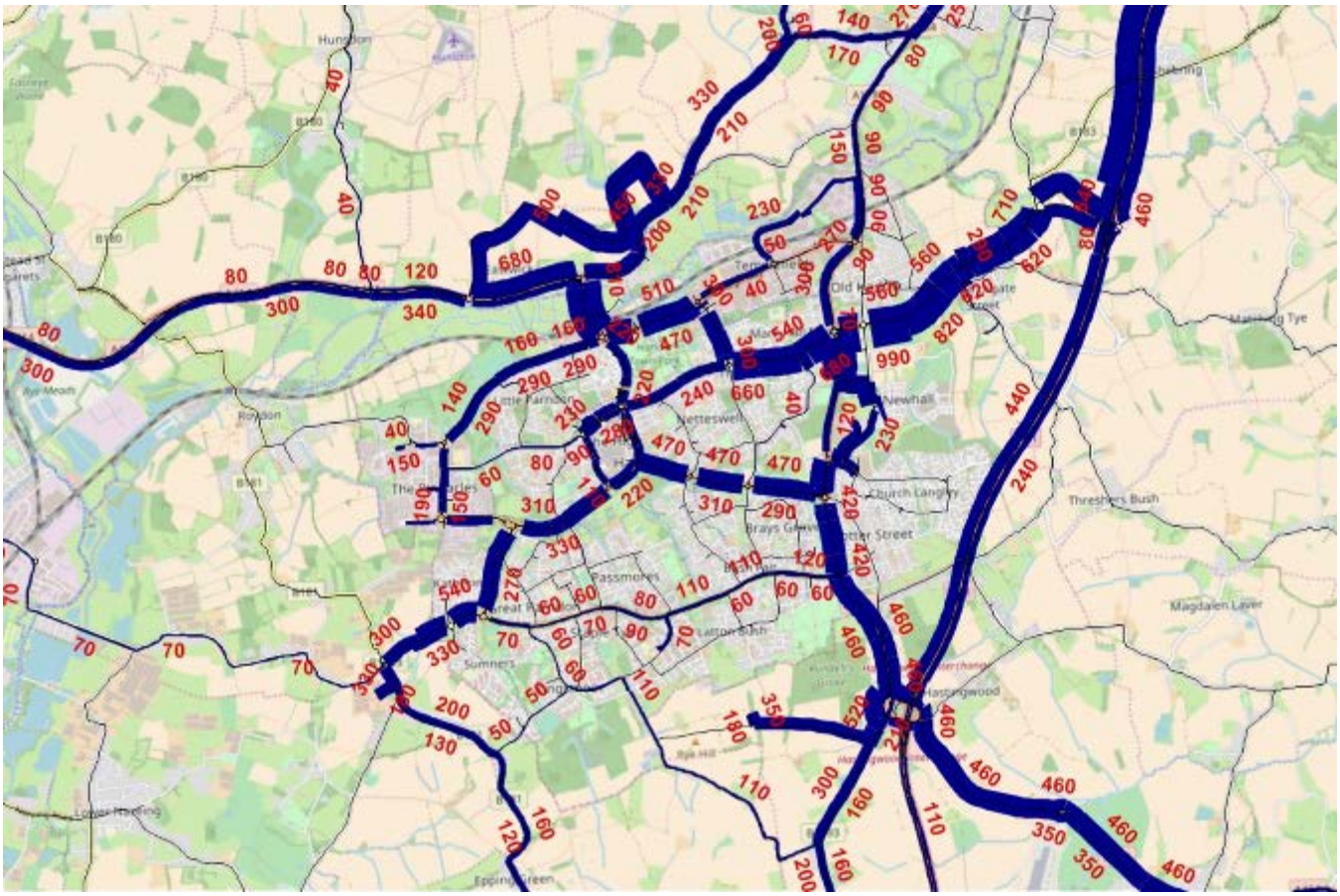


Figure 3-7 illustrates the assignment of all wider Harlow development traffic, again rounded to the nearest 10 vehicles, with the Option B Latton Priory access to the east. Like Figure 3-5, it shows Latton Priory traffic connecting directly to the more strategic routes, such as the A414 and M11, with minimal traffic routeing along Southern Way.

Figure 3-7 – All Wider Harlow Development Traffic – Option B Eastern Access



3.6 Comparison of Options A West and B East

A flow difference plot comparing the two access options was then produced, as shown in Figure 3-8, which is Figure 3-7 minus Figure 3-5, the wider Harlow development plots. Green bars are generally indicative of the Latton Priory single western access flows, and the red are indicative of the single eastern access flows, although they show positive and negative values. In the vicinity of Southern Way and Commonside Road, the negative values relate to the western access and the positive to the eastern access flows. (Note that the west side of the Latton Priory link road does not contain any flow information as the link was turned off to produce the plot.)

Figure 3-8 – Comparison of Latton Priory Option A and Option B Accesses

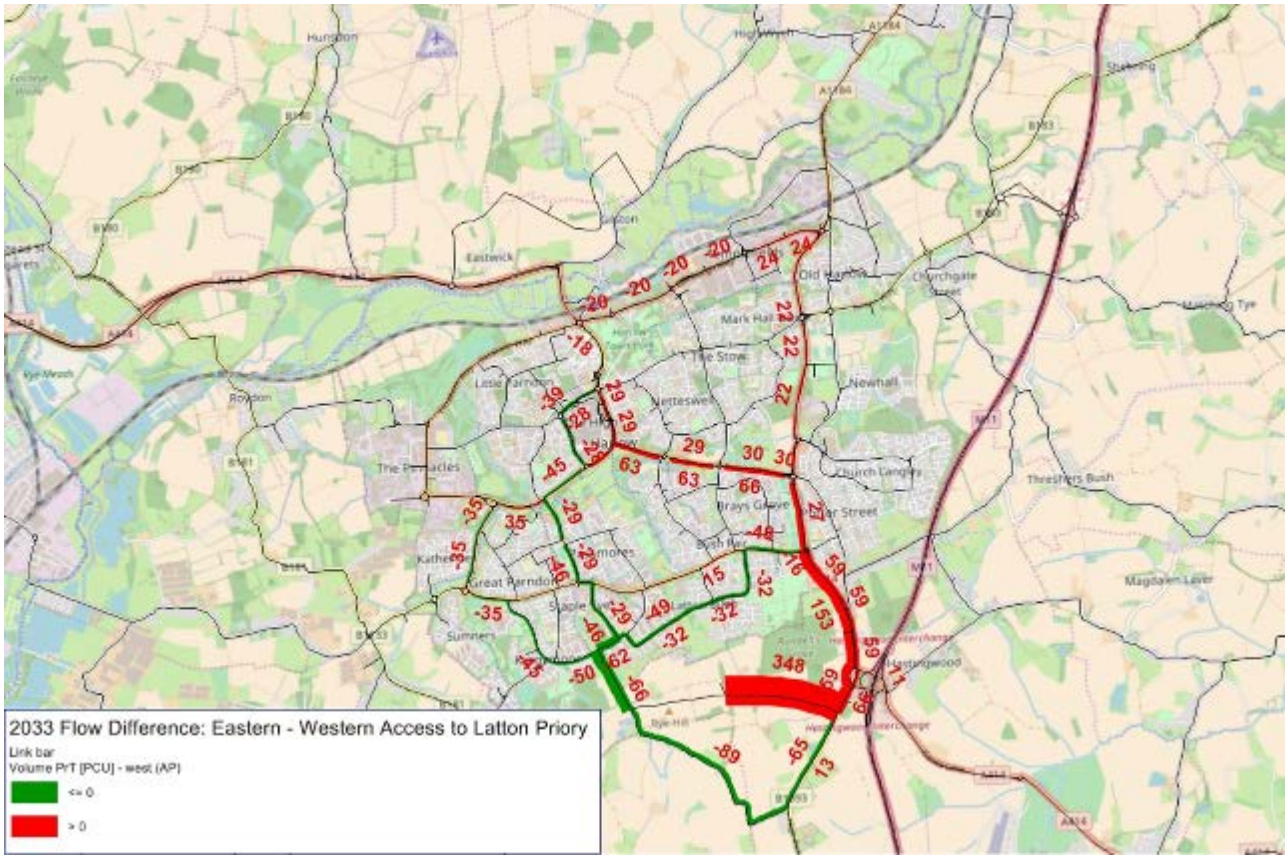


Figure 3-8 shows that the Option B eastern access is likely to result in Latton Priory traffic using more strategic routes to reach the town centre, whereas with the Option A western access traffic would tend to percolate through the more local road network.

It should be noted that the A1025 Second Avenue corridor is identified in TN4 as a corridor with worsening congestion problems with Emerging Local Plan development in place. The indication that Option B, the eastern access would be likely to increase flows on Second Avenue means that this impact should be taken into account when the more detailed Latton Priory development proposals are assessed to identify mitigation measures and contributions.

3.7 Option C: West and East Accesses with Link Road

With access to the network enabled at both the eastern and western sides with the connecting link road in place, Figure 3-9 shows the likely AM peak hour assignment of Latton Priory car traffic on the wider Harlow network, rounded to the nearest 10 vehicles. This indicates that approximately one third of departing traffic would be likely to use the western access route, and two thirds use the eastern access. The most significant routeing within Harlow is shown to be along the A414 and westwards towards Water Lane. Of significance is the indication that very few east-west movements across the town would be likely to take place with the link road in place, so this option would be likely to have the least impact on both Southern Way and Second Avenue.

Figure 3-9- 2033 Latton Priory Traffic Assignment Option C Link Road Access

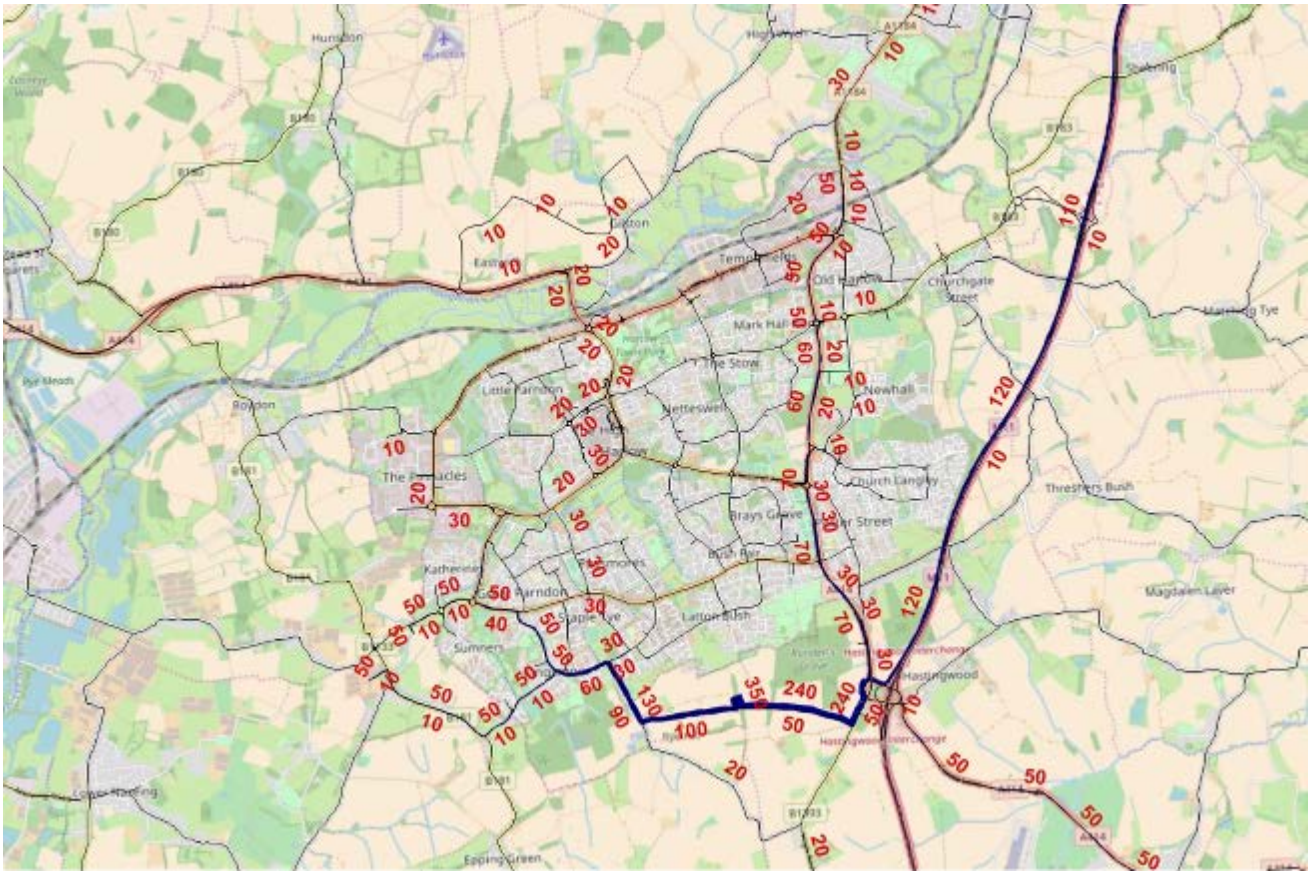
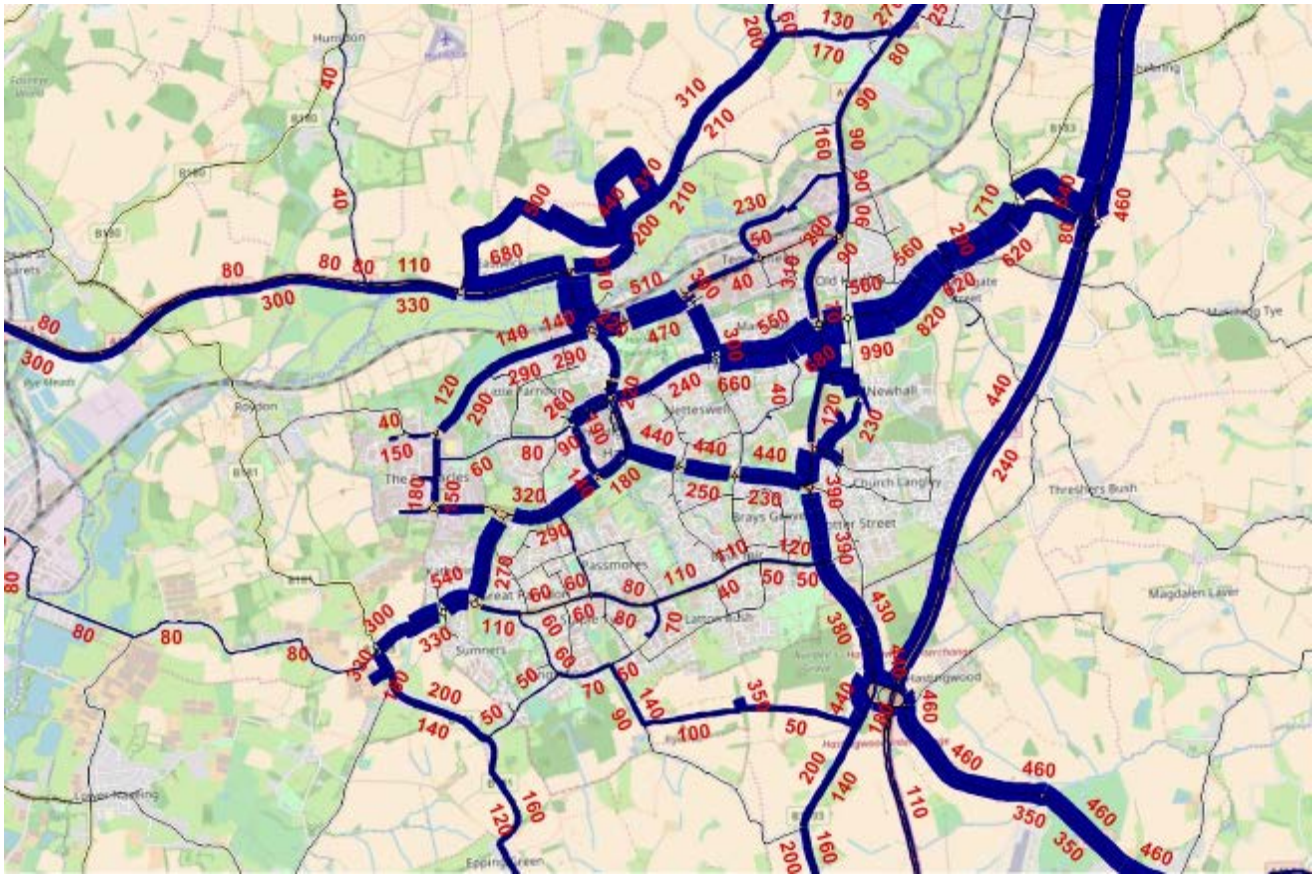


