Appendix H- Options Assessment Report

Access to Harlow:
Stage 1 Option Assessment Report

Transport Consultancy

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RINGWAY JACOBS
integrated expertise

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1 Introduction

1.1 Purpose of Report

Ringway Jacobs are framework consultants to Essex County Council (ECC) and, under the terms of this contract, Jacobs are commissioned to undertake transport planning, modelling and appraisal projects on behalf of ECC, and also to deliver a Business Case for the preferred scheme.

This Stage 1 Option Assessment Report is one of a number of Business Case documents produced at this stage of scheme development which will include:

- Strategic Outline Case (SOC)
- Stage 1 Option Assessment Report (OAR)
- Appraisal Specification Report (ASR)

This Option Assessment Report (OAR) documents the Stage 1 scheme appraisal process of identifying the need for intervention and the process of option development and selection. This OAR will provide the following, in order to meet the requirements set out within the Department for Transport's (DfT) Transport Appraisal Process:

- A sound body of analysis to provide evidence of the problems, challenges and need for intervention, framed within the context of relevant policy and strategy objectives;
- A future 'without intervention' scenario, considering potential scenarios;
- Identified study objectives and intended outcomes, and sufficient information to facilitate an understanding of the links between issues and context and the final statement of objectives;
- Option generation, sifting, and assessment. Decisions made on discarded options will be recorded, along with supporting evidence;
- Documented results of the subsequent assessment of potential options against the Option Assessment Framework. Evidence will be presented in relation to Strategic Case, the Value for Money Case, the Delivery Case, the Financial Case and the Commercial Case;
- Summary of the headline results across all options considered and conclusions on the comparative performance of options;
- Identification of the better performing option(s) to be taken forward for further, more detailed appraisal in Stage 2 as part of a Business Case submission.

These elements form Steps 1-8 of the appraisal process. Step 9 involves clarifying the modelling and appraisal methodology, and is separately documented within the ASR.

Stage 2 involves the further appraisal of a small number of better performing options in order to enable decision-makers to make rational and auditable decisions about whether or not to proceed with intervention. This focusses the analysis on estimating the likely performance and impact of interventions against criteria in the Transport Business Case and should provide sponsoring organisations with sufficient evidence to decide whether or not to proceed with intervention.

1.2 Structure of Report

The DfT's Transport Appraisal Process guidance for the Technical Project Manager[1], dated January 2014 sets out the steps and procedure to be followed. It includes their Figure 1, reproduced here at Figure 1.1.

Stage 1 of the Appraisal process, which this report covers, "*involves identifying the need for intervention and developing options to address a clear set of locally developed objectives. It involves generating a broad range of options, which reflect a range of modes, approaches and scales of intervention, [which] are then sifted and assessed against criteria from the Transport Business Case Five Case Model to identify the better performing options for further appraisal in Stage 2.*"[2]

[1] 'Transport Analysis Guidance, Guidance for the Technical Project Manager', Jan 2014, Department for Transport, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/427078/webtag-tag-guidance-for-the-technical-project-manager.pdf

[2] Chapter 2, Transport Analysis Guidance, The Transport Appraisal Process, Jan 2014, Department for Transport, www.gov.uk/transport-analysis-guidance-webtag

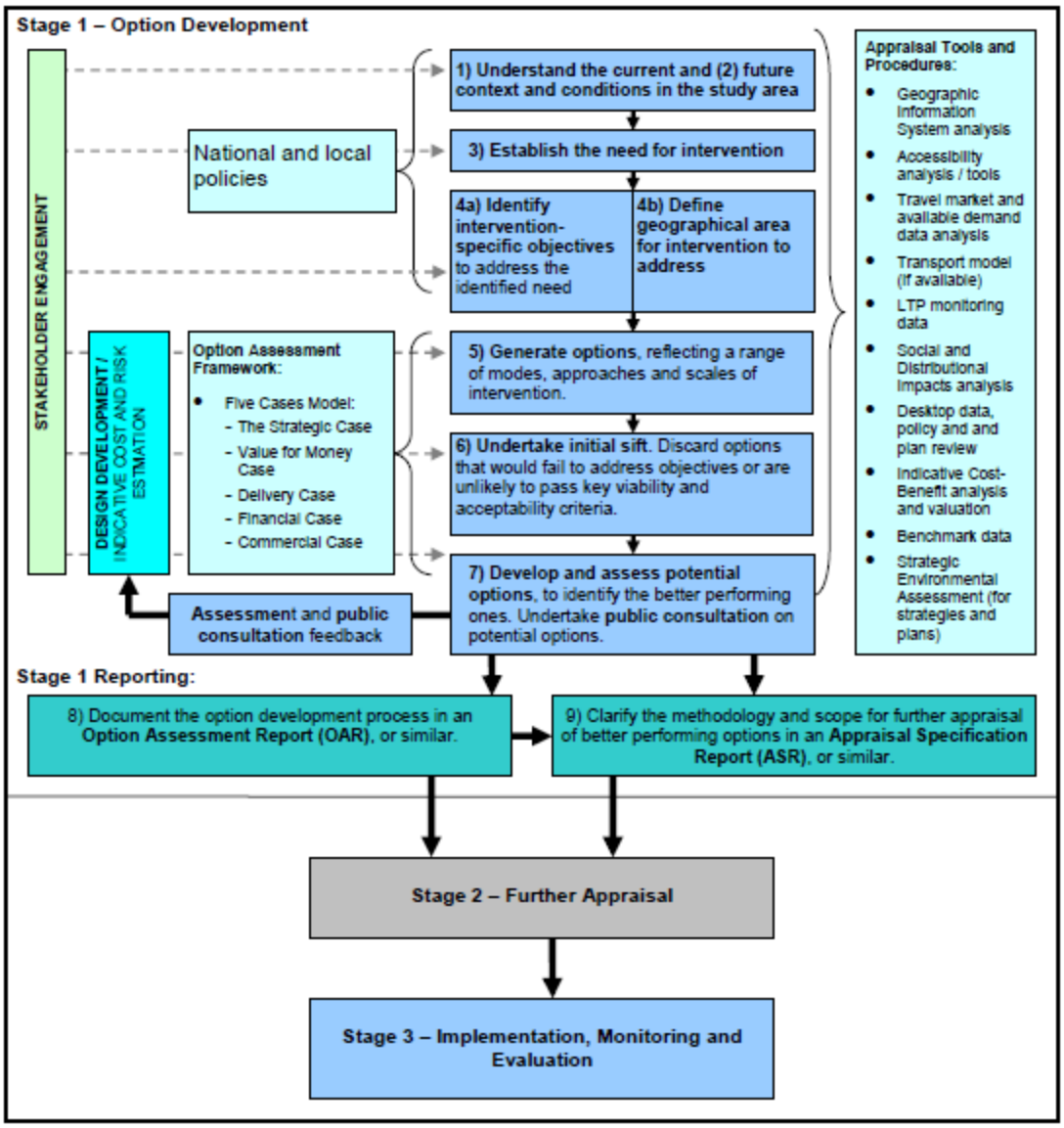

Figure 1.1 Stage 1 Option Development (Source: WebTAG)

This report follows the format of the Stage 1 process and its structure is as follows:

Section 1: Introduction, outlining the purpose and background of the report;

Section 2: Reviews national and local policy and strategy documents to establish the strategic policy context of the study;

Section 3: Outlines the current context and conditions within the study area;

Section 4: Sets out the future context and likely conditions within the study area;

Section 5: Identifies the intervention-specific objectives to address the identified need for the scheme and defines area of impact to be addressed;

Section 6: Draws together the various options, referencing their history, and current basis;

Section 7: Sets out the sifting process within the Five Case Model, reports on this process, and identifies options which do not pass the key viability and acceptability criteria;

Section 8: Develops and assesses the potential options to be taken to public consultation;

Section 9: Summary and Conclusions

2 Policy Review

2.1 Introduction

This section outlines the key strategies and policies relating to planning and transportation within the study area, as articulated at the National, Regional and Local level.

In developing an understanding of the current situation, it is important to establish the strategic policy context in order to identify potential land use, and plans and proposals for development that may have implications for the travel market to which any intervention may relate. Furthermore, it is important to ensure that any interventions identified and assessed are consistent with these policies.

Policy has been and continues to be in a state of change and development; therefore the information presented in this report is accurate at the time of writing but may change during the course of the business case development.

The key policy documents that have been referenced in this report and their hierarchy are set out in Figure 2.1.

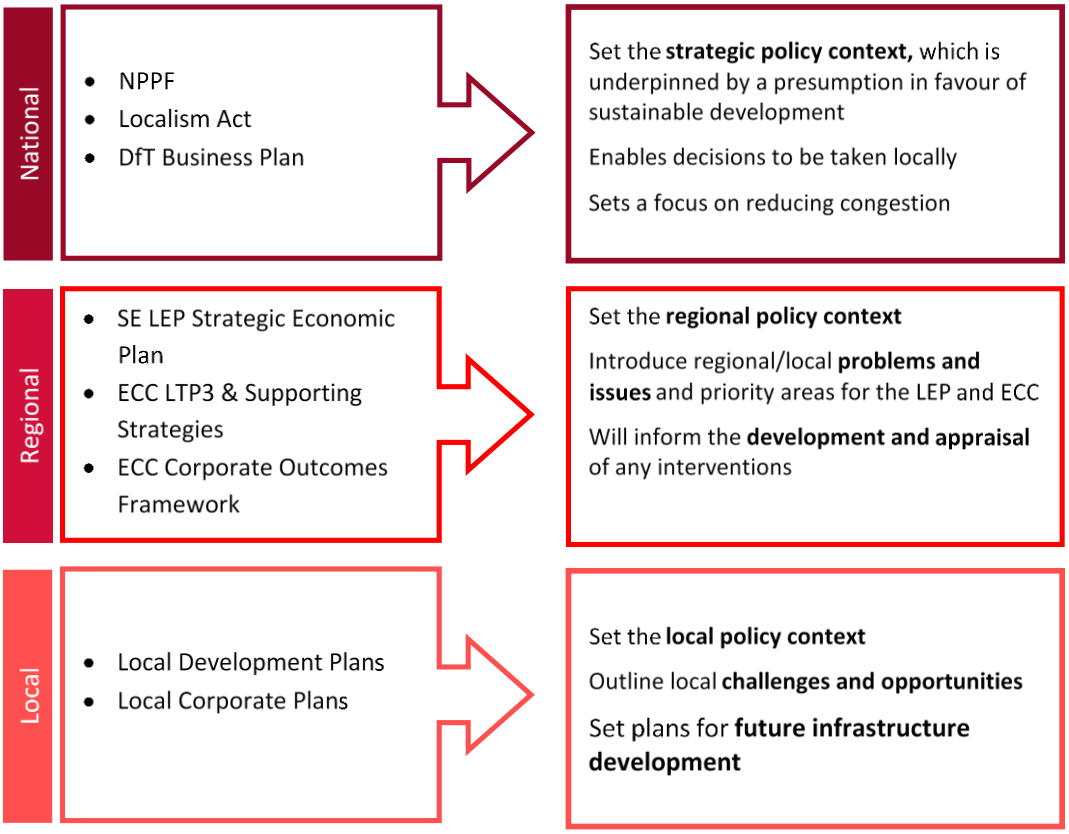

Figure 2.1 Key Policy Documents

2.2 National Policy

2.2.1 Localism Act 2011

The Local Growth White Paper, 'Realising every place's potential', issued in 2010[3], focussed on planning and future development to help deliver strong, sustainable and balanced growth, whilst also being tailored to local aspirations and requirements. The Localism Act 2011[4] provides the legislative foundation for this. The Act decentralises power, giving local government new freedom and flexibilities, provides new rights and powers for communities and individuals, reforms the planning system, and enables decisions to be taken locally.

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[3] Local Growth: realising every place's potential, The Stationery Office, HM Government, October 2010 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/32076/cm7961-local-growth-white-paper.pdf

[4] Localism Act 2011, http://www.legislation.gov.uk/ukpga/2011/20/pdfs/ukpga_20110020_en.pdf

2.2.2 National Planning Policy Framework

In March 2012, the Department for Communities and Local Government (DCLG) published the National Planning Policy Framework (NPPF), which sets out the Government's economic, environmental and social planning policies. The NPPF aims to reform the planning system and is underpinned by a presumption in favour of sustainable development. There is a focus on planning for prosperity, people and places, promoting increased levels of development and supporting infrastructure, whilst also protecting and enhancing the natural and historic environment. It is designed, however, to be interpreted and implemented locally, and delegates responsibility for achieving this vision to local planning authorities. Further guidance was issued in March 2014, which replaced the previous guidance documents, but did not replace the 2012 policy[5].

2.2.3 Department for Transport's Business Plan

The Government's vision for transport is also one that encourages growth, but is greener, safer and improves the quality of life in our communities. The Government's transport priorities and key actions in order to deliver this national vision are set out within the DfT Business Plan[6]. There is a focus on improving road safety, reducing congestion and pollution and making changes at a local level. Priority four in particular outlines the need to 'support sustainable growth by investing in local transport, decentralise funding and powers, tackle local congestion and make public transport (including light rail), walking and cycling more attractive'.

Priority four in the Plan, '*to invest in our roads to promote growth, while reducing congestion and tackling carbon*' is of particular relevance as it calls for investment in the strategic road network to promote growth and address congestion that affects people and businesses.

2.2.4 Highways England

Highways England, formerly the Highways Agency, is a government-owned strategic highway company responsible for long term strategic planning. Funding of the strategic road network (SRN), is being introduced through the Road Investment

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[5] NPPF web-based guidance, March 2014: http://planningguidance.planningportal.gov.uk/
[6] DfT, 2013. Business Plan 2013-15 http://transparency.number10.gov.uk/business-plan/11

Strategy[7] (RIS) published in December 2014, and updated in March 2015. The new organisation is tasked over the next five years with:

"Making the network safer and improving user satisfaction, while smoothing traffic flow and encouraging economic growth."

A total of £15bn of capital investment has been committed, with 127 major schemes over the course of the first Road Period (2015/16-2019/20). The network is expected to directly contribute to economic growth, through improved connectivity, and users will benefit from safety improvements and reduced congestion.

Within the RIS there are two committed M11 schemes referenced subject to value for money and if applicable any necessary statutory approvals, with the stated aim of providing capacity and connectivity to support national and local economic activity:

- ***M11 Junction 7 upgrade*** – expansion of junction 7 on the M11 to provide better access to Harlow.
- ***M11 Junctions 8 to 14 – technology upgrade*** – addition of several elements of the Smart Motorway package on the M11 between Stansted Airport and the Girton interchange north of Cambridge to help deal with congestion.

2.3 Regional & County Policy and Guidance

2.3.1 Local Transport Body and Scheme Prioritisation

The Local Growth White Paper, set out a new approach for driving sustainable economic growth based on local rather than top-down decision making through newly formed Local Transport Bodies (LTB's). The subsequently formed Harlow Stansted Gateway Transportation Board (HSGTB), was chaired by ECC, and brought together Hertfordshire County Council, Harlow, East Herts and Epping Forest District Councils, Highways England , the DfT, Harlow Renaissance and private sector interests such as Manchester Airports Group (MAG) (which owns Stansted airport) and Abellio Greater Anglia. Its focus was to improve travel in and around Harlow and identify investment needed to support regeneration and growth.

[7] 'Road Investment Strategy Strategic Vision, December 2014, DfT, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/383145/dft-ris-strategic-vision.pdf

2.3.2 South East Local Enterprise Partnership

Included in the Localism Act is the power to abolish Regional Spatial Strategies and with that the South East Plan, which previously set out the region's targets for housing, economy, transport and environmental challenges. LEPs have taken on the Regional Development Agencies' role in this process, with Essex forming part of the South East Local Enterprise Partnership (SELEP).

SELEP is the business-led, public/private body established in 2011 to drive new economic growth across East Sussex, Essex, Kent, Medway, Southend and Thurrock. As well as being the biggest LEP outside of London, representing a combined population of 3.9m people, home to more than 130,000 businesses, and providing more than 1.3m jobs, it is also one of the most local.

SELEP operates a fully devolved model with increased reach into local communities through local delivery partnerships/boards in East Sussex, Kent & Medway, Greater Essex and Thames Gateway South Essex. By 2021, SELEP's aim is to:

- Generate 200,000 private sector jobs, an average of 20,000 a year or an increase of 11.4% since 2011;
- Complete 100,000 new homes, increasing the annual rate of completions by over 50% compared to recent years; and,
- Lever investment totalling £10 billion, to accelerate growth, jobs and homebuilding.

SELEP's Growth Deal[8] allocated £442 million of public investment for the SELEP area with more to come. Matched by private and public funds, this will be invested in a programme of activities that will improve the transport and business infrastructure in the SELEP area. The Growth Deal also brings new influence over rail, skills and housing programmes.

SELEP has recently agreed an expansion of its Growth Deal with the government, which will see an extra £46.1m of funding invested in the area between 2016 and 2021.

Within the SELEP Strategic Economic Plan, it is recognised the several key transport investments are required in the M11-Harlow-Stansted-Cambridge corridor to unlock full growth potential. It states at paragraph 2.101:

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[8] 'South East LEP Growth Deal and Strategic Economic Plan 2014, SELEP, http://www.southeastlep.com/images/uploads/resources/SECTION_2_South_East_LEP_-_Growth_Deal_and_Strategic_Economic_Plan_WEB-2.pdf

> *"In particular, the M11 Junction 7a is vital if the EZ is to reach its full capacity and to enable significant housing growth at Harlow. Investments in the A414 to address existing bottlenecks are also essential. In this Corridor we can accommodate 1,050 jobs and 1,230 new homes by 2021 and facilitate 17,200 jobs and 19,000 homes through our proposed transport schemes."*

As part of the Growth Deal, funding for technical feasibility work and for production of an outline business case for the M11 J7a scheme has been committed, and support for the technical work has been committed by Highways England.

2.3.3 Essex Transport Strategy: the Local Transport Plan for Essex

Essex's Local Transport Plan (LTP3), consists of a Transport Strategy[9] and an Implementation Plan. It is the third Local Transport Plan for the county, setting out policies, strategies and priorities to address transport-related issues and challenges across the 15 year period to 2026. The LTP3 is focused on achieving the following five broad outcomes, developed in parallel with those of the Council's Highways Strategic Transformation (HST) programme:

- Provide connectivity for Essex communities and international gateways to support sustainable economic growth and regeneration;
- Reduce carbon dioxide emissions and improve air quality through lifestyle changes, innovation and technology;
- Improve safety on the transport network and enhance and promote a safe travelling environment;
- Secure and maintain all transport assets to an appropriate standard and ensure that the network is available for use; and
- Provide sustainable access and travel choice for Essex residents to help create sustainable communities.

For each of these five outcomes, a series of challenges were identified, which will need to be met for the outcomes to be achieved. The outcome which is most pertinent to the options being assessed within this OAR is that of connectivity. The challenges relating to this outcome are:

a) Providing good connectivity to and within urban areas to support self-contained employment and housing growth and regeneration;

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[9] Essex Transport Strategy, a Transport Plan for Essex, Essex County Council, June 2011, http://www.essex.gov.uk/EnvironmentPlanning/Planning/Transport-planning/Documents/Essex_Transport_Strategy.pdf

b) Providing good inter-urban connectivity within Essex and with adjacent major urban areas; and
c) Maximising the benefit to the local economy of Greater Essex's international gateways and strategic transport links to London, the East and South East of England and the rest of the UK.

It is acknowledged within the LTP that, while most journeys by car between the four main towns in Essex can be achieved in under an hour, there are specific sections of road where congestion is common, including connections from north and west Harlow to the M11.

The approach to this issue, to enable the economy of Essex to grow and to maintain and build on the vibrancy of Essex towns, is to ensure that centres are well connected to each other by both road and public transport. As the Essex economy is closely interlinked with neighbouring areas, to secure growth, good connectivity with adjacent economic areas (including London, Cambridgeshire, Suffolk, Hertfordshire, Thurrock and Southend) is also needed.

The specific ECC transport policies that seek to address connectivity issues are Policy 3 – Congestion and Network Resilience, and Policy 5 – Connectivity, as set out in Table 2.1.

Table 2.1 Essex Transport Strategy: Key Transport Policies

Policy 3 – Congestion and Network Resilience
The County Council will facilitate the improved reliability of journeys by: • undertaking its network management duty in line with the Traffic Management Act: • monitoring and managing the impact of traffic through the Essex Traffic Control Centre; • focusing investment on those parts of the network that would give the greatest benefit to the economy and quality of life; • using a functional hierarchy of routes to manage traffic; • working with operators to improve the punctuality of bus services; • minimising disruption by co-ordinating and managing the impact of roadworks undertaken by the County Council and utility companies; • applying the Speed Management Strategy.

Policy 5 - Connectivity
Transport networks will be strengthened to support a vibrant, successful and sustainable future for Essex by: • improving travel links within and between our main towns; • focussing investment on routes where improvements will give the greatest benefit to the economy of Essex; • improving journey times and journey-time reliability by targeting congestion improvement measures (see Policy 3); • providing for the use of more sustainable forms of travel (see Policy 8); • ensuring international gateways have effective surface access strategies that promote appropriate and sustainable transport; • developing appropriate provision of park and ride facilities serving our main towns; • working with partner agencies to identify and deliver essential improvements to nationally important road and rail connections.

2.3.4 Harlow Transport Strategy

As outlined in LTP3, Harlow is an evolving New Town. It is a primary economic and growth centre in the west of Essex. To support planned growth, in-line with current policies, a number of improvements are required to address current issues with the transport infrastructure and services in and around Harlow.

ECC is responsible for developing and maintaining Transport Strategies for major urban areas within the County. With the recent revisions to national and regional planning and transport policy, ECC are developing a Transport Strategy for Harlow to support the aspirations of the LTP3, Harlow's emerging Local Development Plan[10] and the SELEP Growth Deal and Strategic Economic Plan (SEP), which collectively outline the priority areas for investment in roads, buildings and facilities within Essex and Harlow to 2031.

Harlow is a relatively compact town located in the West of Essex, within the London-Stansted-Cambridge Corridor (LSCC). It is situated close to both the M11 and M25 key

[10] 'Harlow Local Development Plan, Emerging Strategy and Further Options, Consultation Summary Report', Dec 2014, Harlow Council, http://www.harlow.gov.uk/sites/harlow.gov.uk/files/Emerging%20Strategy%20and%20Further%20Options%20Consultation%20summary%20report%20v4.pdf

strategic routes, which provide access to London and the South East, Cambridge and beyond. The northern section of Harlow has two railway stations which are served by the West Anglia Main Line, connecting London, Stansted Airport and Cambridge.

Due to Harlow's location and its history of manufacturing and industrial business, it has been recognised as one of 24 Enterprise Zones, as part of the SELEP's SEP3. As a result there is a push toward promoting economic growth, creating jobs and building new homes in the local area, with a target of 16,000 new houses and 12,000 new jobs by 2026.

This is predicted to put additional strain on the transport infrastructure of Harlow, which has been described as one of the single most significant barriers to accommodating the level of development needed to meet the aspirations of the SEP and LTP3**.** Congestion is described as severe at peak times on both the strategic and local road network, with a number of junctions operating at capacity or near capacity, including J7 of the M11.

The Harlow Transport Strategy sets out the transport and infrastructure conditions in Harlow. It identifies the areas of concern within the local network, and outlines the specific investment priorities for particular areas and types of transport service, to support District Council land use planning.

The overall aims of the Transport Strategy are:

- To summarise the current transport conditions in Harlow
- To forecast future conditions across the network, including an assessment of the planned growth in housing and employment
- To develop potential options, subject to a thorough appraisal process, addressing the potential problems associated with existing and future levels of travel.

2.3.5 West Essex Area Implementation Plan

The scheme sits within the West Essex area, which comprises Harlow, Epping Forest and Uttlesford Districts. At the time of publication of the LTP the level of growth for each of the districts was as set out in Table 2.2.

Table 2.2 LTP3 Growth Forecasts

District	Dwellings 2011-2021	Job Target 2011-2031
Epping Forest	1,120	3,600
Harlow	16,000	12,000
Uttlesford	3,229	10,300

Source: Table 3.2 and Table 3.3, LTP3, 2011.
Please note that these figures have been superseded by the ongoing Local Plans process.