Figure 3-10 shows the likely local network flows with all of the wider Harlow developments and with the Latton Priory link road fully open in both directions. As per the commentary above, the distribution is very similar to that shown in Figure 3-7 with Option B the eastern access but with marginally less east-west movement of traffic through Harlow on Second Avenue and Southern Way.

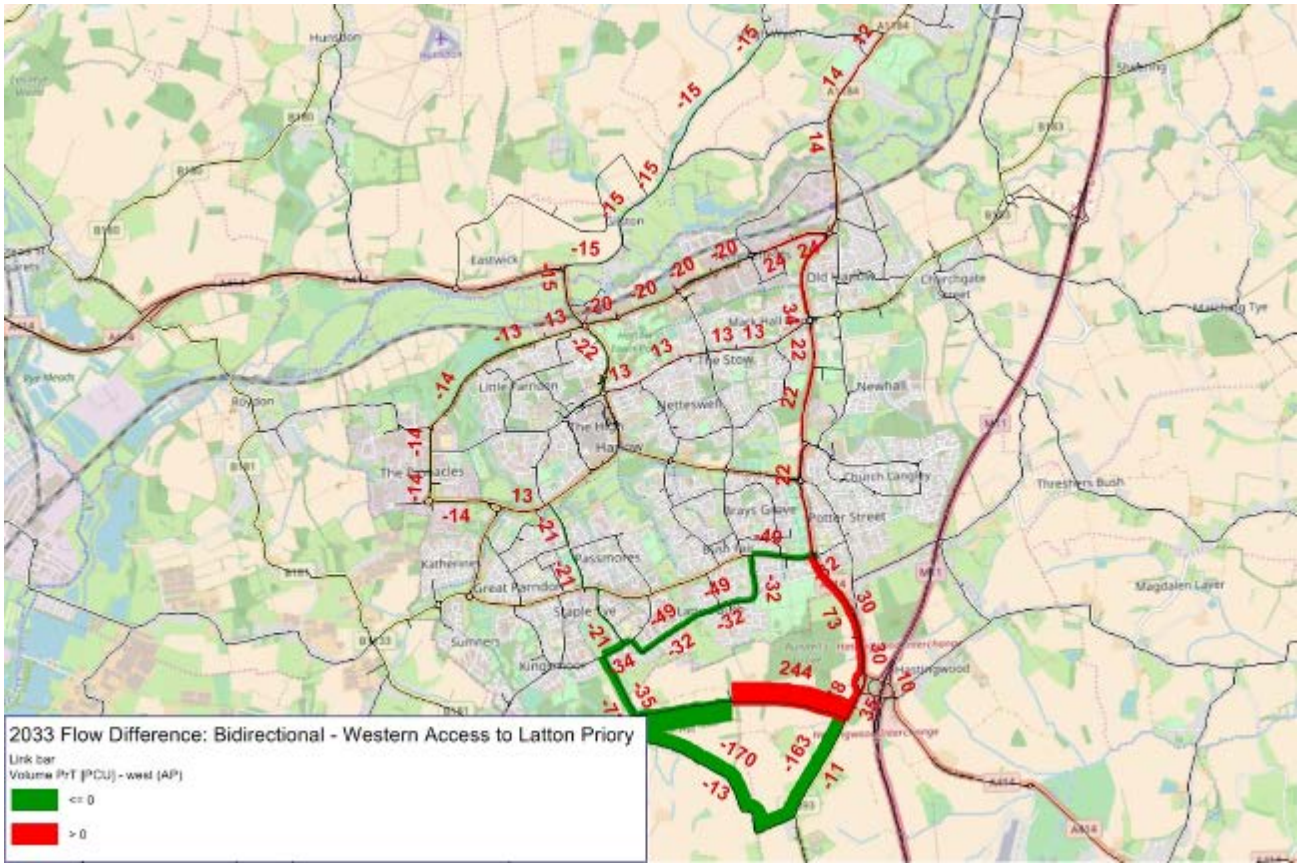
Figure 3-10 – All Development Traffic – Option C Latton Priory Link Road Open in Both Directions



3.8 Comparison of Options A (West) and C (Both East and West)

Figure 3-11 shows a comparison of Option C, the link road, and Option A, the western access, with wider Harlow development flows, i.e. Figure 3-10 minus Figure 3-5. As would be expected, some Latton Priory traffic would be likely to make use of the eastern access, which would result in less traffic using Rye Hill Road and the local highway network in the south of the town, including Trotters Road, Commonside Road and sections of Southern Way.

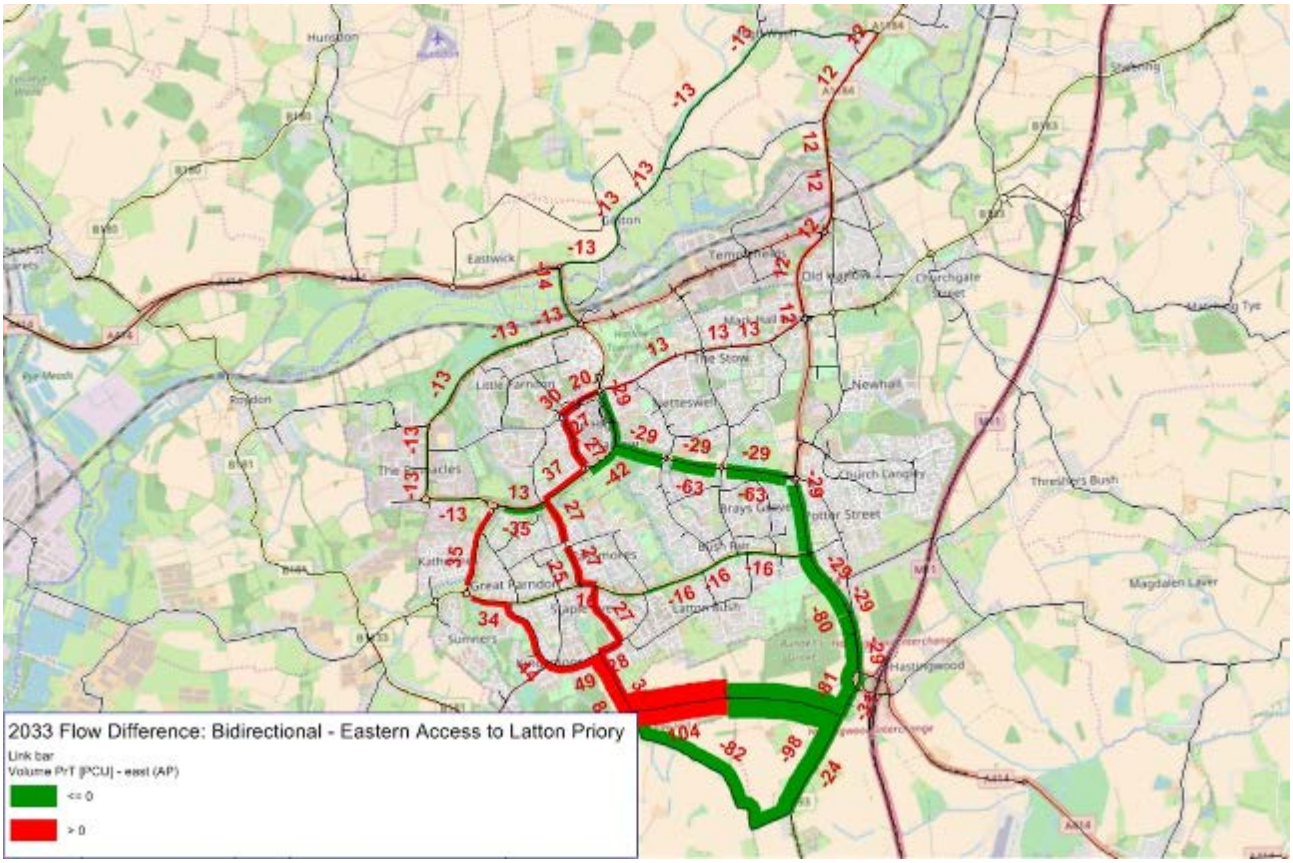
Figure 3-11 – Comparison of Latton Priory Option C Link Road and Option A West



3.9 Comparison of Options B and C

For completeness, Figure 3-12 shows a comparison of the assignment for wider Harlow developments with the access road open in both directions with when it is open to the east only – that is the flows shown in Figure 3-10 minus Figure 3-7. While the Latton Priory promoters have indicated that they may commence site development phasing from the west via the Rye Hill Road access (Option A), it is considered that delivering the eastern access (Option B) first may be preferential from a planning perspective, if the full link road (Option C) cannot be delivered from the outset, and depending on the ability to deliver attractive direct sustainable travel connections to the town from this site at an early stage.

Figure 3-12 – Comparison of Latton Priory Option C Link Road with Option B East



In Figure 3-12 it can be seen that there would generally be likely to be more traffic in the south west of the town with just the eastern access in place and less traffic on the strategic routes of the A414 and A1025 Second Avenue; the difference on Southern Way is slightly reduced westbound.

3.10 Latton Priory Access Summary

Overall, as set out above, allowing access in both directions via a link road (Option C) would be likely to distribute Latton Priory traffic more evenly and more appropriately across the local and strategic road network. With regard to likely impact on Southern Way, Option C would be likely to have the least impact, and Option A (western access) would be likely to have the most impact on this corridor and on the south west of Harlow. In addition, it would be likely that vehicle distances would be reduced with the link road in place as more development trips would be able to assign to more direct, shorter routes.

4. West Katherine's and West Sumners developments

The study objective reported in this section is to consider the effect of traffic from West Katherine's and West Sumners strategic development sites on the surrounding local highway network, particularly but not exclusively along Southern Way.

To provide a worse-case scenario it has been assumed that access to the Latton Priory site from the two south-western sites would be via the Option A single western access.

4.1 Development Sites

As shown in Figure 2-1 and listed in Table 2-1 and Table 2-2, the following sites are those which relate to the West Katherine's and West Sumners analysis, and are all contained in transport model zone 140:

- 8 – West Katherine's, 1100 homes;
- 11– West Sumners, 1000 homes; and
- 3 – Southfield Nursery, Old House Lane, office development, assumed to provide 72 jobs.

It should be noted that, as site access arrangements had yet to be determined when this study was commissioned, it was assumed that the trips for this model zone would be loaded onto the road network at two locations: the B181 Epping Road and the B1133 Water Lane, with the amount of traffic assumed to be loaded on each connector split more or less equally. In reality it is now considered more likely that the loading point for both of these sites will be primarily onto the B1133 Water Lane. The assumptions for how the sites are connected to the network will affect the route choice of trips.

4.2 Trip distribution

The key destinations and directions of travel to and from West Katherine's and West Sumners as used in the modelling are shown in Table 4-1 and illustrated in Figure 4-1.