The key transport priorities for the West Essex area include:

- Improving access to and from the M11 corridor;
- Tackling congestion and improving the management of traffic in Harlow town centre;
- Providing the transport improvements needed to support housing and employment growth;
- Improving the attractiveness of the bus and rail services;
- Revitalising the cycle and walking networks to promote greater use;
- Improving the attractiveness of public spaces;
- Working with Transport for London to improve the journey experience of Essex residents using Central Line underground services;
- Improving access to Stansted Airport by low carbon forms of transport.

Specific objectives for the Harlow area include: tackling congestion in the town centre, reducing congestion on strategic routes including A414 and J7 of the M11, improving public transport connections to major cities, continued investment in the cycle network, improving public spaces and developing a sustainable transport system to service the economic and developmental growth.

2.4 Local Policy

2.4.1 Harlow Council Corporate Plan

Harlow Council's latest Corporate Plan was published in 2014. It sets out the Local Council's vision and priorities for service delivery for the next three years, with a focus on community, leadership and resource management. The five main priorities for residents, businesses and visitors to Harlow are listed below:

- More and better housing;
- Regeneration and a thriving economy – which includes a focus on securing infrastructure that is appropriate for sustainable growth;
- Wellbeing and social inclusion;

- A clean and green environment;
- Successful children and young people.

2.4.2 Harlow Local Development Plans

Harlow Council's 2006 Adopted Replacement Local Plan sets out the policies and proposals for development and land-use in Harlow for the period up until 2011. It is due to be replaced in the near future by the new Harlow Local Development Plan, which will set out the framework to guide and shape development in Harlow up to 2031. The key objectives of the 2006 adopted plan are listed below:

- Make Harlow safer, cleaner and greener;
- Improve the public transport and cycle network;
- Produce higher density housing and develop employment opportunities;
- Facilitate sustainable growth and regenerate the town centre.

In 2011 Harlow Council carried out an issues and options consultation, as part of the new Local Development Plan, the results of which were published in the Core Strategy Issues and Options Report. The consultation was part of the first stage in developing a new Local Plan for the town, and documented some of the concerns of local residents. Key issues included:

- Developing a new bypass to link with a new M11 junction;
- New junction on the M11;
- Dualling the A414;
- Improving bus links between neighbourhoods and extending the Central Line;
- Tackling congestion in the town centre, especially in the north.

In April 2014 Harlow Council published an Emerging Strategy and Further Options Consultation Report. The report documents all emerging schemes, and outlines the overall strategy direction up to 2031. Some of the key points are listed below:

- Meet housing needs & continue sustainable growth;
- Regenerate the town centre and neighbourhoods;
- Continue to improve the public and private transport network;
- Mitigate the effect of climate change.

The Report set out five options for delivery of the growth needed to fulfil the Council's requirements, which were:

1. Focussed on Priority Regeneration Areas;
2. Environmental/Landscape Led;

3. Passenger Transport Led;
4. Regeneration and Landscape Led;
5. Northern Bypass Led.

It is recognised that delivery of Harlow's growth will require cross-boundary co-operation with neighbouring districts, a point which was also mentioned by respondents to the Consultation[11]. The Options that received the most support were: 3 - Passenger Transport led, and 5 - Northern Bypass led. The main issue raised by respondents related to infrastructure capacity and whether the local infrastructure would be able to cope with the proposed levels of development. Comments regarding infrastructure capacity mostly focussed on transport infrastructure (roads and public transport provision), sewerage, health facilities and school facilities.

2.4.3 Epping Forest Local Strategic Partnership Community Strategy

The partnership, 'One Epping Forest', originally established in 2002, comprises representatives from local councils, education, the police, health services and business and community groups. Its aim is to promote the economic, social and environmental well-being of the district and deliver the shared vision, outcomes, and values enshrined in the Community Strategy. Its function is to bring all the agencies and groups that have a role in delivering these outcomes together, with the one aim of 'Together making Epping Forest District a great place to live, work, study and do business'.

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[11] Harlow Local Development Plan, Emerging Strategy and Further Options, Consultation Summary Report, December 2014, http://www.harlow.gov.uk/sites/harlow.gov.uk/files/EmergingStrategyandFurtherOptionsConsultationsummaryreportv4.pdf

The Community Strategy[12], published in 2010 for the period 2010-2031, is the "*long term plan to deliver better quality of life and improve the economic, social and environmental well-being of the Epping Forest District over the next 20 years and beyond"*. It is the *"cornerstone of all the other plans that affect public services and long term planning policies in the district included in the Local Development Framework which replaces the Local Plan. It tells local people, and importantly regional and national government, on whose support and co-operation we depend, how we will achieve the outcomes in this strategy. It brings together the key plans of partners into one co-ordinated local strategy including the Essex Strategy.*"

2.4.5 Epping Forest District Council Corporate Plan

Epping Forest Council's latest Corporate Plan[13] was published in 2011. It describes the district and sets out the aims and priorities of the council for the period, and the challenges it faces to improve services and local quality of life.

The Corporate Plan provides a description of the District, which includes:

> "*Much of the 131 square miles of the Epping Forest District is green and rural. 94% is within the Green Belt or in use for horticulture and farming. Approximately half of our 123,900 residents live in 5% of the area of the district, close to the boundary with London. … . The local population is set to grow over the coming years and pressure for development and the demand for homes, jobs and leisure facilities has never been greater.*
>
> *The district is traversed by both the M11 and M25 motorways and is the only district in Essex that enjoys the benefits of London Underground services. It also has access to Network Rail services, both within the district at Roydon and nearby at Harlow, Broxbourne and Chingford. Stansted Airport is also only a short journey away. However, bus services to railway stations and other public service locations within the district are inadequate and traffic congestion is a problem.*"

In terms of planning growth, the Corporate Plan states:

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[12] "Putting Epping Forest First" The Community Strategy, 2010-2031, August 2010, Epping Forest's Local Strategic Partnership, http://www.eppingforestdc.gov.uk/index.php/help/file-store/category/111-sustainable-community-strategy

[13] 2011-2015 Corporate Plan, Epping Forest District Council, 2011, http://www.eppingforestdc.gov.uk/index.php/home/file-store/category/374-corporate-plans?download=289:corporate-plan-2011-2015

"The local economy should be able to provide jobs and services for local residents, with high-quality and accessible employment land and premises so that there can be effective competition with adjoining areas.

The council's Strategic Housing Market Assessment for the district identified that around 4,620 affordable homes need to be provided within the district to meet current and forecast need. It is a considerable challenge for the council to increase the amount of affordable housing over the next four years.

As the population grows and changes, provision needs to be made for additional housing in a manner appropriate to the council's over-riding priority to protect and conserve the environmental heritage of the district. This will put further pressure on available land, transport services and jobs."

2.4.6 Epping Forest Local Development Plan

Epping Forest District currently has a mixture of policies from the Adopted 1998 Local Plan and the Adopted 2006 Local Plan with alterations, all of which are set out in the Combined Policies document[14], published in 2008. The district is currently developing its Local Plan and its Issues and Options went out to 'Community Choices' consultation, in 2012, with the responses reported to Cabinet in June 2013[15].

The consultation presented three potential housing targets for the plan period (2011-2033), based on various population and household projections. These were: 10,200 based on governmental projections, 8,900 based on East of England Plan (EEP) and updated official projections, and 6,400 based on the original EEP target. Employment growth options were 28.5ha based on EEP, and 21.5ha based on identified need. A total of seven spatial options for distribution of growth were presented.

The key issues raised in the responses, as summarised in the 2013 report to Cabinet, were:

- continuing to protect the Green Belt;
- using "brownfield" (ie previously developed) land before releasing any Green Belt for development;
- preventing London from sprawling into the district and preventing larger urban areas (eg Harlow) from merging with nearby villages (eg Roydon);

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[14] Combined Policies of Epping Forest District Local Plan (1998) and Alterations (2006), February 2008, http://www.eppingforestdc.gov.uk/index.php/home/file-store/category/168-current-policy?download=688:combined-local-plan-1998-and-alterations-2006-policy-document

[15] Community Choices Consultation (Issues & Options) Summary, June, EFDC, http://rds.eppingforestdc.gov.uk/documents/s49377/C-006IOResponsesRpt.pdf

- establishing accurate forecasts for population growth and related new housing targets;
- establishing accurate forecasts for new numbers of jobs which would be needed;
- whether local services have the capacity to cope with the current population and any future growth, eg schools, GP surgeries, public transport including the Central Line and rural bus services, sports, leisure and other community facilities, town centre car parking, and sewerage (in some parts of the district). Traffic congestion, the general capacity of local roads and motorway junctions, and problems with commuter parking near Central Line stations were also frequently raised issues;
- protecting the countryside and landscape, including Epping Forest, and acknowledging the importance of agriculture in the district; and
- protecting the heritage and character of the district's towns and villages.

The responses mentioning transport raised several issues, including concerns about traffic congestion and the general capacity of motorway junctions and the local road network, the impact of road traffic on Epping Forest, and the impact of HGVs on rural roads.

The next stage will be consultation on the Preferred Options, which will take place later this year.

2.4.7 Hertfordshire County Council

The Herts LTP3 has a suite of daughter documents that include Urban Transport Plans, which set out the framework to focus transport improvements and investment within specific areas over the next 20 years. These identify possible interventions to deal with existing issues and longer spatial strategies to facilitate future growth and development.

The LPT3 addresses five nationally set goals:

- Support economic development and planned dwelling growth;
- Improve transport opportunities for all and achieve behavioural change in mode choice;
- Enhance quality of life, health and the natural, built and historic environment;
- Improve the safety and security of residents and other road users; and
- Reduce transport's contribution to greenhouse gas emissions and improve its resilience.

The Hertfordshire Inter-Urban Route Strategy is a daughter document to their LTP3, and is concerned with corridor improvements up to 2017. It acknowledges that

pressures of growth and population mean increasing levels of traffic are forecast which will exacerbate existing capacity issues in peak times, that east-west movement can be difficult, particularly by passenger transport, and that there is a major airport immediately to the east at London Stansted.

Herts are currently developing a 'Transport Vision' to identify packages of transport interventions to enable growth across the county to 2050. The accommodation of East:West movements will be a key consideration in this work. Herts are also seeking to establish clear working arrangements between all authorities on the A414 in Hertfordshire and Essex to address the emerging challenges associated with growth in a managed way along the corridor.

Herts have recently commissioned consultants to build a county-wide transport model to meet a range of short, medium and long term objectives. These include:

- Understanding road and rail travel patterns;
- Develop evidence base of present day network operation and congestion to enable modelling of incidents and events impacts;
- Identify future issues and solutions for strategic and spatial development planning;
- Enable strategic option and policy testing.

The Herts Model development is expected to take place over the next 18 months.

2.4.8 East Hertfordshire District

The East Herts District emerging District Plan (EHDCDP) is being developed in accordance with the NPPF and a draft has been produced. This sets out the key issues and challenges facing the district, which all mainly relate to managing the high levels of growth and the effects of population increase. The EHDCDP recognises the importance of providing the infrastructure and services which are need to support new development, which includes transport infrastructure and the need to deliver this alongside growth.

The district is predominantly rural, making provision of comprehensive public transport a key challenge. This means that many local communities are reliant on private cars, and there is a need to ensure that development is directed to sustainable locations to encourage reduced reliance on the car.

The EHDCDP sets out the vision for East Herts in 2031 together with nine strategic objectives as stepping stones to deliver the vision. These include: mitigation of climate

change effects, safe and vibrant mixed communities, housing market mix, protection of the countryside from inappropriate development, employment and education, cultural facilities, and the environment.

The key objectives with regard to growth and infrastructure are:

To improve access opportunities, minimise the need to travel, encourage necessary journeys to be made by sustainable means to ease congestion and help to reduce East Herts' carbon footprint;

To ensure that development occurs in parallel with provision of the necessary infrastructure.

The existing over-arching transport policy document for East Herts is the Hertfordshire Local Transport Plan (LTP3). While this identifies some specific schemes in the district, the majority of transport schemes have been identified through a rolling programme of Urban Transport Plans (UTP) which identified how and where the strategic objectives and targets could be delivered at a local level. These documents are in the process of being replaced.