Table 4-1 – Approximate AM Peak Hour Distribution of West Katherine's and West Sumners Trips

To	From West Katherine's and Sumners	To West Katherine's and Sumners
Harlow	70%	68%
Cheshunt	4%	-
Hertford	3%	-
Epping/Loughton/Chigwell/North Weald	19%	24%
Bishop's Stortford/Standed	4%	8%

Figure 4-1 – Destinations of Traffic from West Katherine's and West Sumners

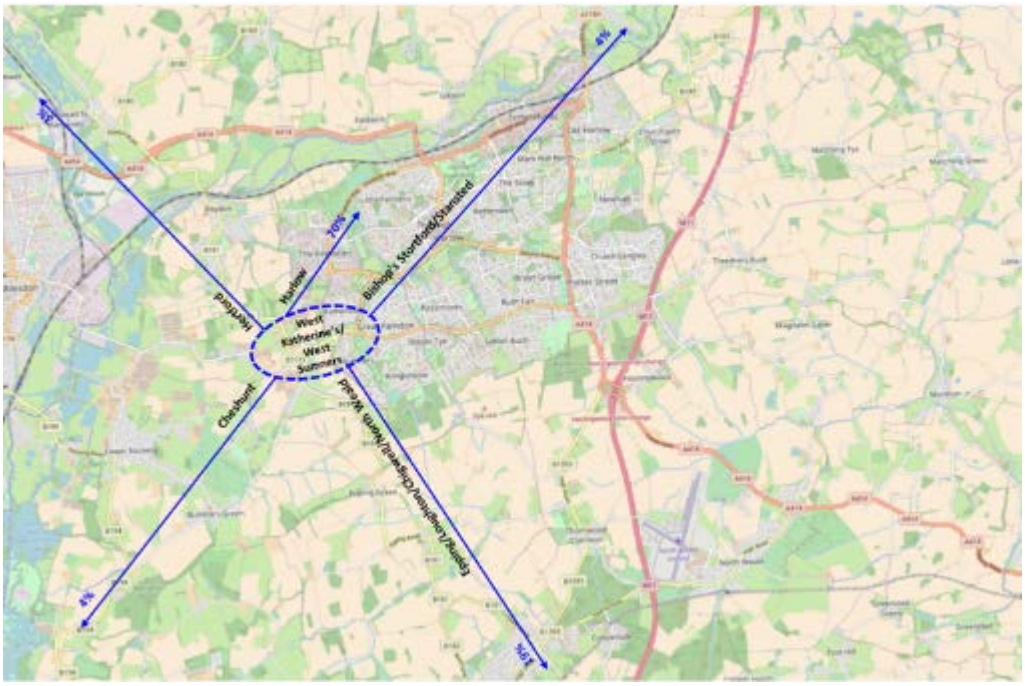
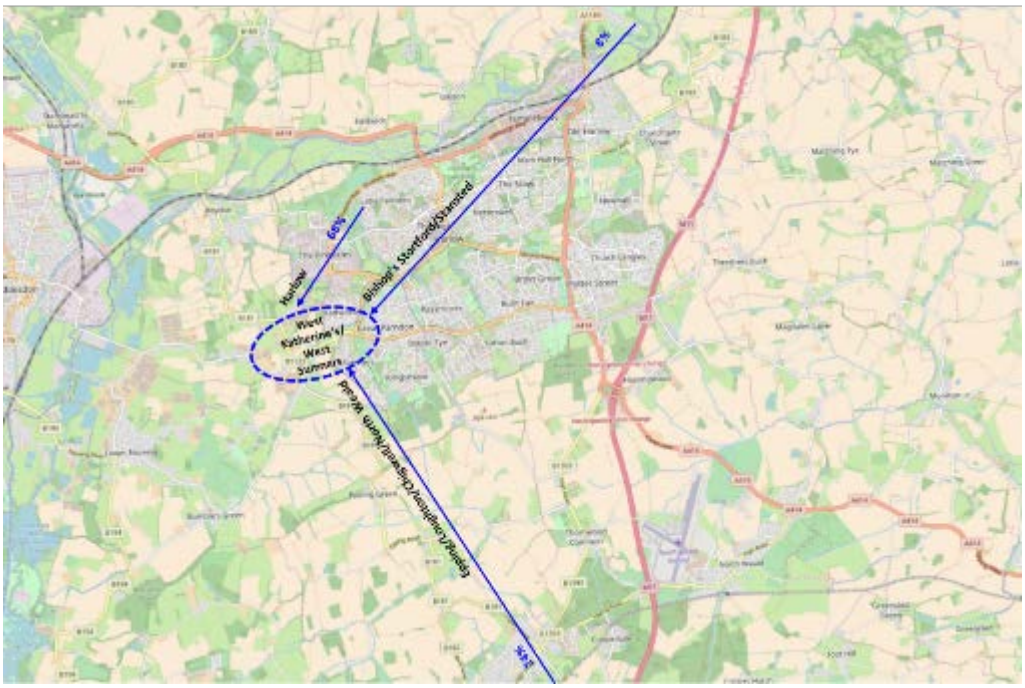


Figure 4-2 – Origins of Traffic to West Katherine's and West Sumners



4.3 Traffic assignment: AM

Figure 4-3 and Figure 4-4 show a select-zone analysis of trips from both the West Katherine's and West Sumners development sites in the AM-peak. In the detailed view in Figure 4-3 it can be seen that approximately three-quarters of the traffic would be likely to head towards Harlow, the majority using Katherine's Way, and one-fifth using Southern Way. The remaining traffic would be likely to head south along the B181.

Figure 4-3 – Detailed View of Traffic Assignment from and to West Katherine's and West Sumners

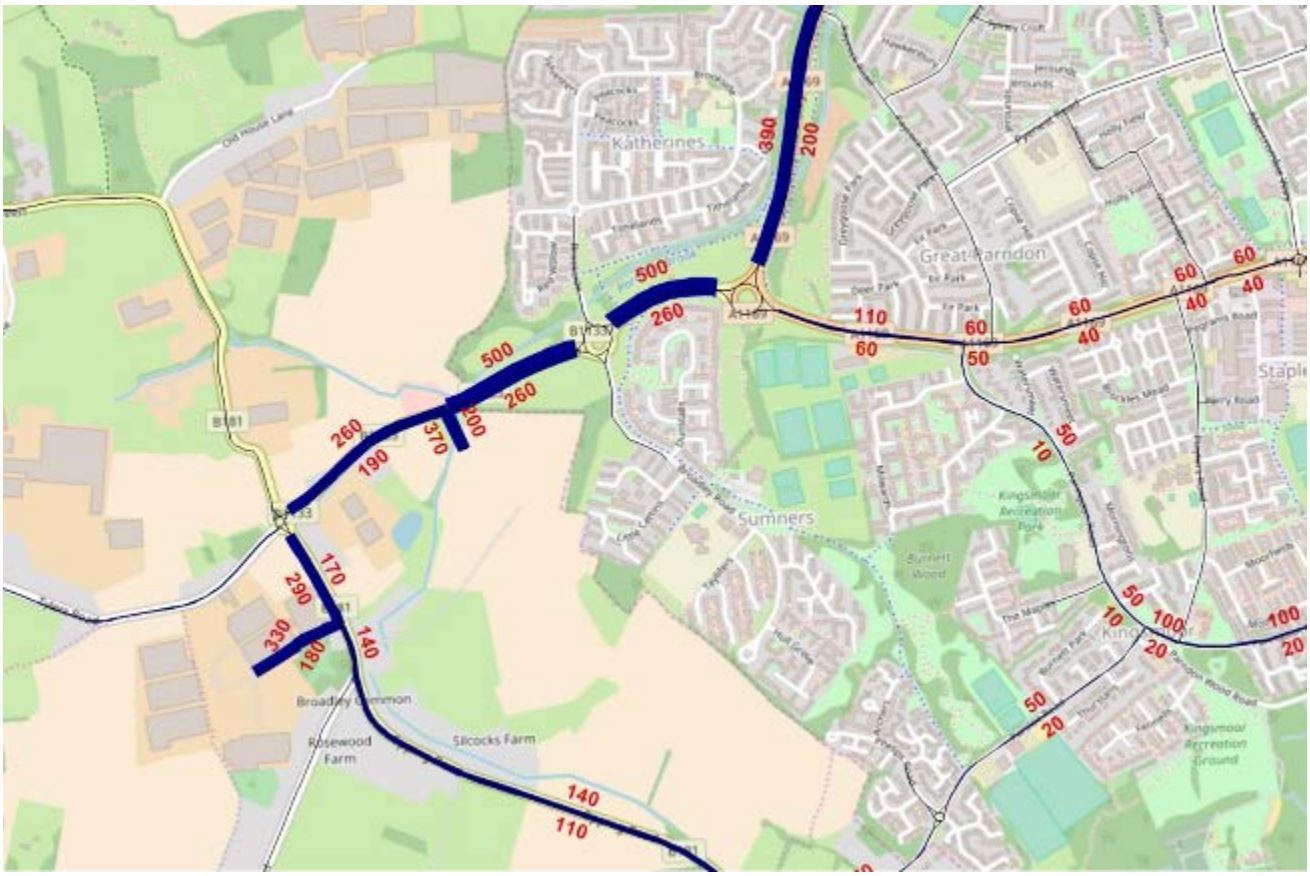


Figure 4-4 shows a wider view of the assignment of the traffic from the two sites in the model across the wider Harlow area onto an empty network, so it does not take into account any congestion effects which would be likely to influence routeing.

It can be seen that traffic is likely to be generally spread out east-west across the whole network 'grid', with half of the 500 trips routeing along A1025 Second Avenue and the rest split more or less evenly between Southern Way, First Avenue and A414 Edinburgh Way.

With regard to the impact on Southern Way itself, it can be seen that these south-western development sites are likely to have a greater impact than would Latton Priory, not only due to the need for trips to travel further to reach the wider strategic network, but also because these two sites combined are modelled at twice the size of the Latton Priory site. But while the contribution of traffic from Latton Priory onto Southern Way can be minimised by allowing access to the east or in both directions along the proposed link road (see Chapter 3), other traffic management measures would need to be considered to reduce traffic from West Katherine's and Sumners routeing along Southern Way. It should be noted that the Latton Priory link road has been modelled to be relatively unattractive to through traffic. If the link were to be designed to more readily facilitate some through traffic, this may reduce the tendency to use Southern Way. Care should be taken in its design, however, in order to limit its attractiveness as a possible southern bypass to access key destinations like The Pinnacles.