The Hertford and Ware UTP was adopted in 2010. The key issues referenced of relevance to the Harlow study area are those pertaining to the A414 which, although dual carriageway in its entirety within East Herts, is subject to significant congestion as it passes through Hertford, as well as at its junction with the A10 at Rush Green[16]. Longer term schemes have been identified using a Scheme Assessment Framework (SAF), including widening the circulatory carriageway at Rush Green, but the possible solution for the A414 congestion through the town is likely to require a bypass. This is considered to be undeliverable within the current LTP period to 2021 due to "*lack of policy support, environmental impacts of new road building, insufficient funding available for compulsory purchase of land.*" However, ongoing reviews may involve revisiting bypass proposals and reassessment.

[16] Appendix B – Key Issues, Hertford & Ware Urban Transport Plan, November 2010, Herts County Council
http://www.hertsdirect.org/services/transtreets/tranpan/tcatp/handwutp.pdf/18440647.pdf/

2.4.9 Broxbourne Borough

Broxbourne Borough are currently developing their Local Plan, the vision being set out in the their framework document[17]. Preparation is ongoing with consultation likely to take place in Summer 2016, and submission in Spring 2017.

The Hertfordshire LTP3 is the key transport policy document for the district, together with the Hoddesdon and Broxbourne UTP, which was adopted in 2012. The key issue of relevance to the Harlow study area is the acknowledged congestion on the A10, and how planned and new developments in the borough may affect this[18].

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[17] Local Plan, a Framework for the Future Development of the Borough, Borough of Broxbourne, October 2015 https://www.broxbourne.gov.uk/sites/default/files/Documents/Planning/151012LocalPlanDocOct15_NEW.pdf

[18] Table 4.1, Hoddesdon & Broxbourne UTP, March 2012, Hertfordshire Highways http://www.hertsdirect.org/services/transtreets/tranpan/tcatp/hodbroxutp/18440668.pdf/

3 Understanding Current Situation

3.1 Key Issues

Taken from Harlow's Local Development Plan Emerging Strategy 2014 Consultation, 'A Spatial Portrait of Harlow'[19] this extract provides the background to the current situation in the town:

> "*Harlow is a relatively small town of 82,200 people located on the borders of Essex and Hertfordshire. The town is surrounded by the Green Belt and a number of important ecological sites; the floodplain of the River Stort lies to the north and landscape ridges surround the town. Harlow's Green Wedges give the town a distinctive character and connect residential neighbourhoods with open spaces and the countryside beyond. A key design feature of Harlow was higher density housing with the majority of the town's open space provided within the Green Wedges.*
>
> *Designated in 1947 to meet the development needs of London and the wider south east the town was originally planned to house 60,000 people but this was increased to 80,000 in the 1952 Masterplan. Harlow underwent rapid growth between the 1950's and the 1960's, reaching a peak population of 81,000 in 1974. However, Harlow's population began to fall in the late 1970s and throughout the 1980s, dropping to 73,000 people by 1994. The town's population began to increase in the late 1990s and throughout the 2000s to 82,200 people in 2011.*
>
> *Today Harlow forms part of a wider network of towns that extend across Essex and Hertfordshire forming an arc of settlements around London. These centres provide a range of services and facilities as well as housing and employment opportunities and are closely related to London. The town has good rail links to London, Stansted Airport and Cambridge. To the east of the town is the M11 motorway which is a key north-south route linking London to Cambridge and beyond. The M25 (3 miles to the south of Harlow) provides access to other parts of London and the wider south east. Epping Forest District adjoins the town to the south, east and west while East Hertfordshire District lies to the north.*
>
> *The latest forecasts show that the town's population is estimated to grow by 14,036 people between 2011 and 2031. This would require a minimum of 7,500 new dwellings to meet Harlow's population growth alone. In addition changing social trends (people living longer and living in smaller households) has put pressure on the existing housing stock. Moreover, property prices in Harlow*

[19] Taken from Harlow Local Development Plan Emerging Strategy 2014 Consultation: http://harlow.jdi-consult.net/ldp/readdoc.php?docid=11&chapter=3&docelemid=d483

have increased by approximately 150% between 2000 and 2012 and although property prices are lower than in surrounding areas there are still considerable affordability problems for the town's residents with a growing number unable to afford to buy their own home.

Harlow has traditionally been a good location for manufacturing and industrial businesses. Compared to the national average Harlow has a much higher proportion of employment in Manufacturing, Wholesale and Retail Distribution, Administrative and Support Services and Health and Social Work. Conversely, it is under-represented in Public Administration, Professional, Scientific and Technical Services and Financial Services. The town has experienced a large reduction in jobs between 2008 and 2011 as a consequence of the international financial crisis and subsequent recession.

Approximately 14% of Harlow's employed residents commute to London and in overall terms the labour market is well balanced with Harlow having a net in-flow of just over 500 workers. Although the district is a net importer of managers and professionals from its immediate neighbours (East Hertfordshire, Epping Forest and Uttlesford) it is a net exporter of workers in lower paid occupations. Although the Council has been working with partners to address this, Harlow needs to be seen as an attractive location to employers in its own right, in order to improve the range of employment opportunities in the town and secure regeneration.

Harlow is also home to one of 24 Enterprise Zones set up across England in 2011 to promote business growth and job creation. The Enterprise Zone is split across three sites and aims to create approximately 5,000 jobs in the Advanced Manufacturing, Research and Development, ICT and Health and Allied Industries in Harlow. The Council has adopted three Local Development Orders [LDO] *to fast track planning applications on these sites.*

The Enterprise Zone's aims and objectives reflect Harlow's wider economic growth aspirations for the town which seeks to boost economic growth, diversify the economic base and to capitalise on the town's proximity to the Cambridge and London economies and connections to rest of the UK and beyond."

In addition, Harlow commissioned a study to examine the relationship between regeneration and growth in Harlow[20] which reported in 2013 that:

"New Towns face a unique range of economic, social and environmental challenges that reflect their original design, age and evolution.

[20] Nathaniel Lichfield & Partners (NLP), "Harlow Future Prospects Study: Linking Regeneration & Growth", August 2013

The problems facing New Towns are almost universal and, as all aspects of these towns were built at the same time, everything needs replacing as one. One of the most acute problems is that the earliest New Towns were not planned for car usage and many walkways and green spaces are out of sight of both houses and roads creating expanses of unsafe land. Low density development typical of the New Town design has also made operating public transport financially unviable with residents cut off from services and the town centre. Skills shortages in all New Towns are mainly attributed to the provision of large quantities of social housing.

The use of experimental architecture styles and materials has led to swathes of undesirable and some structurally unsound homes and town centres. The difficulty of accessing the town centre by car means residents shop elsewhere.

Many New Towns have failed economically due to being of modest scale and with an over-reliance on one sector of employment. The key message from the literature is that bigger populations can sustain more diverse economies which are better placed to endure economic decline and attract inward investment whilst evening out the split between housing tenures."

3.2 Current Travel Issues

3.2.1 Congestion

The Harlow Transport Strategy reports that there are several factors that contribute towards the traffic conditions in Harlow, especially during weekday and weekend peak periods. As well as the limited access routes into and out of the town, the 2011 Census data indicates that 16,000 outbound and 16,500 inbound travel to work trips are made each day. In addition to the demand placed on the strategic road network from these work-related trips, adjacent towns and villages have limited access to the M11 and so tend to travel through Harlow in order to reach J7. The A414 as it passes through the town is also mainly single carriageway. Access to the M11 itself is also restricted within Epping Forest District to the south of Harlow, J5 having only south-facing slips, and J4 at the southern end of the motorway is some 12 miles distance from J7.

As previously stated, it is recognised in the emerging HDLP that congestion on the strategic and local road network is severe at peak times and a number of junctions are operating close to capacity or in excess of their original design thresholds. The local road network within Harlow is based on a grid system, with limited east:west routes which experience delays as a consequence. The north:south situation is worse as there are only two links from the north (A414 and A1184), and a single exit to the south (A414), and so all traffic entering or leaving Harlow in this direction is routed

through J7. This situation leads to a tendency for local or regular drivers to use less suitable minor routes to the north-east (B183) and south (B181) of the town.

The AM network peak hour congestion in a neutral month in 2013-14 is illustrated in Figure 3.1 below, where links shown in red and darker are operating at 30% or less of the links' freeflow speed. The grid nature of the network is also evident, as is the congestion on the A414 between Harlow and J7 in the south, at Eastwick in the north, and on the A1184 through Sawbridgeworth (the old A11).

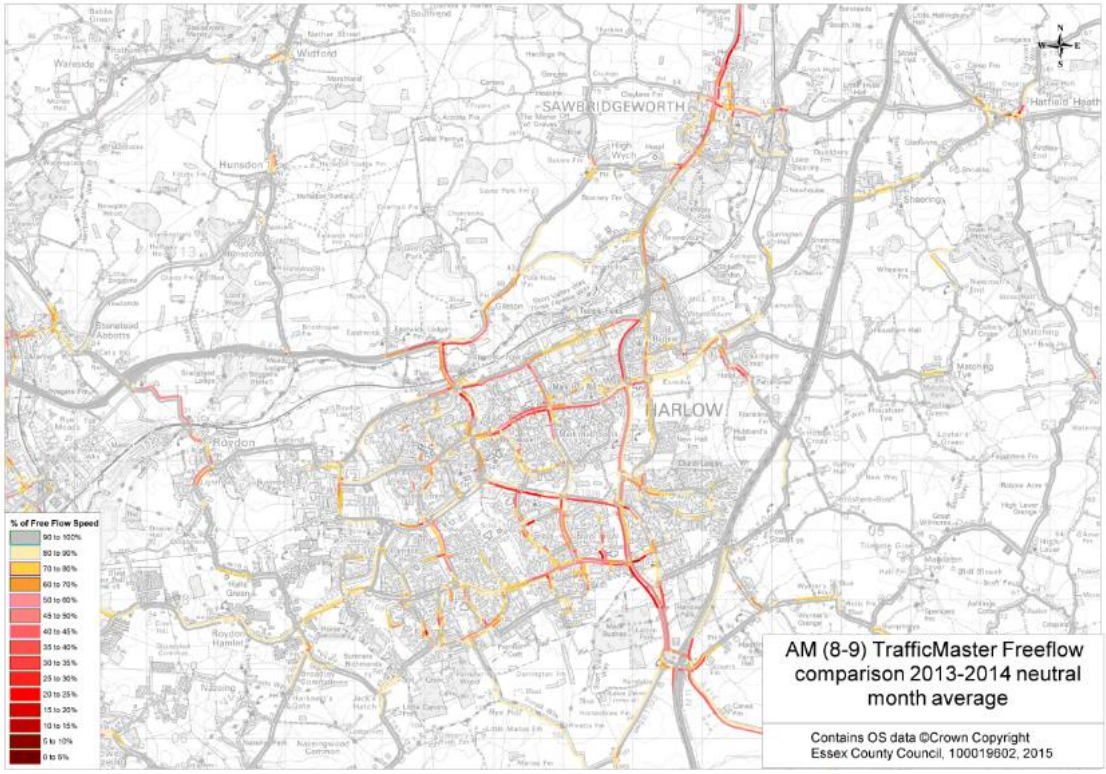

Figure 3.1 TrafficMaster Freeflow AM 2013-14 neutral month

More detailed analysis of the TrafficMaster data, focussing on three key routes, further demonstrates the congested nature of the road network. Comparison has been made between off-peak and AM peak hour journey times on routes with the following end-points:

A) North:Harlow – between A1184/B1383 Thorley Wash south of Bishop's Stortford and A414/A1019 Burnt Mill roundabouts, via either:
   - Route 1) A1184/High Wych Road, or
   - Route 2) A1184/A414 Edinburgh Way;

B) South:Harlow – between M11 J7 and A414/Eastwick Rd, via either:

Route 3) A414, or

Route 4) A414/A1025/A1019;

C) North:South – between Bishop's Stortford town centre and Harlow town centre, via either a more local route, or via the strategic network:

Route 5) B1383/A1184/A414 ('old A11'), or

Route 6) M11/A414/A1025 (M11).

These routes are illustrated in Figure 3.2, Figure 3.3 and Figure 3.4 respectively. It should be noted that this analysis focusses on the morning AM peak situation, but it would be expected that the evening PM peak situation would be similar but with the effects reversed.

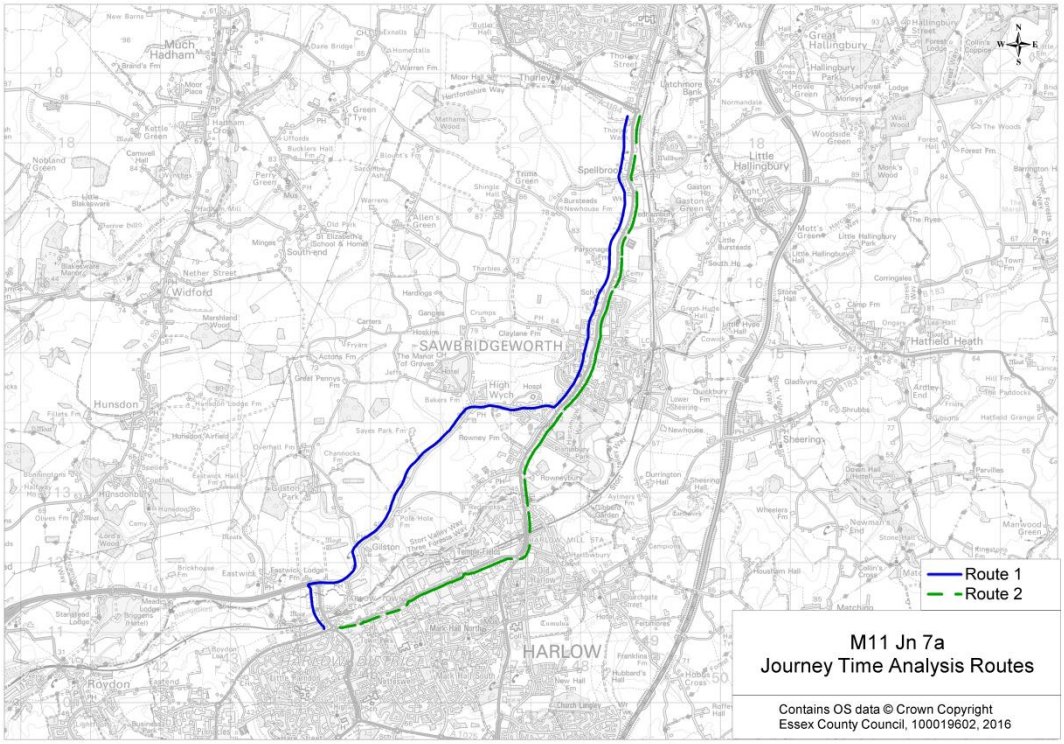

Figure 3.2 TrafficMaster Routes Comparison - North:Harlow

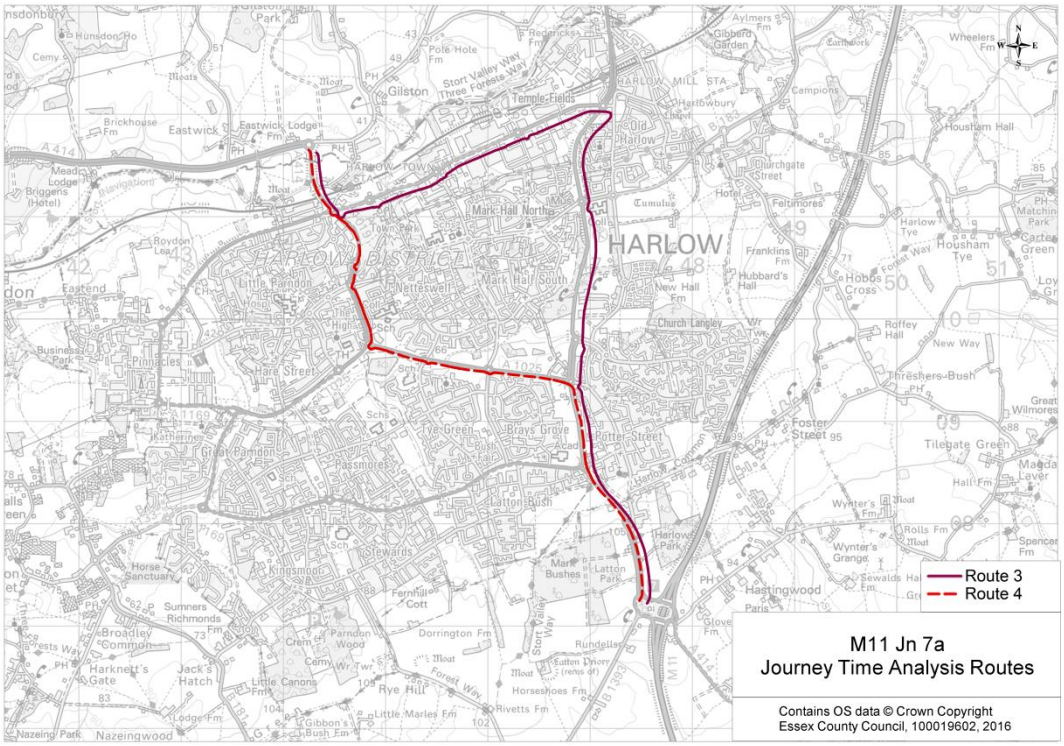

Figure 3.3 TrafficMaster Routes Comparison - South:Harlow

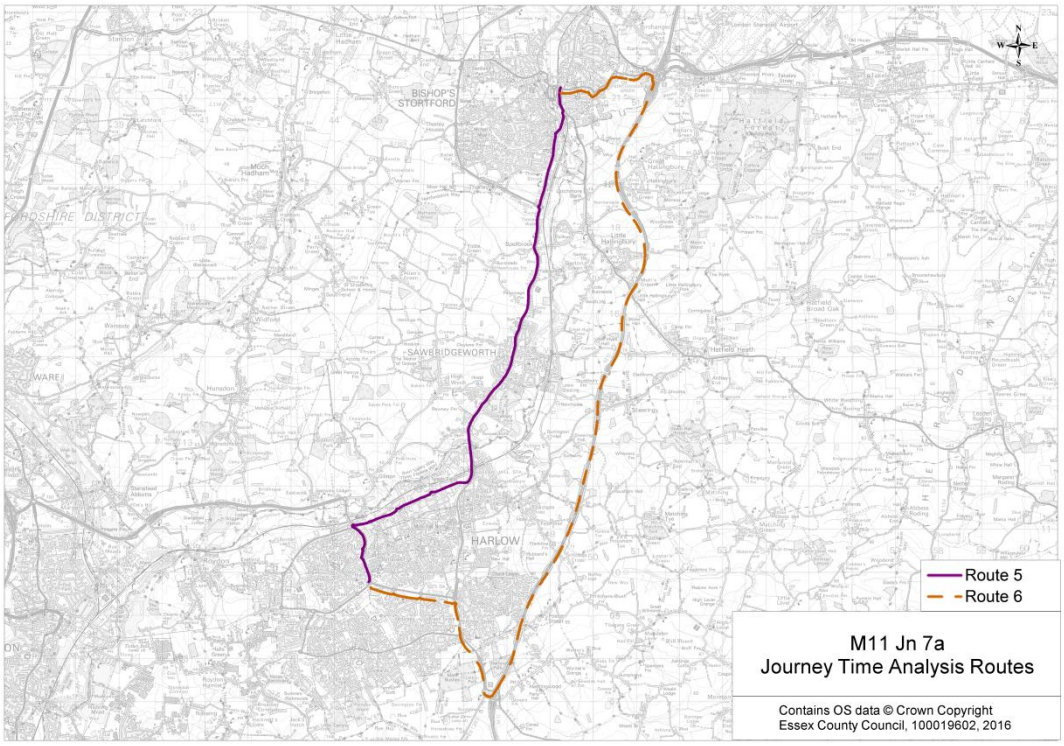

Figure 3.4 TrafficMaster Routes Comparison - North:South

In broad terms, Routes 1 and 2 provide detail on two key local competing routes to the north of Harlow, Routes 3 and 4 detail two key local competing routes to the south of Harlow, and Routes 5 and 6 enable comparison of a local route (broadly following part of the old A11) with that of a strategic route via the M11.

Table 3.1 Route Comparisons: AM peak vs Free-Flow Journey Times

				Journey Time (mins)		
Ref	**Route**	**Dir**	**Distance (km)**	**AM (0800-0900)**	**Free-Flow (2000-0000)**	**AM – Free-Flow % diff**
North:Harlow (Harlow-centred)						
1	A414 Burnt Mill/Edinburgh Way/ A1184/B1383 Thorley Wash	NB	3.8	15.3	11.2	+37%
	B1383 Thorley Wash/A1184/Edinburgh Way/ A414 Burnt Mill	SB	3.8	20.2	10.9	+86%
2	A414 Burnt Mill/Eastwick-High Wych Rd/ A1184/B1383 Thorley Wash	NB	3.9	14.9	10.7	+39%
	B1383 Thorley Wash/A1184/High Wych-Eastwick Rd/A414 Burnt Mill	SB	3.9	19.7	10.7	+85%
South:Harlow (Harlow-centred)						
3	M11 J7/A414/Eastwick Rd	NB	3.5	20.7	9.4	+119%
	A414 Eastwick Rd/A414/M11 J7	SB	3.8	14.5	10.1	+44%
4	M11 J7/A414/A1025/A1019/A414 Eastwick Rd	NB	2.6	20.0	7.5	+165%
	A414 Eastwick Rd/A1019/A1025/A414/M11 J7	SB	2.8	11.9	7.7	+54%
North:South (Local [‘old A11’] vs Strategic [M11])						
5	A1019/A1025 Velizy Ave/Edinburgh Way/ A1184 Cambridge Rd/B1383 London Rd/ A1250 Hockerill	NB	14.3	31.3	17.9	+75%
	A1250/B1383 Hockerill/ B1383/A1184/A414 Edinburgh Way/A1019 Velizy Ave/A1025	SB	14.1	28.0	16.5	+69%
6	A1019/A1025 Velizy Ave/A1025/A414/M11 J7/M11 J8/A120/A1250/B1383 Hockerill	NB	22.5	24.7	17.8	+39%

	A1250/B1383 Hockerill/ A1250/A120/M11 J8/M11 J7/A414/A1025/A1019 Velizy Ave	SB	23.3	32.8	19.4	+69%

As set out in Table 3.1, during the AM peak route 1 and 2 southbound journeys from the north, and route 3 and 4 northbound journeys from the south, are much slower than those in the opposite direction. The southbound route 1 and 2 peak hour journey times increase by ~85%, while the northbound ones increase by ~38%. Routes 3 and 4 show even greater peak hour congestion impacts, with the northbound routes peak hour journey times increasing by between 119%-165%, and the southbound routes increasing by 44-54%. This directional difference is undoubtedly due to the time of day, and it would be expected that this situation would be reversed during the evening peak.

The substantially greater delays for Harlow-bound traffic, with significant peak time increases for this traffic as set out in Table 3.1, indicate that there is much greater pressure on the network for journeys travelling towards Harlow from all directions. Both routes 1 and 2 are adversely affected by delays in both directions through Sawbridgeworth, although southbound delays through the town in the morning are greater. Routes 3 and 4 are both affected by northbound delays on the A414 between the M11 J7 and A1025 Second Avenue.

For routes 1 and 2, there is little difference in distances and travel times between them, and in either direction. This is likely to lead to some traffic diverting to the less suitable High Wych route rather than using the A1184/A414 primary route as there is no apparent time benefit from using the more suitable signed route.

Routes 3 and 4 are both primary routes; route 3 via the A414 is the strategic signed route through the town but is about one mile longer than route 4 which goes through the town centre. As a consequence the shorter route 4 is likely to experience greater traffic demand and therefore delays in peak periods, although this route remains quicker than the signed A414 route for traffic crossing the town.

When looking at the local vs strategic routeing journey times for routes 5 and 6 in the morning peak, these both show similar journey time changes during the AM peak, increasing by 69-75%, with the exception of the north-bound strategic route 6 via the M11 which, with an increase in journey time of 39%, is less affected by the morning peak period congestion.

All the journeys illustrated above demonstrate the impact on the network of only having three key access routes into Harlow, ie via A414 at Eastwick, via A1184, and via the A414 at J7. This funnelling of traffic leads to significant peak period delays and congestion and a greater tendency for regular drivers to use less suitable rural routes, particularly to the south via B181, and to the north-east via B183. It also results in reduced network resilience which means that any incidents that occur on the key links have even greater impacts on journeys to and from Harlow.