Figure 4-4 – Traffic from West Katherine's and West Sumners

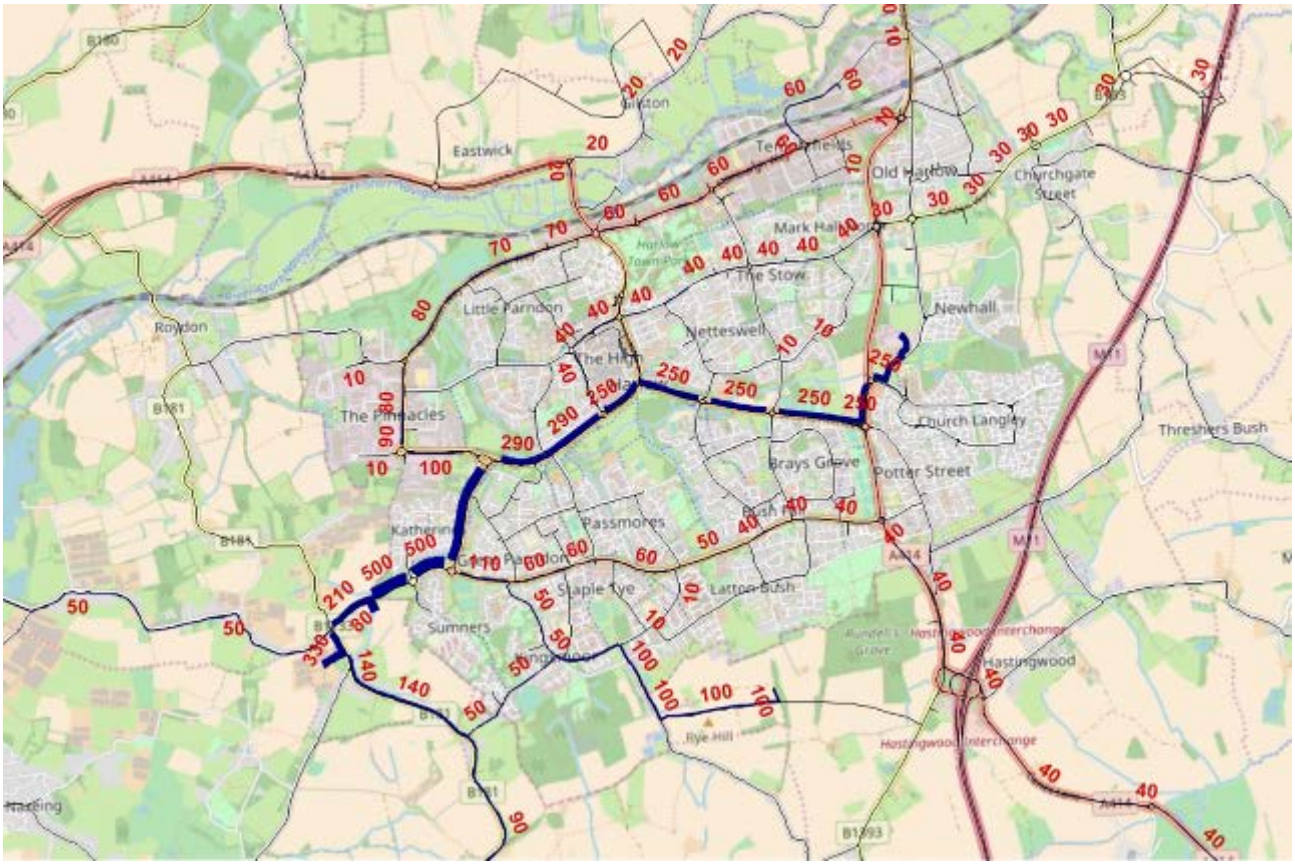
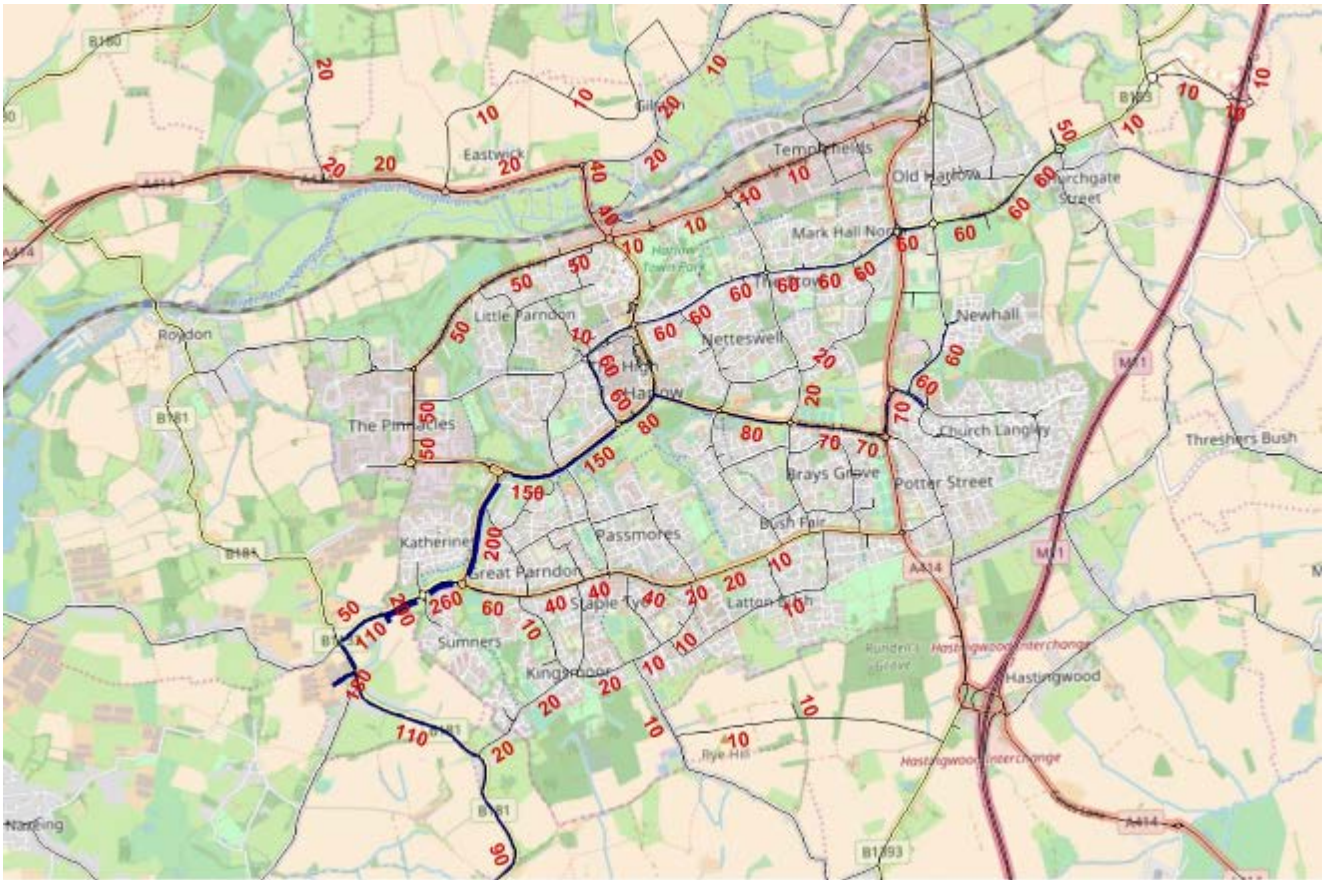


Figure 4-5 shows the traffic arriving at West Katherine's and West Sumners. It can be seen that similar routeing choices to those illustrated in Figure 4-4 are evident although the proportions vary, with traffic split more evenly across the A414 Edinburgh Way, First Avenue, A1025 Second Avenue and Southern Way routes.

Figure 4-5 – Traffic to West Katherine's and West Sumners



While care must be taken in comparing this model with the Emerging Option model presented in TN4, as the amount of traffic generated by West Katherine's and West Sumner's developments forms a relatively small proportion of the overall growth, it would still be likely that these developments would contribute additional traffic at locations which have been identified as congested either currently or in the forecast reference case scenario. As such their impacts will need to be assessed in more detail as the planning process progresses.

5. Southern Harlow Traffic Management

5.1 Traffic Management Measures

To address the potential issues from additional developments in the south and west of Harlow, a series of traffic management measures to reduce possible impacts on Southern Way have been identified. These are illustrated in Figure 5-1, and were presented to Harlow District Council in early 2017. The objectives of these proposed improvements are to relieve traffic impact on Southern Way by increasing the attractiveness of other routes from West Katherine's and West Sumners, and decreasing the attractiveness of Southern Way. (As impact from Latton Priory can be managed by allowing access to the east (or both the west and the east) on a proposed link road, traffic management measures only need to consider the impact on West Katherine's and Sumners traffic.)

Figure 5-1 - Possible transport and traffic management interventions in southern Harlow

Initial proposals for possible junction improvements and modifications are illustrated in Figure 5-2 and Figure 5-3. Other improvements in accessibility, with additional crossing facilities for pedestrians and cyclists and speed limit reductions along Southern Way, are also proposed.

Figure 5-2 - Possible Improvements at A1025 Third Avenue and Abercrombie Way Junction

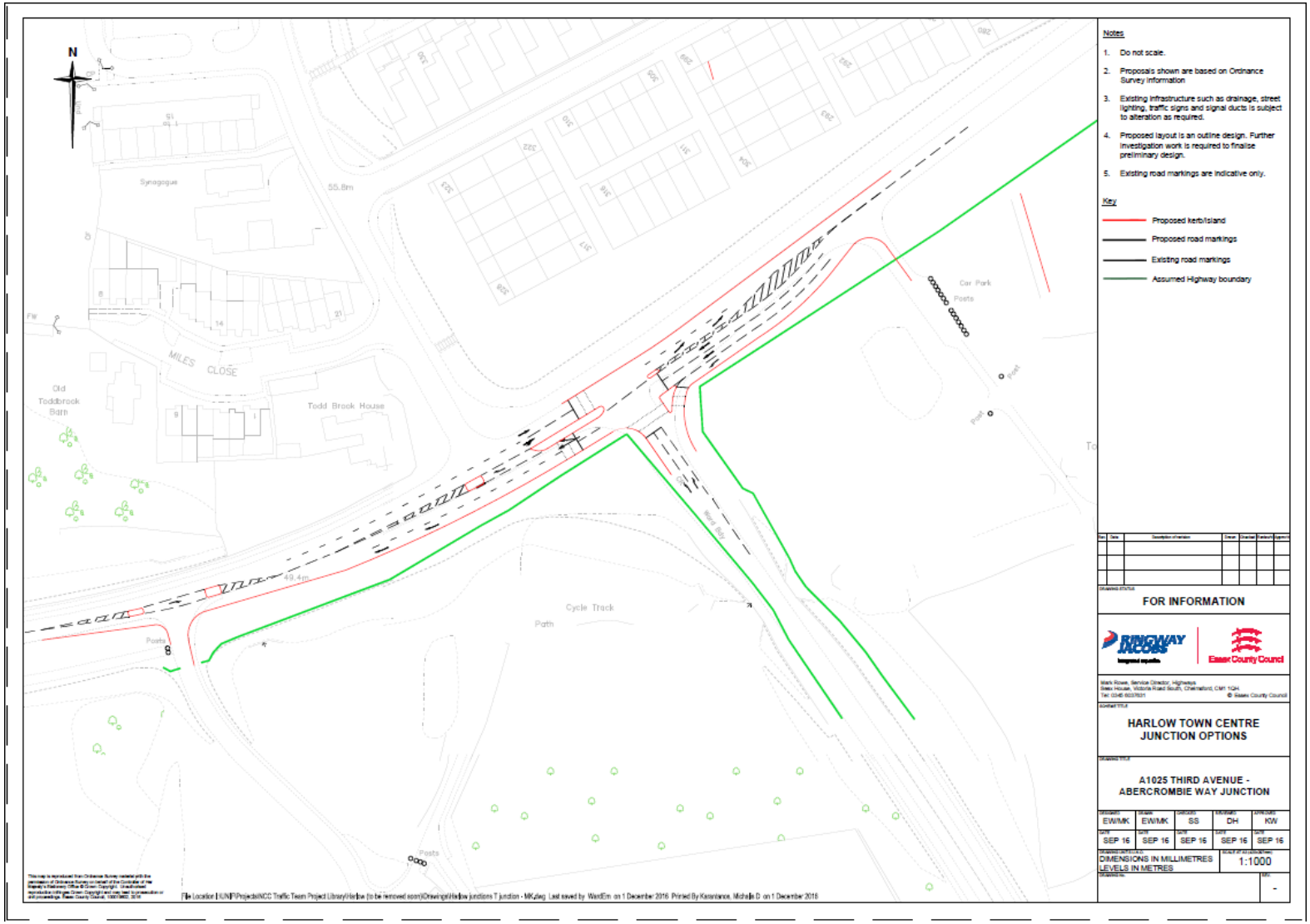
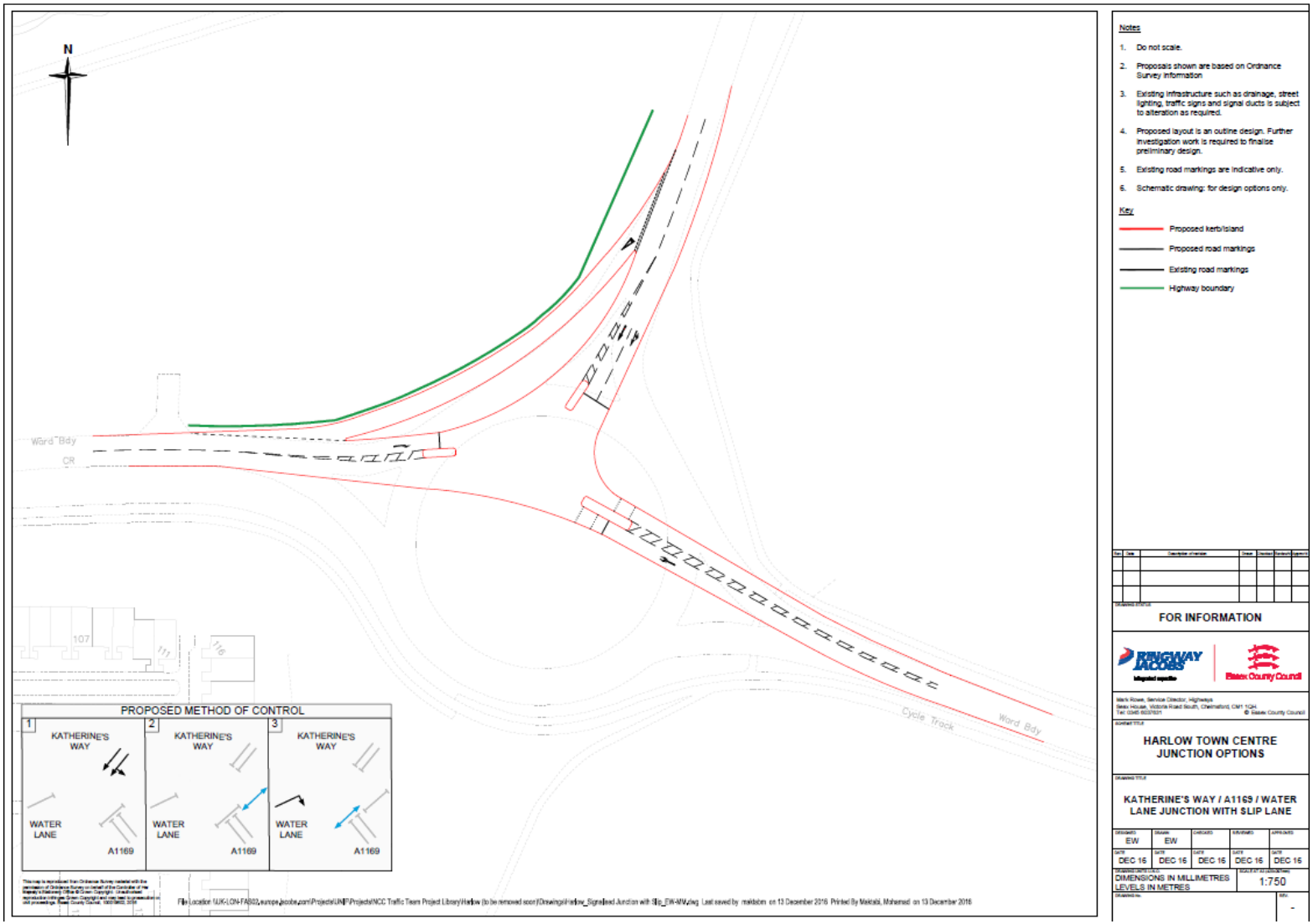


Figure 5-3 - Proposed Reconfiguration of A1169 Katherine's Way/A1169 Southern Way /B1133 Water Lane Junction



The model was first re-run to provide outputs for the updated Latton Priory site, i.e. jobs attributable to Latton Priory were removed from the matrix and the Latton Priory site was assumed to include the link road to enable access from both the west and the east (Option C), together with through movements. These updated outputs are reported first in each of the next two sections. To model the effects of these mitigation proposals, the model network was updated to include the proposed junction layout changes. A further test which incorporated the proposed speed reduction measures likely to result from additional crossings and a speed limit reduction from 40mph to 30mph was then applied to the network.

It should also be noted that that connectors used for arrivals and departures to the developments in Zone 140 have not been altered in order to ensure that the assignment of trips on the network is similar to that shown in Chapter 4. Keeping the connectors to Zone 140 constant also helps to identify the effect of the junction changes and traffic management measures.

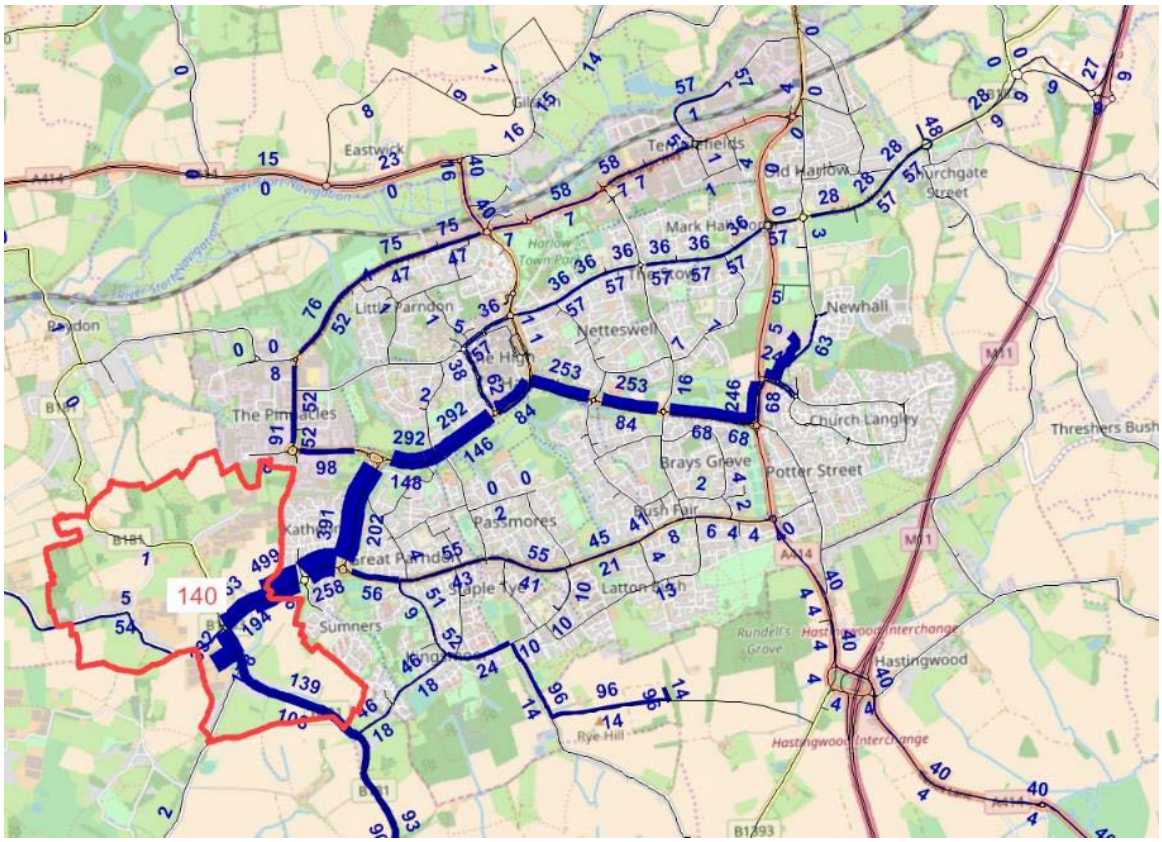
As in the previous chapters, only development related trips have been loaded onto the network. Sections 5.2 and 5.3 identify the effects of mitigation measures in the AM and PM peak hours, respectively, by showing:

- Arrivals and departures at Zone 140 with the Latton Priory updates
- Arrivals and departures at Zone 140 with the Latton Priory updates and the junction changes
- All development traffic with the Latton Priory updates and the junction changes
- Arrivals and departures at Zone 140 with the Latton Priory updates, the junction changes and the speed reduction
- All development traffic with the Latton Priory updates, the junction changes and the speed reduction
- Change in flows before and after the junction changes and speed reduction for all development traffic

5.2 Effect of Mitigation Measures: AM Peak Hour

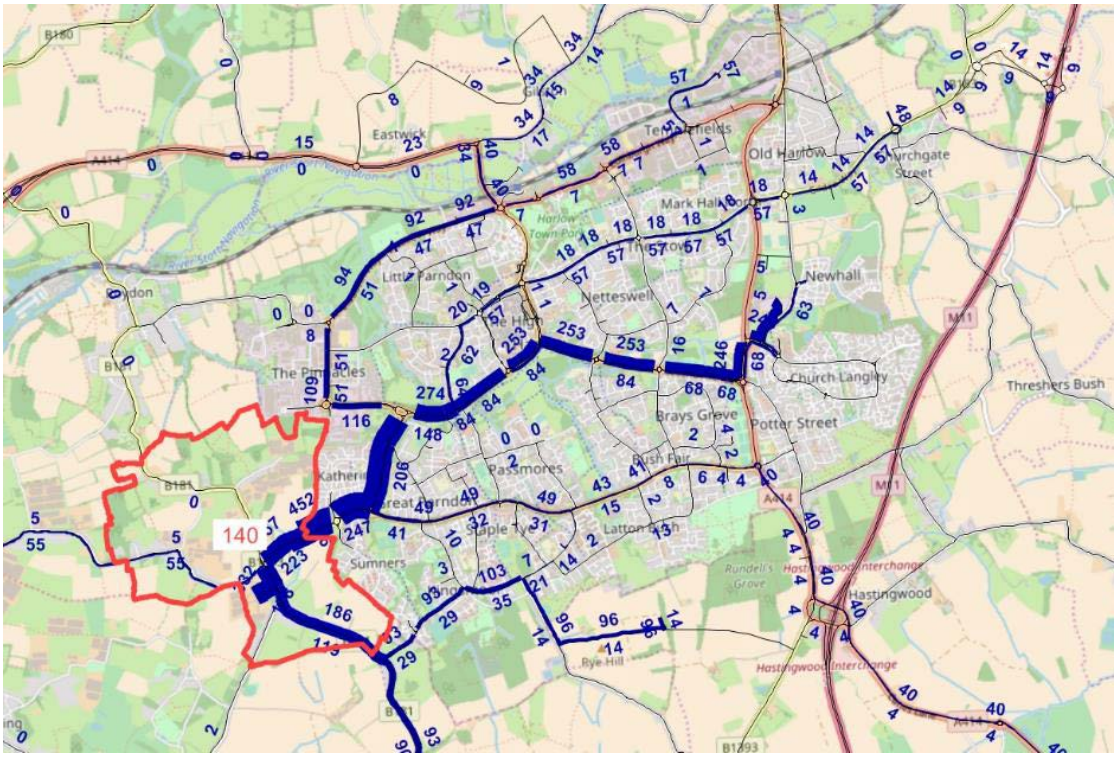
With the Latton Priory updates the AM peak traffic associated with the south-western sites (zone 140 in the model) is shown in Figure 5-4. It can be seen that traffic associated with the south-western sites is assigned with approximately 60% of the total two-way trips likely to use Katherine's Way, around 25% would use B181 Epping Road, and around 15% Southern Way.

Figure 5-4 – South-Western Sites Updated 2-Way Traffic Assignment: AM Peak Hour



With the proposed changes in junction design in place, Figure 5-5 illustrates the revised two-way flows which indicate that the proportion of south-western sites traffic using Katherine's way remains the same at around 60%, while the flows on Southern Way would be likely to reduce to 10%, with an equivalent increase to 30% in traffic using the B181 Epping Road. This indicates that the junction modifications make Southern Way less attractive, but that re-routeing to the south is likely to be more attractive than travelling through the town.

Figure 5-5 – South-Western Sites 2-Way Traffic with Junction Re-Design – AM Peak Hour



The assignment of AM peak hour traffic to and from West Katerine's and West Sumners is shown in Figure 5-6 with all mitgiation measures in place. The proportion of south-western sites traffic using Katherine's Way would be likely to increase slightly to around 60%, while that using the B181 Epping would increase to around 33%. Development flows along Southern Way would reduce to around 5%, indicating that the combination of the junction layout changes and the traffic management measures is likely to be an effective deterrent to south-western sites traffic useage.

Figure 5-6 - South-Western Sites 2-Way Traffic with All Mitigation– AM Peak Hour

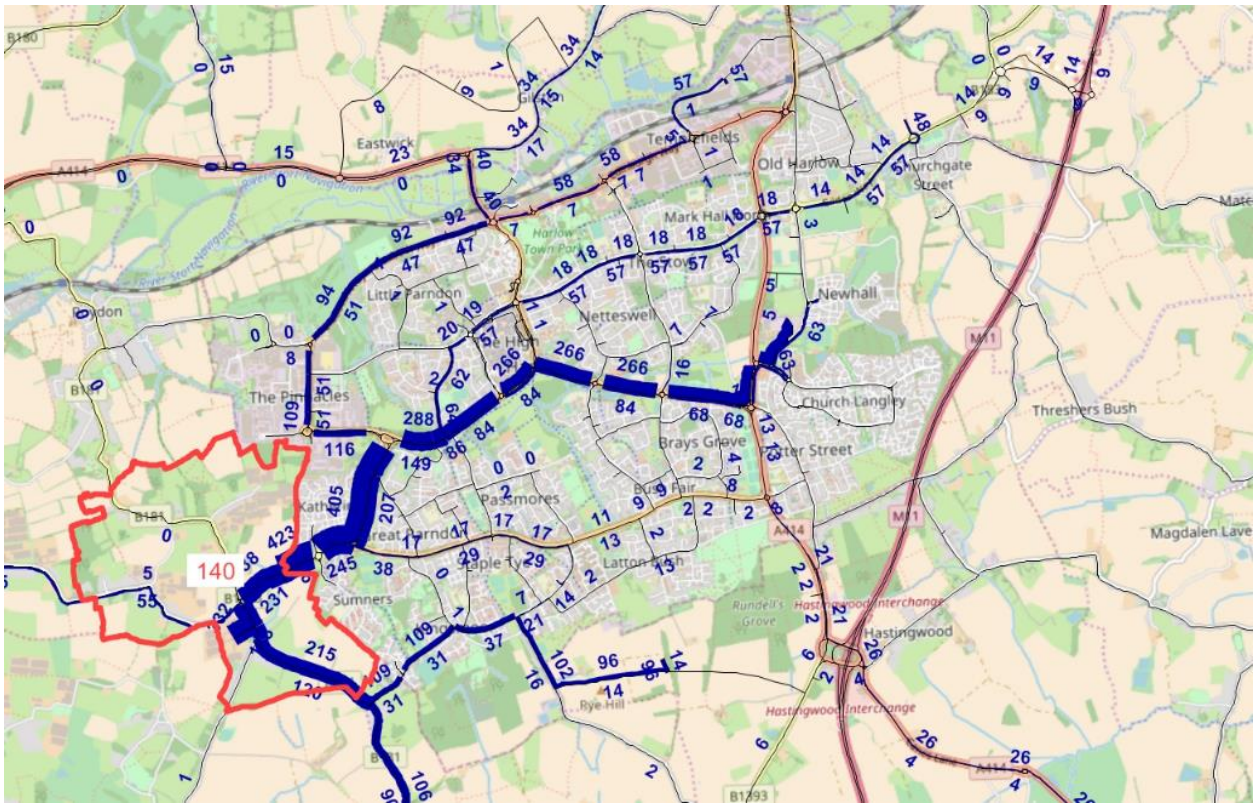


Figure 5-7 illustrates the likely two-way flows in the AM peak of the Latton Priory updates when all of the wider Harlow area developments are assigned. This shows that the other sites within Harlow would be likely to have the most impact on the more strategic routes across the town, particularly the A414 and the Gilden Way/J7a link road which is to be expected as the sites in the north and east comprise more than 6,000 homes. The other sites would also be likely to have an impact on the south and west of the town, with an increase of approximately 90% on Katherine's Way over the flows associated with the south-western sites. The increase on Southern Way would be likely to be around 35% and on B181 Epping Road around 40%.