Surveys undertaken in April 2014 confirmed the data obtained from Trafficmaster, finding that extensive queues occurred at J7 during the morning and evening peak periods. Both the northbound and southbound M11 off-slips were found to have queues of almost 200m over extended periods during the AM peak period, and on the northbound off-slip again during the PM peak period. To the south-west, the B1393 also had queues in excess of 100m for much of the AM peak period, and to the north-west the A414 also had queues reaching 100m for much of the AM and PM periods.

To the north of Harlow, one of the issues affecting access to and from Harlow is the congestion on the A1184 through Sawbridgeworth, as discussed above. Queue surveys in July 2013 found that there was extensive queuing at the A1184/Station Rd/West Rd double mini-roundabout junction. Queues on the A1184 were found to be in excess of 70m throughout both peak periods. At the A1184/High Wych Rd junction, queues on the High Wych Rd, particularly during the PM period, were continuous and extended beyond the sight of the surveyors (>115m) for the majority of the survey period.

Other queue surveys in 2011 indicate extensive queuing on the A414 to the north-west of the town, at both the Eastwick and Burnt Mill junctions (the latter has since had capacity improvements).

The significant congestion at J7 has been recognised by the Highways Agency with their requirement during the Local Development Order (LDO) process in 2013 to cap the number of jobs approved at the Harlow Enterprise Zone sites until this situation can be mitigated. The 2012 traffic assessment for the EZ[21] investigated capacities of a number of junctions within the town.

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[21] Enterprise West Essex @ Harlow, Transport Assessment, August 2012, Mouchel for Harlow District Council
http://moderngov.harlow.gov.uk/Data/Cabinet/20130131/Agenda/Transport%20Assessment%20and%20Framework%20Part%20A%20(pdf).pdf

The background to the EZ employment cap is set out in the 'Agreed Statement of Common Ground between Harlow District Council and the Highways Agency'[22]. This document commented on supplementary transport assessment work which found that M11 J7 would be expected to be operating at the limits of its capacity by the end of 2019, and during 2022 (with all three EZ phases in place) the junction operation would further deteriorate, particularly during the AM peak. The conclusion reached by the HA was that "*the majority of the revised quantum of EZ development can be accommodated at M11 J7. However, there is a need to cap the final phase of EZ development until J7a has been provided and is open for use*."

The EZ TA also found that other junctions within the town would be experiencing capacity issues, and undertook sensitivity tests with J7a in place. The summarised results are set out in Table 3.2.

[22] Agreed Statement of Common Ground between Harlow District Council and the Highways Agency, May 2013, http://www.harlow.gov.uk/sites/harlow.gov.uk/files/documents/files/London%20Road%20North%20Statement%20of%20Common%20Ground%20-%20Highways%20Agency_0.pdf

Table 3.2 Harlow Enterprise Zone TA A414 Junction Assessments

Junction	Time Period	Year / Scenario (Max DoS%/Max RFC)			
		2011 Base	2021 with Committed	2021 with EZ	2021 with EZ & J7a
A414 / A1169 Southern Way	AM	92%	101%	132%	111%
	PM	116%	128%	106%	91%
					Comments
A414 / A1025 Second Ave	AM	1.00	1.59	1.94	Mitigation proposed
	PM	0.95	1.29	1.08	
A414 / Church Langley	AM	0.82	1.11	1.31	
	PM	0.71	0.90	0.96	
A414 / Gilden Way	AM	0.82	1.19	1.04	Mitigation proposed
	PM	0.79	1.10	1.04	
A414 / A1184 Cambridge Rd	AM	0.78	0.89	0.97	Mitigation proposed
	PM	0.67	0.81	0.75	
A414 / East Rd	AM	62.9%	69.4%	61.5%	Mitigation proposed
	PM	90.3%	104.2%	92.1%	

The junctions that were identified as needing additional capacity mitigation measures, have since had designs approved and the schemes are currently programmed by ECC for 2016/17; these schemes include improvements to pedestrian facilities.

3.2.2 Through Traffic

In order to understand the impact of through traffic on Harlow an analysis of movements on key links immediately surrounding Harlow was undertaken, based on mobile phone data. Figure 3.5 and Figure 3.6 show the results of the analysis.

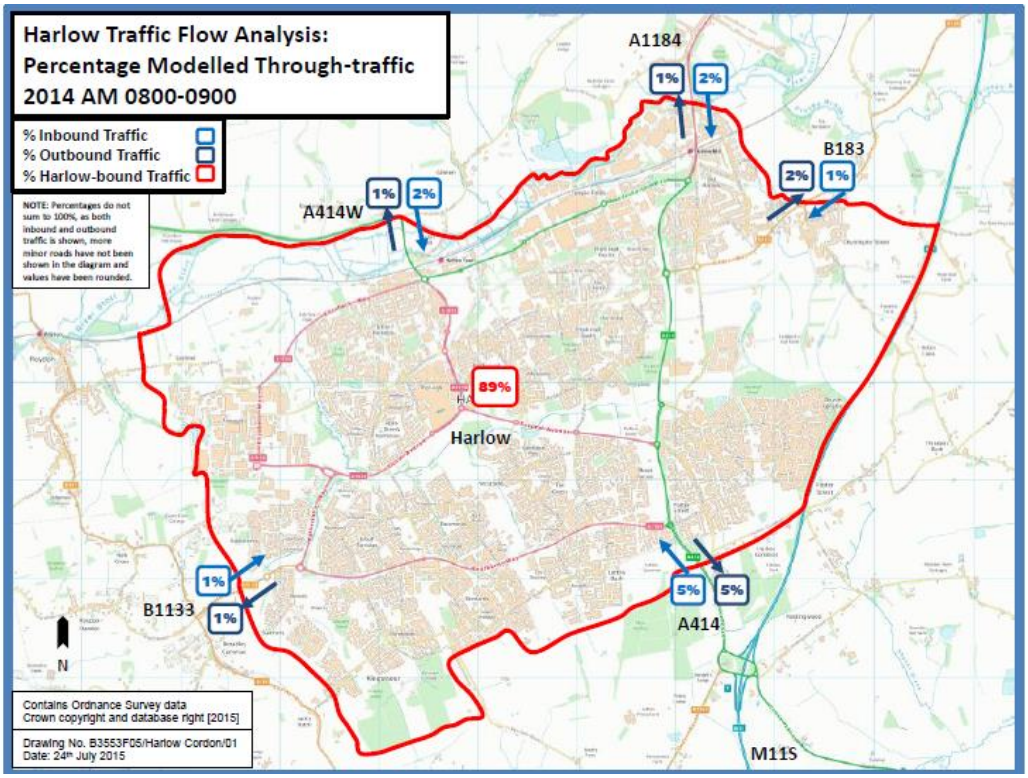


Figure 3.5 Through-Traffic Analysis 2014 AM

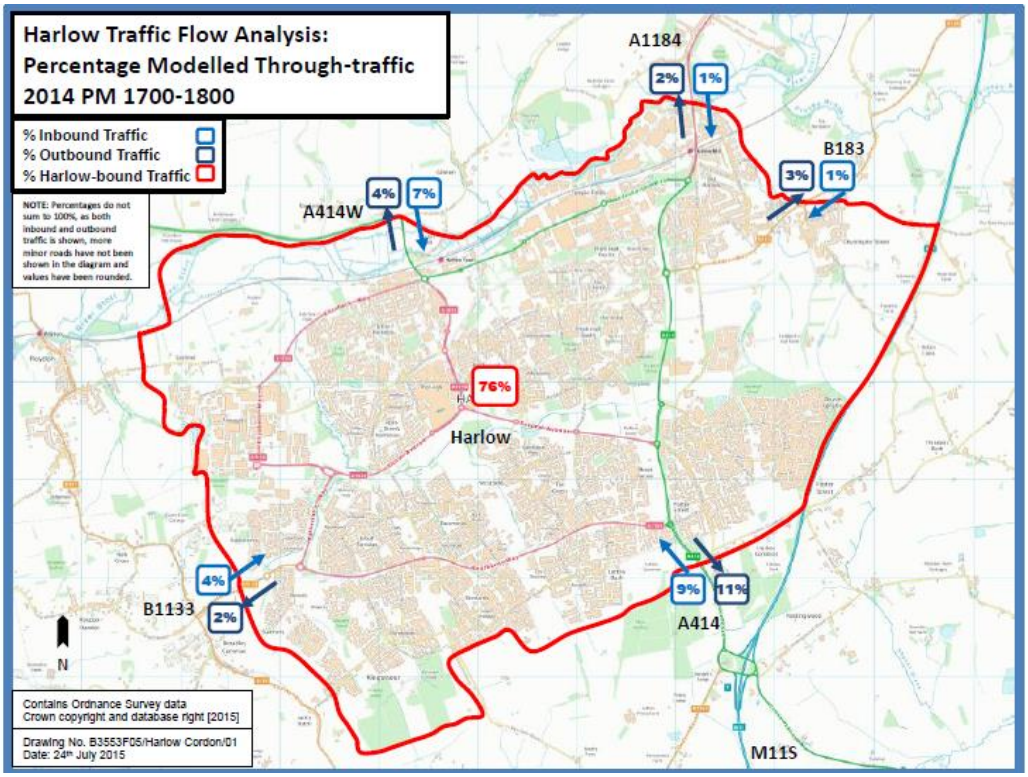


Figure 3.6 Through-Traffic Analysis: 2014 PM

It can be seen that during the AM peak approximately 89%, and during the PM peak approximately 76%, of trips had an origin or destination within Harlow. The analysis found that through trips within the town make up only around 11% in the AM and around 24% in the PM. The connection which has the highest level of through traffic in both time periods is on the A414 immediately north of J7; in the AM through trips on other key links are evenly spread, while in the PM the A414 to the north of the town has the next greatest level of through trips after the southern A414.

This supports the objective that access to and from Harlow needs to be improved as it is a key origin or destination of the majority of trips on the network.

3.2.3 Mode Choice

There is also a high dependency on the use of the private car, with 75% travelling to work in Harlow by car/van as driver or passenger, and 70% of Harlow residents travelling to work by car/van. The attractiveness of this mode of travel is compounded by the large number of car parks available in the town and at places of work.

The town has a comprehensive local bus network, with around 40 daytime bus routes, run by six operators. However, most services travel to the centrally located bus station and so bus journeys to the key employment and retail sites on the periphery of the town often require an intermediate change of buses.

The West Anglia mainline, which serves the two rail stations, links the key international gateways of Stansted and Stratford, and is, in common with the rail network across Essex, reaching full capacity. Both rail stations are in the north of the town, the main station, Harlow Town, providing regular trains between London, Cambridge and Stansted Airport. The peripheral locations of these stations, the lack of both direct and evening bus services, and the need to cross the A414 to reach the town are factors which affect the mode of travel used to reach the stations.

London Underground services, available at Epping, some seven miles to the south, are attractive to commuters as, despite being slower, they offer lower fares than mainline rail services to London. Commuters also tend to drive to Epping station, resulting in additional peak period trips on the local road network.

When Harlow was built it included a comprehensive network of segregated footpaths and cycleways, connecting the individual ‘villages’ with the town centre and employment areas. Despite this only 2% of commuters cycle to work, although 40% of journeys to work are less than 3km in length.

There has been significant investment in cycle infrastructure by ECC in recent years, to help to improve the condition of the network and to plug gaps which had developed over the years. Personal Travel Planning (PTP) has also been extensively rolled out, helping to publicise the improvements and encourage modal shift in the targeted areas. This has resulted in reduced car use and increased reliance on more sustainable modes. As a consequence PTP is now considered a core element in delivering more sustainable travel in Harlow.

3.3 Opportunities and Constraints

Constraints:

- majority of district already developed resulting in very limited opportunities to deliver required growth within boundary;
- existing highway network constraints need to be addressed before growth can occur;
- restriction on number of jobs at Enterprise Zones until strategic network access issues addressed;
- major improvement to J7 may result in unacceptable pressure on A414 junctions within town, limiting the effectiveness of the increased junction capacity;
- likelihood of adjacent districts proposing urban extensions to Harlow during current round of Local Plan development as provides more sustainable growth location if network constraints can be reduced;
- physical and environmental constraints likely to reduce viability of some network congestion solutions.