Figure 5-7 – Wider Harlow Development Updated 2-Way Traffic Assignment – AM Peak Hour

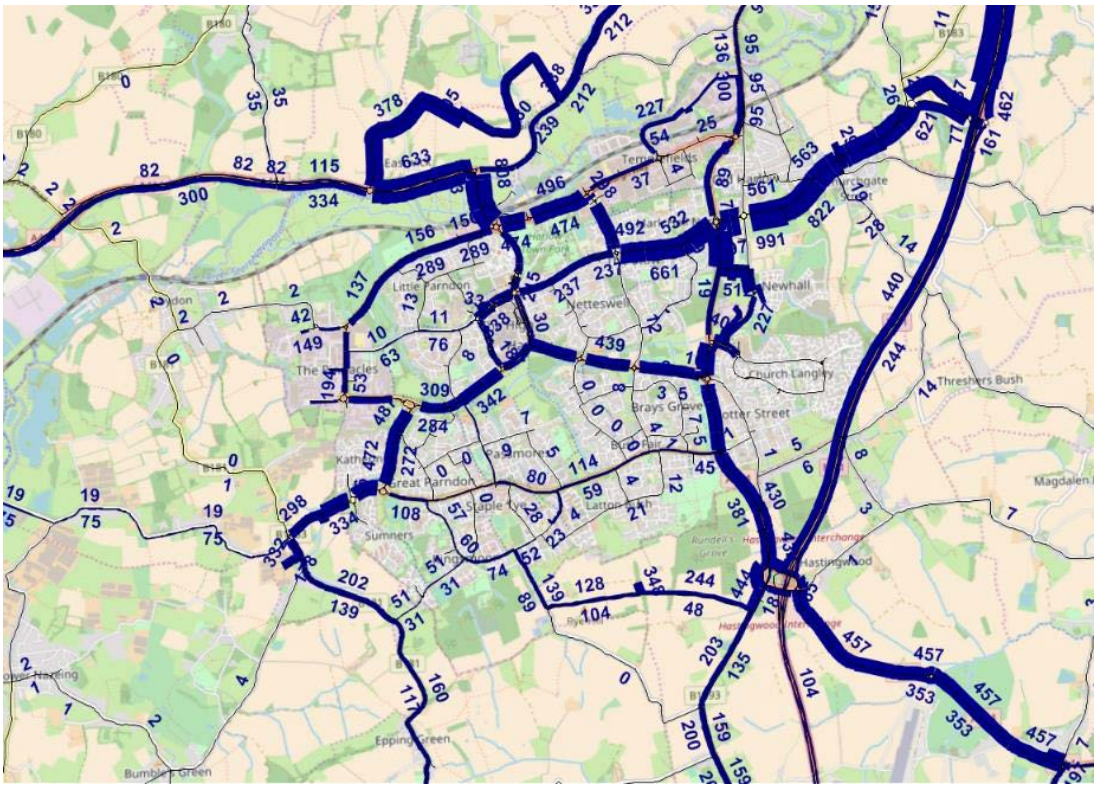
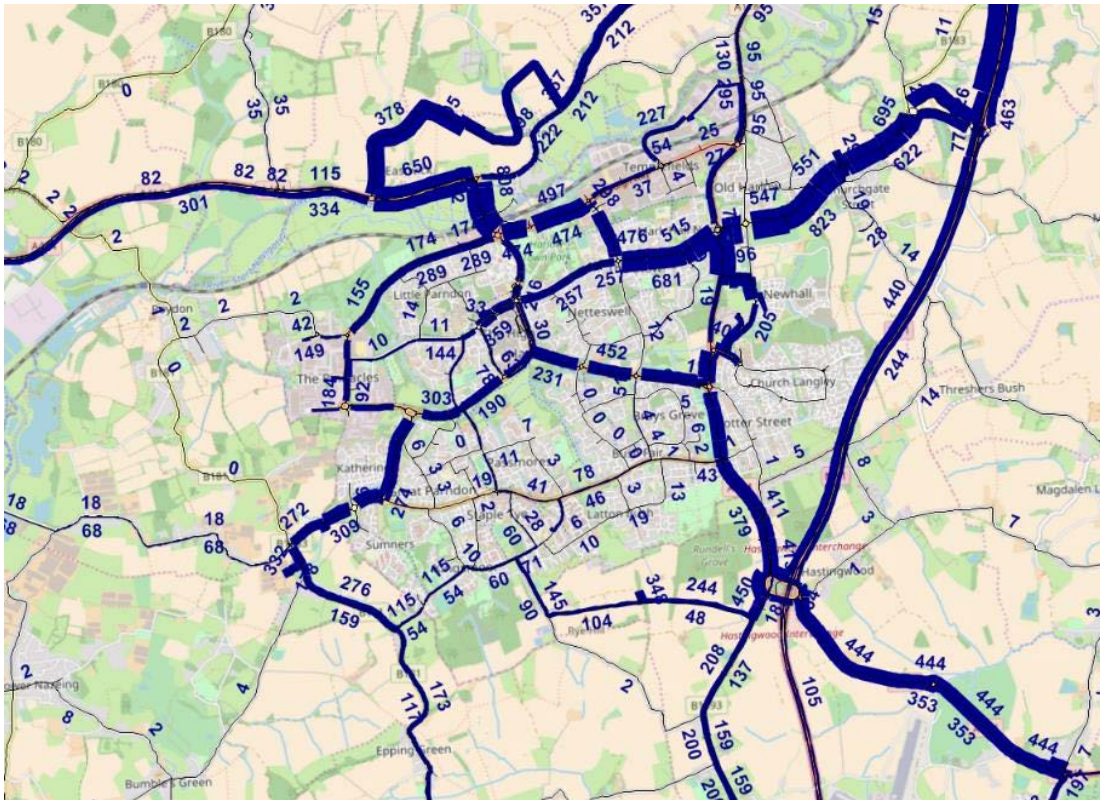


Figure 5-8 illustrates the wider Harlow developments two-way flows in the AM peak with the junctions redesigned and the traffic management in place. Again it can be seen that the wider Harlow sites assign mainly to the strategic links across the town, and that there are likely to be increases in the south and west of the town, over and above those related to the south-western sites. This would be likely to result in approximately 20% additional traffic on Katherine's Way, 13% more traffic on Southern Way, and 30% more on B181 Epping Road.

Figure 5-8 – Wider Harlow Development with All Mitigation – AM peak



By way of summary, Table 5-1 sets out the two-way AM link flows without and with the junction changes and traffic management, for the south-western sites and for the wider Harlow sites. It can be seen that the mitigation measures proposed help to reduce the likely impact of development in this area of Harlow, although it may lead to additional movements to the south within Epping Forest District.

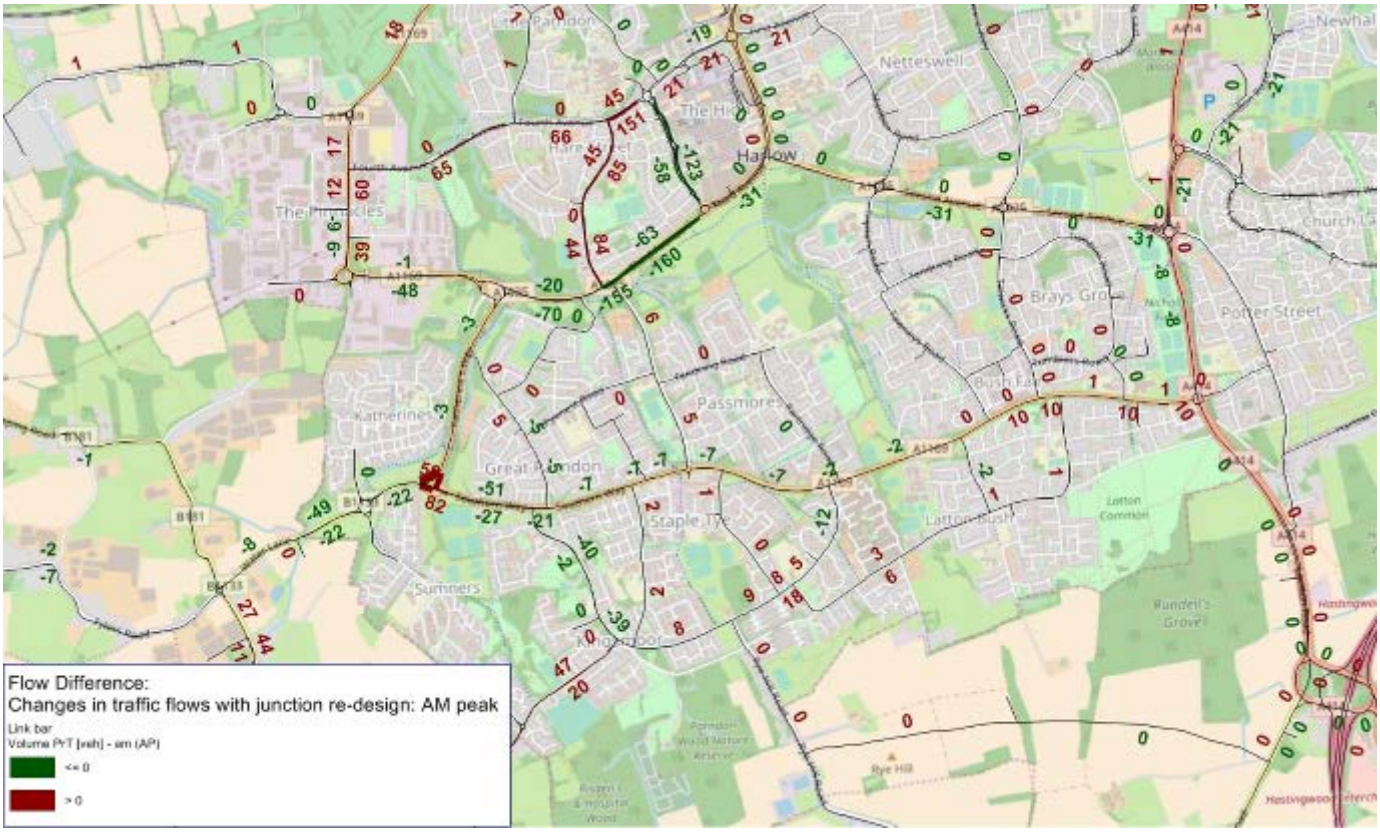
Table 5-1 – Two-Way key Link Flows and Changes with Mitigation Measures: AM Peak Hour

	South-western sites:			All wider Harlow sites:		
Scenario / Link	Updated Network	With mitigation measures	% Change	Updated Network	With mitigation measures	% Change
Katherine's Way	593	612	+3%	744	723	-3%
Southern Way	163	55	-64%	220	62	-72%
B181 Epping Road	247	335	+36%	341	435	+26%

Figure 5-9 below shows the flow differences before and after junction changes for all development traffic that has been assigned to the network. This combines both departures and arrivals at Zone 140 but also picks up other routeing changes from development traffic.

The plot illustrates the overall reduction of traffic along Southern Way alongside local re-routing. It also shows the effect of the Third Avenue/Abercrombie Way junction alteration on choice.

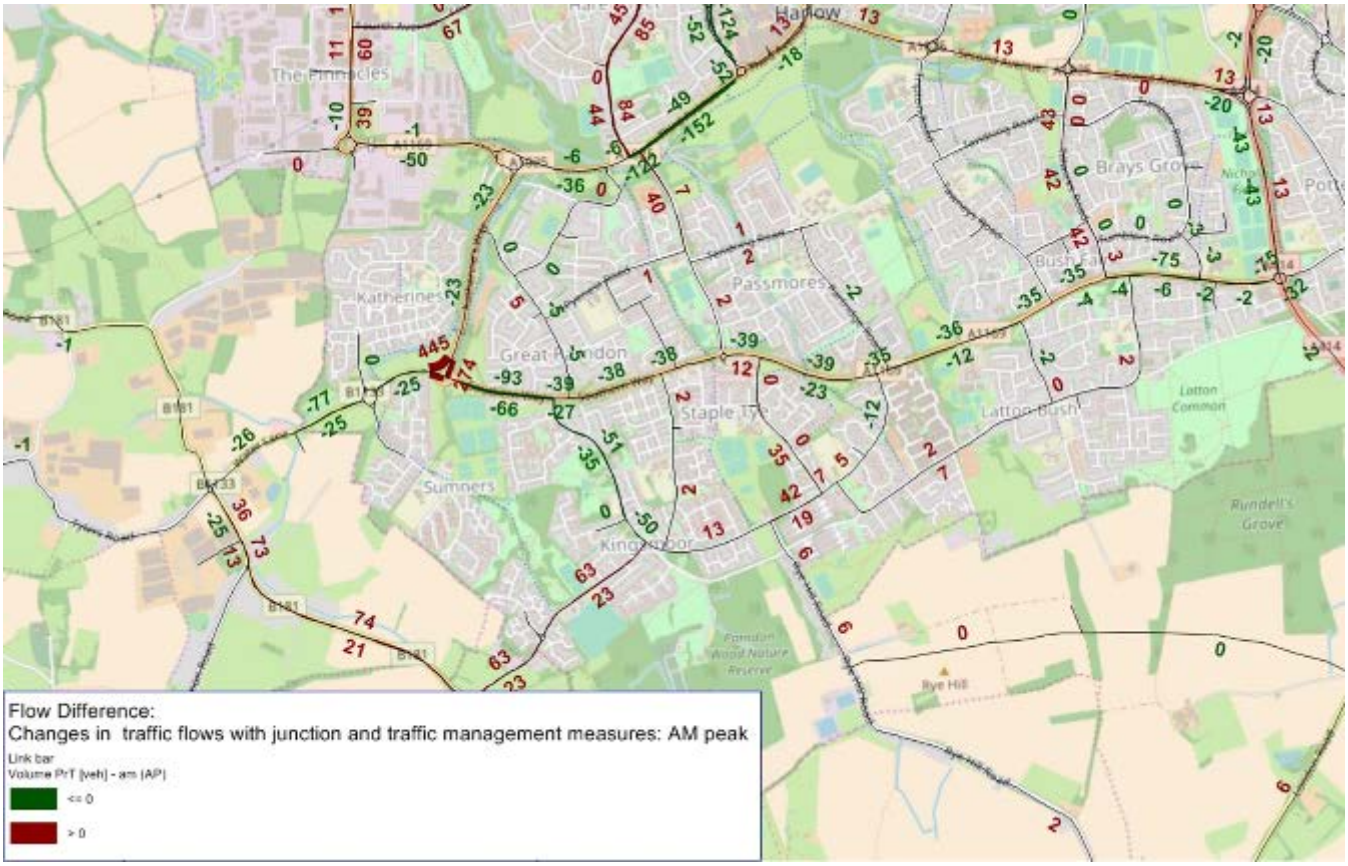
Figure 5-9 - Changes in Wider Harlow Development Traffic Flows with Junction Re-Design – AM Peak Hour



Meanwhile Figure 5-10 shows the 2-way flow differences with all the mitigation measures place. This combines both departures and arrivals at Zone 140 but also picks up other routeing changes from development traffic.

The plot indicates that there would be likely to be a reasonable reduction in traffic on Southern Way, with local re-routing onto Epping Road and Parsloe Road.