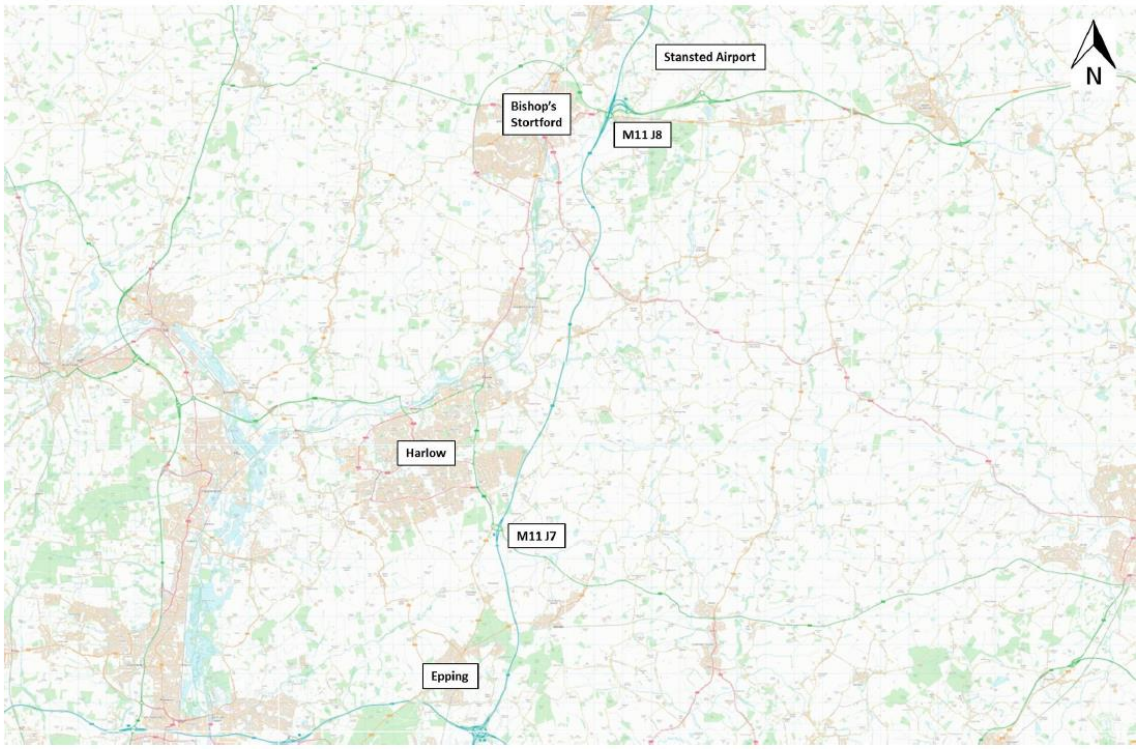
Opportunities:

- Emerging Local Plans provide mechanism for delivering and funding network improvements;
- Growth in the vicinity of Harlow provides an opportunity for sustainable development due to opportunity to improve current and future public transport accessibility;
- Opportunity to open up development land within and around district for housing and employment;
- Improving network resilience will encourage private sector investment and help to deliver new jobs and homes;
- Improving network will also encourage regeneration, Harlow is in the most deprived 30% of local authorities, and is 2nd most deprived in Essex.

4 Understanding Future Situation

4.1 Study Area

The geographical area of impact to be addressed by the potential intervention has been informed by the evidence reviewed in earlier sections of this OAR, including the extent of current and future transport problems and underlying drivers. The geographic extent of the study area is illustrated in Figure 4.1.



Contains Ordnance Survey data © Crown copyright and database 2015

Figure 4.1 Indicative Study Area

4.2 Future Land Use and Policies

The Harlow Local Development Plan (HDLP) Emerging Strategy Consultation, with reference to the need for high quality infrastructure, states:

> *"2.16 The ability of the transport system to accommodate growth has emerged as one of the single biggest barriers to accommodating the level of development needed in Harlow. On the strategic and local road network congestion is severe at peak times and a number of junctions are operating close to capacity or in excess of their original design thresholds. The existing*

road layout within some residential areas can also make parking and manoeuvring difficult.

2.17 Although there are a number of planned improvements to the road network to support committed development schemes in Harlow (Newhall, the Harlow Enterprise Zone and the Gilden Way development) the evidence shows that junction 7 on the M11 is operating close to its planned capacity and that any significant growth (housing and/or employment) in the Harlow area will cause the junction to exceed this capacity. Therefore, a new junction on the M11 (Junction 7a) is required to deliver growth in and around the town.

2.18 The strategy for Harlow will need to include measures that integrate transport and land use planning in order to provide an increase in public transport use as well as implementing enhanced access to the M11 through a new junction."

There are already several committed developments within Harlow, including the Harlow Enterprise Zone, and several large housing sites, all within the eastern sector of the town. In addition, significant committed housing development is taking place in Bishop's Stortford, as well as the ongoing expansion of passenger numbers at Stansted Airport. These developments will increase pressure on the local and strategic transport infrastructure within the study area.

All four districts in the vicinity of Harlow, including Epping Forest, East Herts and Uttlesford, are part of the same Strategic Housing Market Assessment area (SHMA), and Opinion Research Services (ORS) were jointly commissioned by them to undertake a housing assessment in order to establish the districts' objectively assessed need (OAN)[23]. The SHMA report also includes employment projections. The estimates for both are summarised in All four districts are in the process of developing new Local Plans to address their OAN and, given that the Plans have yet to be agreed, all development information contained in this section is based on informed assumptions made early in 2015, following discussions with district planning officers. It should be noted that this information pre-dates the later SHMA values, and will be subject to change as the spatial options for the Local Plans are developed and evaluated, at which point the most up-to-date OAN housing and employment numbers will be used.

[23] West Essex & East Herts Strategic Housing Market Assessment, Report of Findings, Sept 2015, Opinion Research Services;
http://www.uttlesford.gov.uk/CHttpHandler.ashx?id=5344&p=0

Table 4.1.

All four districts are in the process of developing new Local Plans to address their OAN and, given that the Plans have yet to be agreed, all development information contained in this section is based on informed assumptions made early in 2015, following discussions with district planning officers. It should be noted that this information pre-dates the later SHMA values, and will be subject to change as the spatial options for the Local Plans are developed and evaluated, at which point the most up-to-date OAN housing and employment numbers will be used.

Table 4.1 Draft Housing & Employment Estimates 2011 to 2031

District	Estimated Housing	Estimated Jobs
Harlow	5,100	3,900
Epping Forest	9,520	3,600
East Herts	12,920	9,700
Uttlesford	9,520	9,200
Total	37,060	26,400

As part of the options assessment, districts were asked to provide planning information on possible development sites and their housing and employment levels. This information has been used to assess future highway network capacity, which will in turn be fed back to the districts to inform their site allocation and spatial options processes. In addition to Harlow, Epping Forest, Uttlesford and East Herts, planning information was also sought from Broxbourne and Enfield councils. The resulting totals are summarised in

Table *4.2*; it should be noted that the highway modelling has a base year of 2014 and a forecast year of 2036 and the table reflects this period of assessment.

Guidance states that forecasts of population, households and employment should be based on the TEMPRO database[24]. While this provides a useful reference case with which to compare model outputs, for the purposes of the options assessment it was considered pertinent to base the evaluation on best available planning data as current TEMPRO forecasts do not include, and are therefore much lower than, the emerging Local Plan growth predictions.

[24] Further Guidance on Option Assessment, Technical Analysis Guidance for Technical Project Manager, DfT WebTAG January 2014

Table 4.2 Inputs to 2036 Highway Modelling Matrix Building (Medium Growth)

District	Estimated Housing	Estimated Jobs
Harlow	4,850[#]	6,000
Epping Forest	6,575	9,725
East Herts	15,550	2,400
Uttlesford	10,455	7,750
Other Districts	18,775	9,800

[#] It should be noted that the level of development in the immediate vicinity of Harlow will include sites that are located within East Herts and Epping Forest. These would comprise around 8,000 homes that would also be likely to impact on the immediate area of Harlow.

In the absence of detailed and site-specific information on other areas within the study area, TEMPRO background growth factors have been applied. For further information about modelling methodology refer to the Appraisal Specification Report (ASR), the Local Model Validation Report (LMVR) and the Model Forecast Report (MFR).

4.3 Future Changes to Transport System

A number of studies have been undertaken to identify the likely impact of the committed and emerging Local Plan growth, the most recent of which is the Harlow highway model. This has resulted in the identification of a number of highway schemes which are currently being constructed, designed, and/or are awaiting determination of funding streams to enable their implementation. The majority of these are to mitigate the likely impact of already committed development and are listed in Table 4.3.

Table 4.3 Capacity Improvement Schemes for Committed Development

Scheme	Description	Status
A414/B183 Gilden Way	Improved geometry and link widening	Construction scheduled 2016/17
B183 Gilden Way / London Rd	Approach width improvements	Part of Harlowbury development S278
B183 Gilden Way	Capacity enhancements and cycle way improvement	Part of Harlowbury development S278

Scheme	Description	Status
Sheering Rd / Churchgate St	Improved geometry and link widening	Part of Harlowbury development S278
A414 / A1184	Junction capacity improvement	Construction scheduled 2016/17
A414 west of A1184	Link widening	Construction scheduled 2016/17
A414 / New Hall Link	New link & junction with A414	EZ improvement, Construction scheduled 2015
London Road	Restriction of link to bus / cycle / peds	Implementation 2021
Templefields / A1184	New link & junction with A1184	EZ improvement, funded
A414 / A1025 Clocktower rbt	Improved geometry	Completed
A1025 Second Ave / A1019	Improved geometry	Preliminary design
A1019 / First Ave	Improved geometry	Preliminary design
M11 J7 short term scheme	Hamburger link north to south	Preliminary design
M11 J8 short term schemes:	Segregated LT slip from M11 SB off-slip to A120E	Preliminary design
	Widening of M11 NB offslip nearside lane	Preliminary design
	Widening of A120W	Preliminary design
A120 / A1250 rbt	Reconfiguration to signalised junction	Preliminary design
A120 / B1393 rbt	Improved geometry	S106 funding from BS North
A120 / BSN site access	New rbt junction	S106 funding from BS North
A120 Lt Hadham Bypass	Single c'way bypass	HCC LEP scheme, scheduled for 2018

Over and above these identified improvements, the level of growth likely to come forward as a result of the emerging Local Plans will undoubtedly require additional and major transport infrastructure to be provided.

In terms of public transport, the planned four-tracking of the West Anglia Mainline, and Crossrail2 (with the possibility of extending both schemes to Harlow Town) are both key rail projects which will have a significant impact on accessibility, connectivity and growth in the study area.

4.4 Future Travel Demands

Earlier work was undertaken to identify the likely impact of Local Plan growth using a SATURN model. While this was broadly WebTAG-compliant and gained the approval of the Highways Agency for high level assessment of strategic impacts, it was not considered suitable for the assessment of more local issues. However, it did provide valuable information with regard to several schemes which are currently under construction (as shown in Table 4.3).

To ensure that a reliable assessment of future travel demands and impacts could be obtained, ECC commissioned Jacobs to develop a highway assignment model in Visum in 2014.

The new model methodology follows WebTAG guidance; origin:destination information used within it has been informed by mobile phone data. The 2014 base model is in the process of being signed off by Highways England. The variable demand model (VDM) is in its final stages and will be incorporated for the next stage of more detailed option modelling, which will be presented as part of the planning application for the preferred option. As such, outputs reported herein should be considered high level and as a worst case as they do not take into account mode shift, etc, that VDM would allow for.

The modelling has included an evaluation of the 'without intervention' scenario, referred to as the 'Do Minimum model'. Following WebTAG guidance, a Constrained version of this model has been run, in which the growth has been constrained to TEMPRO. The future year matrices have been developed using an Uncertainty Log, which contains the best available planning information obtained from the various districts. The planning and network assumptions information is summarised in Appendix A. The Constrained models include those sites and schemes which are near certain (NC) or more than likely (MtL), and with overall district and model area growth constrained to TEMPRO.

The various options modelled to determine the need for intervention are set out in Table 4.4.