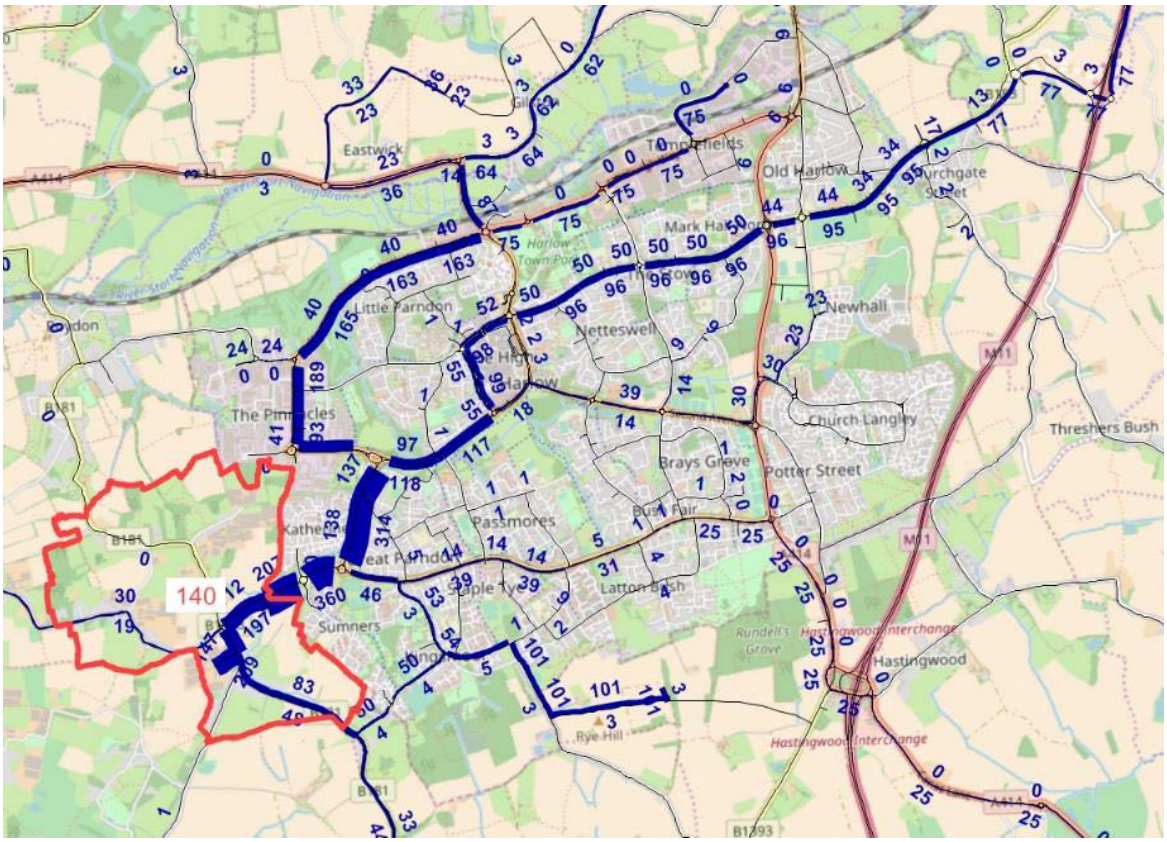
Figure 5-10 – Changes in Wider Harlow Development Traffic Flows with All Mitigation: AM Peak Hour



5.3 Effect of Mitigation Measures: PM Peak Hour

Like the AM peak modelling with the Latton Priory change made, the majority of south-western sites traffic would use Katherine's Way, but the proportion is likely to be higher in the PM peak with approximately 65% of traffic using this link. Around 15% would be likely to use Southern Way, and 20% use the B181 Epping Road. The two-way flows are shown in Figure 5-11.

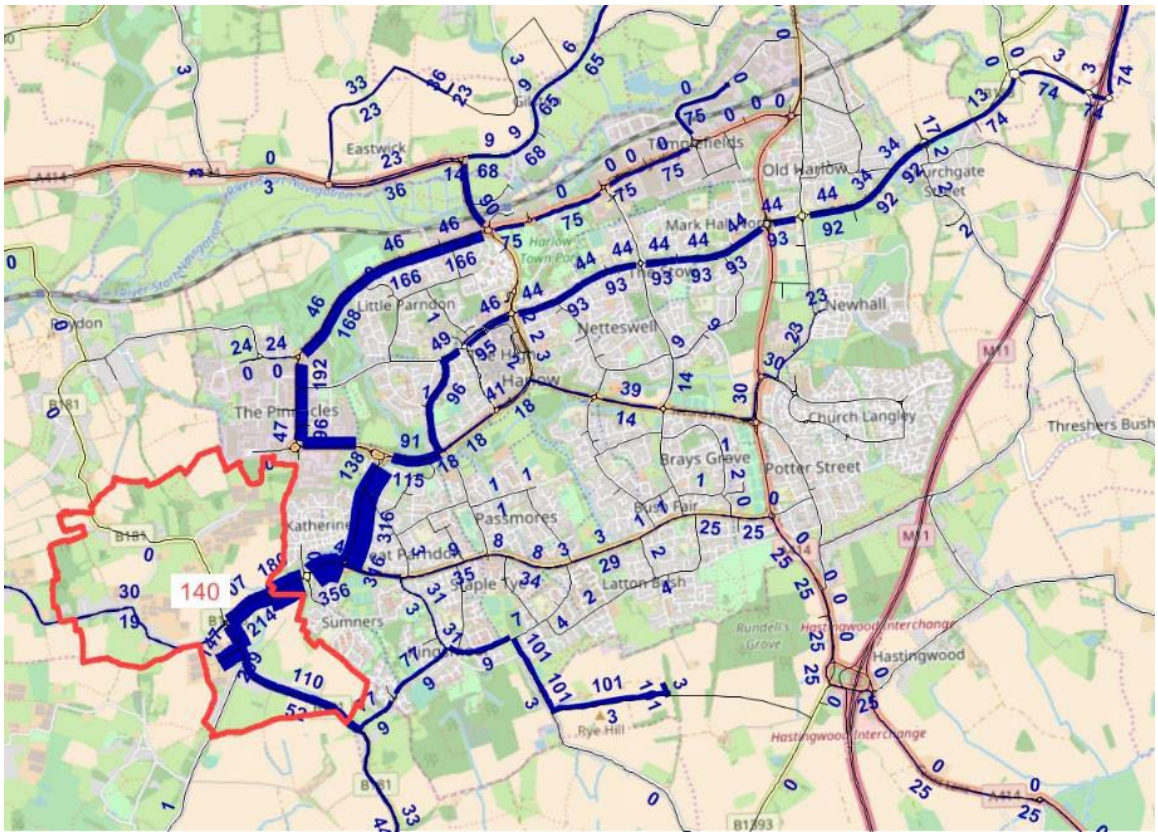
Figure 5-11 - South-Western Sites Updated 2-Way Traffic Assignment: PM Peak Hour



After the junction changes, the proportion of traffic using Katherine's Way remains the same at around 65%, but the proportion likely to use the B181 increases to 25%, and along Southern Way reduces to 12%. The two-way flows are shown in Figure 5-12.

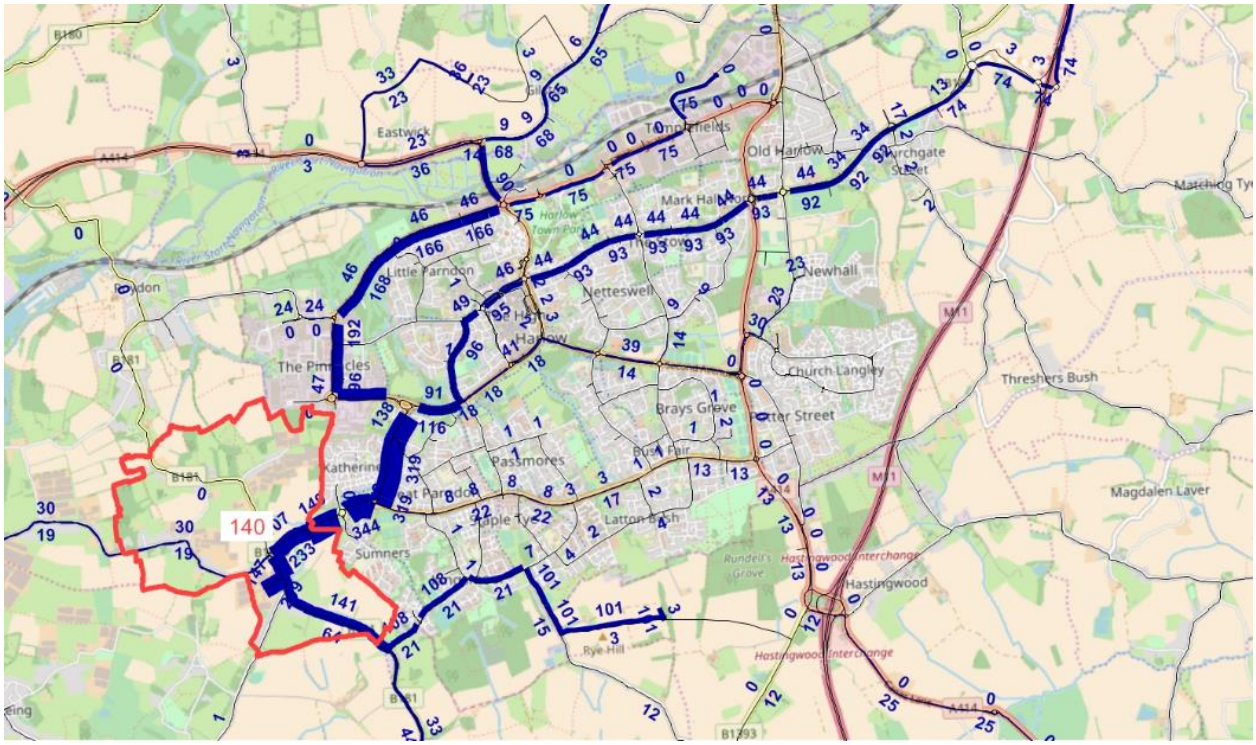
As with the AM peak analysis, the junction changes are likely to result in a reduction in development traffic using Southern Way during the PM peak hour.

Figure 5-12 - South-Western Sites with Junction Re-Design: PM Peak Hour



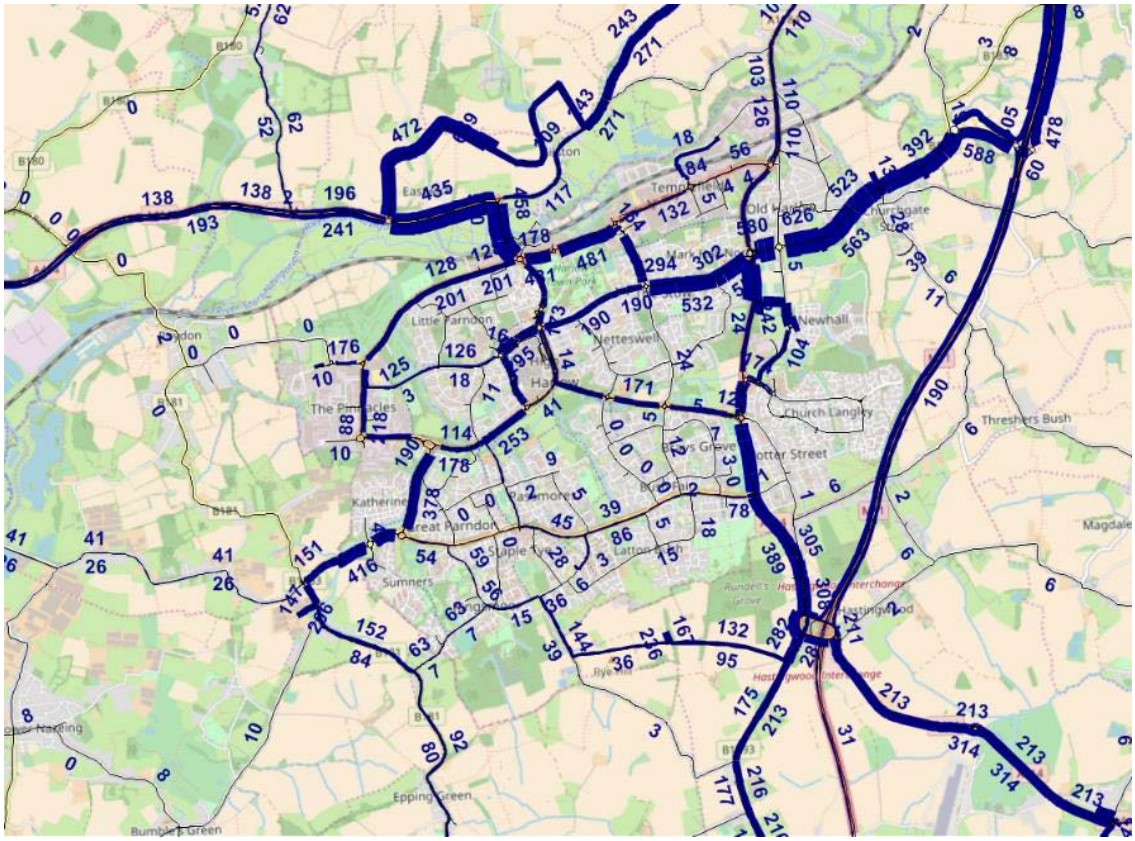
The PM peak hour departing traffic flows for the south-western sites with both the junction changes and traffic management measures in place are shown in Figure 5-13. Like the AM peak hour analysis, the flows likely to use Katherine's Way would increase slightly to 66%, and the use of the B181 Epping Road would also increase to around 30%. The use of Southern Way would be likely to reduce to around 5% of the south-western sites traffic.

Figure 5-13 – South-Western Sites with All Mitigation – PM Peak Hour



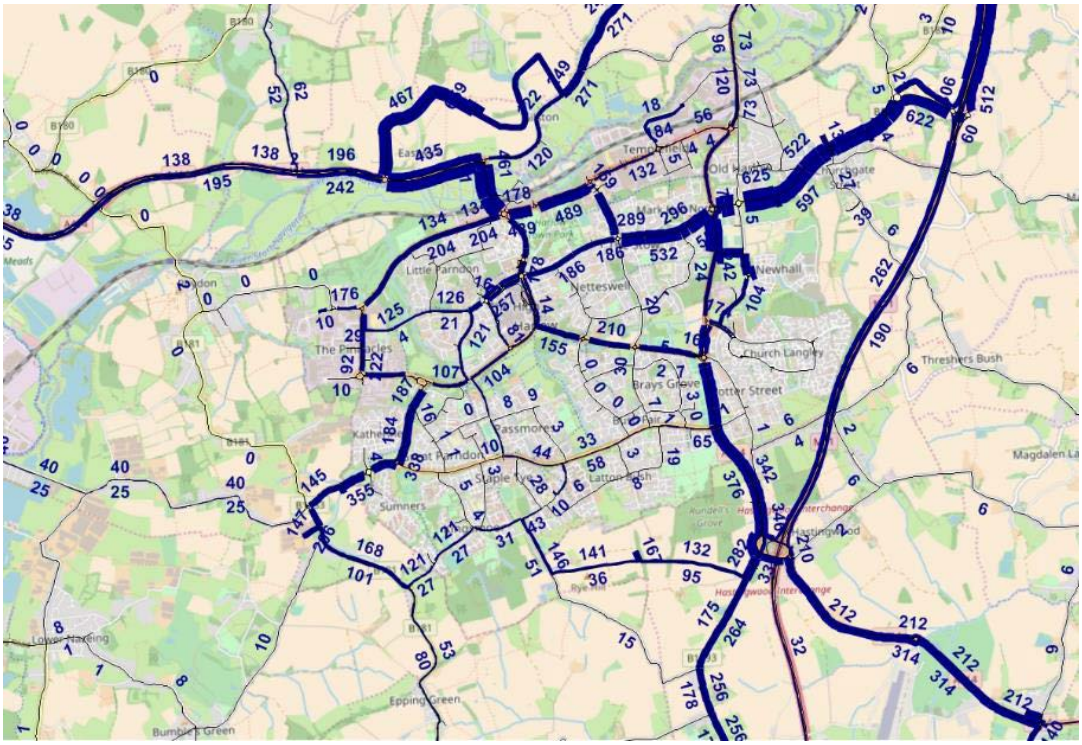
Looking at the likely assignment of all of the wider Harlow developments with the updated network, like the AM peak modelling with the Latton Priory changes made, traffic would be likely to assign to the major routes across the town as shown in Figure 5-14. The impact of all of the wider sites on the south and west of Harlow are likely to see an increase of around 25% on Katherine's Way, 12% on Southern Way, and 80% on B181 Epping Road, over and above that relating to the south-western sites.

Figure 5-14 - Wider Harlow Development Updated 2-Way Traffic Assignment: PM Peak Hour



With all of the mitigation measures in place, the likely impact of all of the wider Harlow sites on the key links in the south and west of Harlow is shown in Figure 5-15. This indicates that flows on Katherine's Way would be likely to increase by 15%, by 15% on Southern Way, and around 30% on B181 Epping Road, over and above what would be expected from the south-western sites.

Figure 5-15 - Wider Harlow Development Traffic with All Mitigation: PM Peak Hour



In summary Table 5-2 sets out the two-way PM link flows without and with the junction changes and traffic management, for the south-western sites and for all of the wider Harlow sites. It can be seen that the mitigation measures proposed help to reduce the likely impact of development in this area of Harlow, although it may lead to additional movements to the south within Epping Forest District.

Table 5-2 – Two-Way Key Link Flows and Changes with Mitigation Measures: PM Peak Hour

	South-western sites:			Wider Harlow sites		
Scenario **Link**	**Updated Network**	**With mitigation measures**	**% Change**	**Updated Network**	**With mitigation measures**	**% Change**
Katherine's Way	452	459	+1%	564	522	-7%
Southern Way	115	34	-70%	129	39	-70%
B181 Epping Road	131	205	+56%	236	269	+14%

Figure 5-16 shows the flow differences before and after junction changes with all the wider Harlow developments traffic assigned to the network. This combines both departures and arrivals at Zone 140 but also picks up other routeing changes from other development traffic.

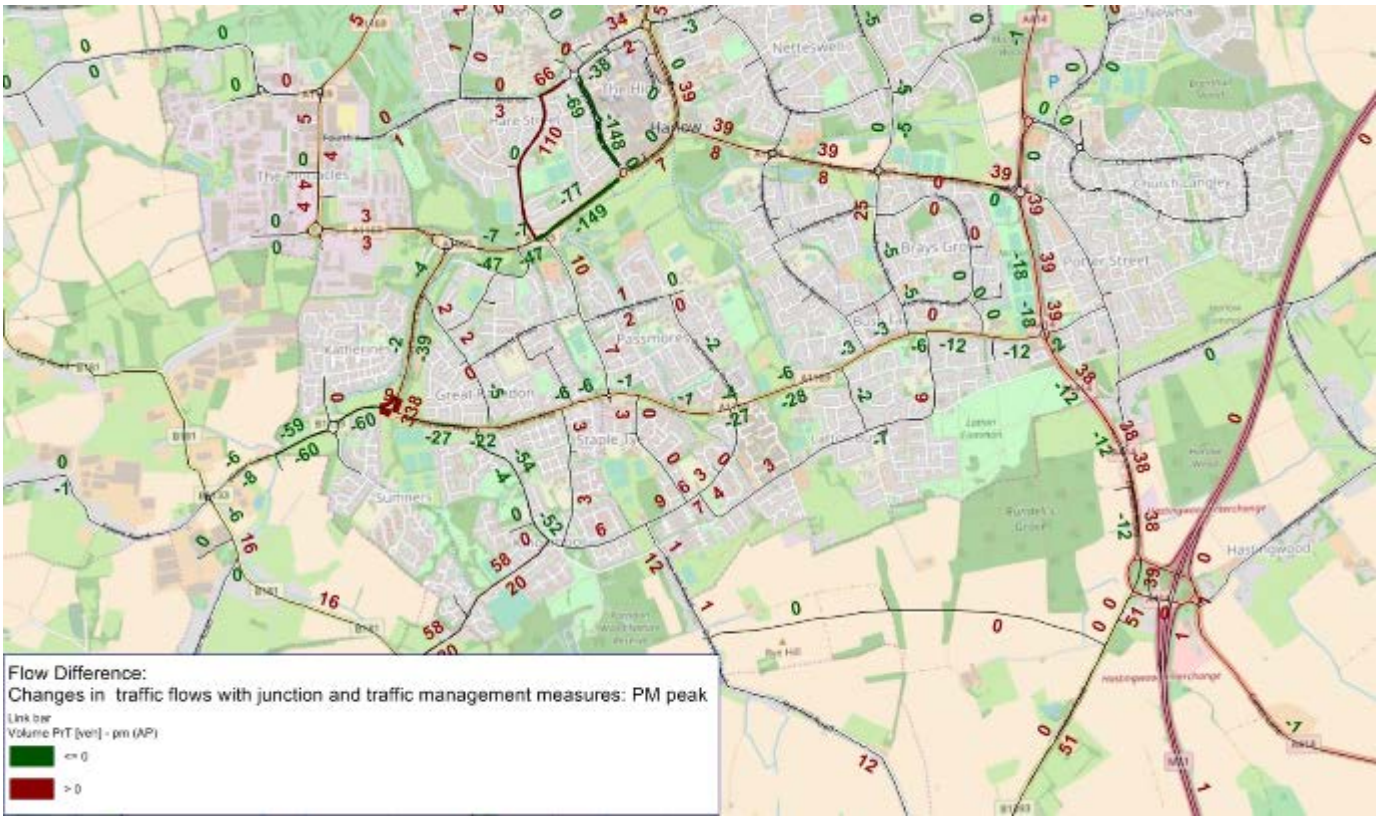
The plot illustrates an overall reduction of one-third of the south-western sites traffic along Southern Way alongside local re-routing. It also shows the effect of the Third Avenue/Abercrombie Way junction alteration on choice and possible impacts on Harberts Road, as previously referred to.

Figure 5-16 - Changes in Wider Harlow Development Traffic Flow with Junction Re-Design – PM Peak Hour

Meanwhile Figure 5-17 shows the 2-way flow differences with all the mitigation measures place. This combines both departures and arrivals at Zone 140 but also picks up other routeing changes from development traffic.

It can be seen that departing traffic would be less likely to use Southern Way, although the decrease in traffic does not appear to be as great as for the AM peak. Again local re-routing onto Parsloe Road and Epping Road may occur.

Figure 5-17 – Changes in Wider Harlow Development Traffic Flows with All Mitigation: PM Peak Hour



5.4 Model Outputs: Link Flow Changes Overview

The flows along Katherine's Way, Southern Way and Epping Road associated with the south-western sites, zone 140, for each scenario reported in the previous sections are set out in Table 5-1 and Table 5-2**Error! Reference source not found.**. Note that the location of the flows shown for Southern Way is just to the east of its junction with Katherine's Way.

It can be seen from **Error! Reference source not found.** that the model suggests that the percentage change in flows following the introduction of both mitigation measures would be likely to be greatest on traffic along Southern Way, as desired. The largest changes are to traffic leaving the south-western sites along Southern Way in the AM Peak with the junctions re-designs and traffic management measures.

6. Conclusions

This study set out to:

1. Identify the modelled impact on the local network of traffic from the Latton Priory strategic development site, in particular, along Southern Way using three alternative site access configurations; and
2. Consider the effect of traffic from West Katherine's and West Sumners strategic development sites on the surrounding network, particularly but not exclusively along Southern Way, and evaluate possible traffic management measures.

In order to explore Objective 1, the AM peak model for the forecast year of 2033 was used with an input of development-only car traffic. The development assumptions were taken from the Emerging Option of the WEEH Local Plans without some strategic employment developments in Epping Forest. The Latton Priory development was assumed to contribute 1,050 new homes and no jobs (due to the removal of some Epping Forest employment sites from the model):

- With Option A, the western access, development traffic would be likely to split fairly evenly on Rye Hill Road, with the majority of southbound traffic heading for M11 J7, and northbound being split between Water Lane, Abercrombie Way and the A414, with some of the latter traffic possibly assigning via Commonside Road. Around 80-90 vehicles would be likely to use some sections of Southern Way.

- With Option B, the eastern access, development traffic would be likely to primarily use the A414 to access the east of Harlow, but for trips to the west these would be likely to route south on the B1393 and then north along Rye Hill Road. Around 20-60 vehicles would be likely to use some sections of Southern Way.

- With Option C, a link road in place and network access available both directions, traffic would be expected to be split with one third using the western access and two thirds using the eastern access. Within Harlow traffic would tend to use north-south routes like the A414 and Katherine's Way/A1019 Velizy Avenue. It would be expected that around 90 vehicles would use the western end of Southern Way.

To address Objective 2, the impact of West Katherine's and West Sumners developments on the network, the same 2033 AM model was used as for Objective 1. The West Katherine's and West Sumners developments were assumed to contribute 2,100 homes in total. In addition, a nearby employment site which is assumed to provide 72 jobs was also included:

Approximately three-quarters of the south-western sites traffic would be likely to head towards Harlow, the majority using Katherine's Way, and one-fifth using Southern Way. Within Harlow, the majority of the traffic would be expected to use A1025 Second Avenue, but generally their traffic impact would be likely to be spread fairly evenly across the town.

These south-western sites would be likely to have more impact on Southern Way than would Latton Priory, as much more development has been assumed there, and there is a greater distance between the sites and the strategic road network. While the modelling of the south-western sites included the Latton Priory link road, this was set to be relatively unattractive to through traffic. If this were to be designed to be more attractive to some through-routing traffic, this would be likely to reduce the level of south-western sites traffic (and other traffic) using Southern Way. However, it is important to note that this could result in the use of the link road as a proxy southern bypass for access between the M11 and The Pinnacles.

To address the potential traffic impact of the south-western sites on Southern Way a series of measures were identified, including re-design of two junctions to encourage use of the Katherine's Way route, and traffic management along Southern Way itself. The junction changes would be likely to discourage traffic from routeing along Southern Way, with a reduction of around 65% in both the AM and PM peak hours. Flows on Katherine's Way would be likely to be broadly unchanged in the AM peak hour, but may increase by about 80% in the PM peak hour. Traffic using the route to the south via the B181 towards Kingsmoor and Epping would be likely to increase by around 40% in the AM peak hour and by 25% in the PM peak hour.

It is concluded that it would be possible to accommodate the strategic sites to the south and west of Harlow provided that appropriate access arrangements and traffic management measures are provided (subject to more detailed assessment as part of the planning process).

In using the findings of this report the limitations and assumptions of the modelling approach should also be recognised. Namely:

- The findings in Sections 3-4 are based on an AM peak period model in which it is assumed that PM peak development trips will largely be a reversal of the morning trips
- Epping Forest strategic employment sites have been removed, so the model conceivably under-represents employment developments
- Development-only, car trips have been assigned in the model and all base traffic and background growth has been removed. This will lead to over-simplified traffic assignment in the model. If more traffic was on the network some trips would be assigned to alternative routes.

So while this study has been able to indicate the strategic impacts from the Latton Priory and West Katherine's and West Sumners developments, a more detailed approach using either micro-simulation modelling or junction capacity assessments would be beneficial as details of developments emerge.

References

Jacobs, March 2017, “WEEH Technical Note 1: Forecast Methodology”

Jacobs , March 2017, “WEEH Technical Note 2: Spatial Options A-E (March 2016)”

Jacobs , March 2017, “WEEH Technical Note 4: Emerging Option (September 2016)”