Table 4.4 Transport Intervention Determination Modelling Scenarios

Scenario	Network	Matrix
2014 Base	Existing network	2014 matrix
2021 Do Minimum	Includes schemes in Table 4.3	Base plus committed development plus TEMPRO background growth
2036 Do Minimum - Constrained	Includes schemes in Table 4.3	Base plus Local Plan NC & MtL sites, constrained to TEMPRO
2036 Do Minimum - Unconstrained	Includes schemes in Table 4.3	Base plus Local Plan sites; TEMPRO growth applied to non-study area trips

It should be noted that 2021 is the assumed Opening Year for any major network intervention, and 2036 is the corresponding Design Year. Model outputs used to estimate Design Year option benefits and value for money reported later in this OAR have been taken from both the 2021 and 2036 Do Minimum unconstrained models.

4.5 Do Minimum Modelling Outputs

The modelling in VISUM shows how traffic in the study area is expected to increase from the 2014 base to the 2036 Do Minimum Unconstrained scenario, ie with committed developments and schemes, with growth in the detailed model area as per emerging Local Plan requirements, and with growth in the wider non-study area constrained to TEMPRO. As the Unconstrained modelling shows the greatest impact on the network due to the level of growth included, all outputs reported in this OAR are from the Unconstrained modelling.

The model plots for the AM and PM peak hours shown in Figure 4.2 and Figure 4.3 illustrate the level of change in flows that can be expected without any of the major highway options being implemented. It can be seen that traffic would be expected to significantly increase on the strategic road network, particularly on the M11, A120, A10 and M25. In the vicinity of Harlow, the A414 corridor on the immediate approaches to the town indicate significant increases, as does the B183 Sheering Road/Gilden Way.

It should be noted that the A1184/B1393 corridor (the old A11) shows little or no change in flows which is likely to be due to the corridor being already at capacity. Traffic wishing to travel between Harlow and Bishop's Stortford is seen to be using less suitable roads to avoid the congested route through Sawbridgeworth, particularly the A1060/B183 Sheering Road/Gilden Way route, and unclassified roads north of High Wych. To the south of Harlow, the B181 is shown to be carrying significantly more traffic, particularly in the PM period, which is likely to be as a result of congestion at M11 J7 and through Epping. This traffic is also shown to be routeing around the west of Harlow on the A1169. During the PM peak traffic on the A414 east of the M11 is also not shown to increase, which may also be as a result of M11 J7 congestion.

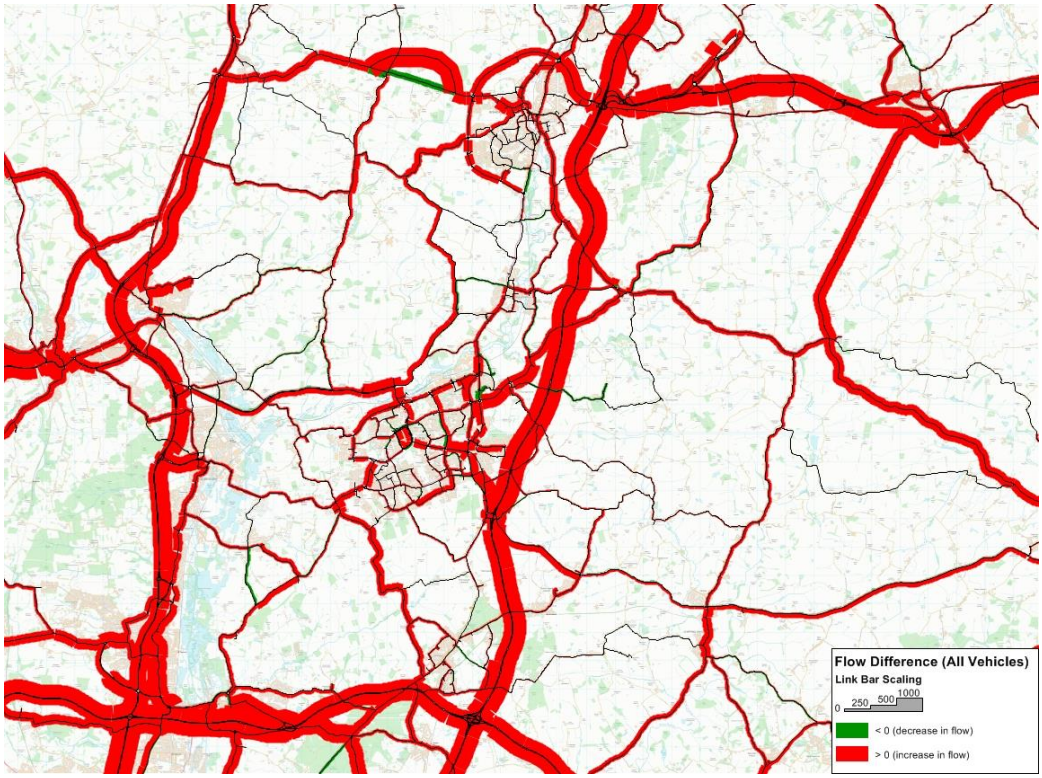


Figure 4.2 Change in flows: 2014 to 2036 Do Minimum AM (Unconstrained)

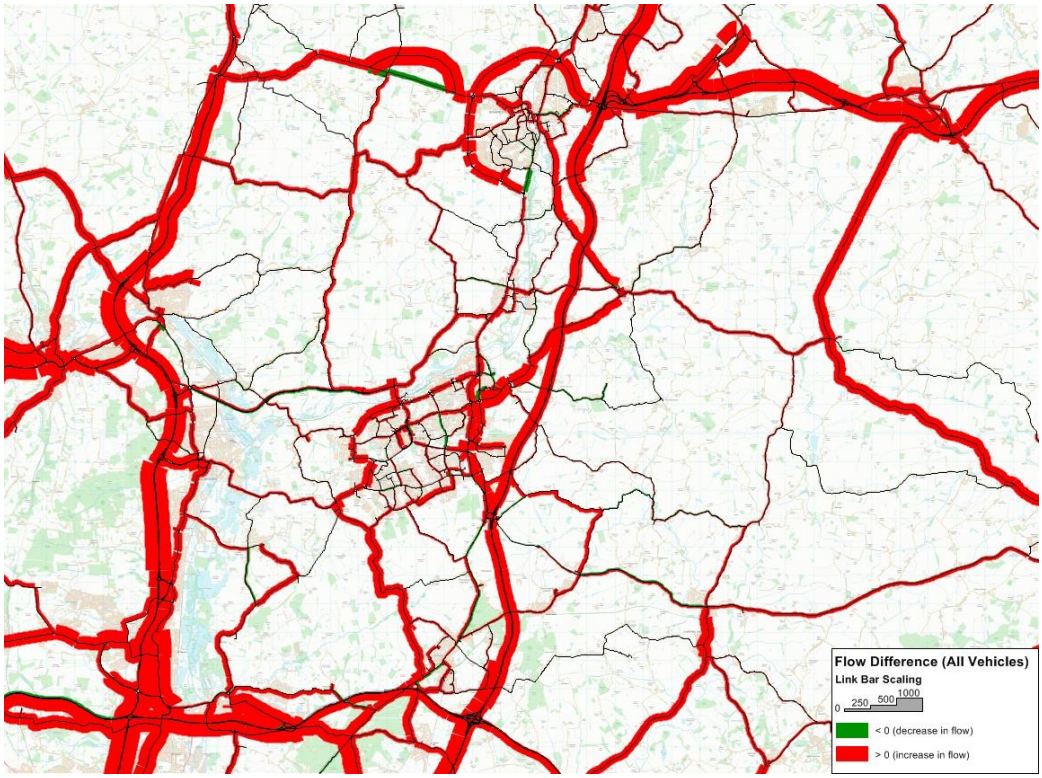


Figure 4.3 Change in flows: 2014 to 2036 Do Minimum PM (Unconstrained)

Daily flows on key links would be expected to increase significantly, as set out in Table 4.5. It can be seen that flows on links within Harlow could increase by between 45-76% in 2036 with no intervention.

Table 4.5 Forecast Model Traffic Flows on Key Links without major network interventions

	2-way AADT		Change over 2014
Link	**2014**	**2036**	**%**
A414 south of Eastwick	23,100	39,000	+69%
A414 north of J7	41,400	72,400	+75%
A414 Edinburgh Way	22,600	32,700	+45%
A1184 Cambridge Rd	15,900	26,900	+69%
A1025 Second Ave	23,900	38,800	+62%
A1019 Velizy Ave	9,800	16,000	+63%
B183 Sheering Rd	11,000	19,400	+76%
M11 J7:J8	86,300	127,500	+48%
M11 J6:J7	97,500	153,100	+57%

Almost all of these links are shown to currently experience significant peak period congestion, as illustrated in Figure 3.1 and, therefore, additional demand as a result of traffic growth would be a key indicator of future increased and more widespread congestion within the town.

5 Need for Intervention

The need for intervention is set out in the NLP regeneration and growth study[20] which states that:

> *"There is a well-founded concern that the issues of localised deprivation, skills shortages, economic restructuring, areas of poor quality housing, insufficient range of housing, inadequate infrastructure and ageing physical environment will continue to affect the town without concerted effort to address these. Without intervention Harlow's long term prospects are considered to be weak, particularly given the position of comparator towns and cities elsewhere."*

It concludes that there is a clear link between growth and regeneration outcomes, and that recent developments in the town have delivered jobs, homes, infrastructure investment and new community facilities.

As set out in sections 3 and 4, evaluation of the existing situation and highway modelling of future demands has shown that there is a need for intervention to increase highway capacity to help to facilitate likely levels of growth and improve accessibility within the town.

5.1 Underlying Drivers or Causes

As previously stated in Section 3, Harlow was originally planned in the 1950s to have a population of 80,000, and a peak of 81,000 was reached in 1974. However, the population declined to 73,000 during the 1980s, and only exceeded the earlier high levels in the late 2010s; the 2011 Census indicated that the population was 82,200.

Over the past 20 years, the underlying drivers for change have shifted in priority. Whereas the priority in the early 1990's was focussed on improved road access to the wider network and congestion relief in the Harlow urban area, the priority has more recently become enabling sustainable economic growth and regeneration within the West Essex and East Herts area, with particular reference to Harlow and the London-Stansted--Cambridge corridor.

In particular, there is recognition that it will not be possible to release the residential and employment development potential of key sites around Harlow in the emerging Local Plans without major transport interventions and associated improvements to the local road network.

5.2 Current Transport-related Problems

The key current transport problems relate to the configuration of the existing J7, which is already at capacity during peak periods, and which provides the only access to the strategic road network. The resilience of the A414 is also compromised by its routeing through J7, as well as the existing and future capacity issues at some of its junctions (see Table 3.2) through Harlow, where peak period congestion already leads to traffic routeing along less appropriate roads, particularly the town centre.

Existing growth in Harlow is already constrained by the lack of capacity at J7, with the LDO for the Enterprise Zone capped until additional network capacity is realised. This situation is recognised by Highways England within the RIS, and a Stage 0 study to identify possible junction capacity improvement at J7 is currently being undertaken on their behalf.

5.3 Future Transport-related Problems

As well as existing and committed growth constraints the existing highway network congestion situation will be exacerbated by growth arising from OAN that the districts will need to deliver as part of the emerging Local Plans process. Additional highway infrastructure improvements are needed to enable future growth, particularly along the A414 corridor, and through the town centre.

In addition, land that could be brought forward for development in the east of Harlow is constrained by lack of transport infrastructure to enable connection to the local road network.

5.4 Impacts of Not Changing

Thus the immediate impacts of not changing are:

- Very limited scope for growth in housing and employment, and regeneration to meet required regional and local objectives.
- Worsening congestion at J7, with consequential impacts on traffic on the A414 through Harlow, access to the M11 and Stansted Airport;
- Worsening connectivity within the town;
- Worsening inter-connectivity with major centres including London, Cambridge and Stansted Airport.

6 Generating Options

Since the decision to expand Stansted Airport in 1985 there has been recognition of the need for intervention within the Harlow area, and there have been a number of studies of possible road schemes. Some of these have been in outline only, and others in more detail. This section sets out the history of options development and then details the initial sifting process.

6.1 Evaluation of Alternative A1184-M11 Connections (1994)

The 1994 report of a A414-M11 Link Road study, jointly commissioned by both Herts and Essex County Councils, set out the background to its own remit and noted that, following consultation in 1988, three objectives for the comprehensive improvement of the road network in the Hertfordshire/Essex border area had been identified. These were:

- To provide a high quality access to Stansted Airport along the A414 corridor;
- To relieve the urban area of Harlow of A414 Primary Route traffic;
- To relieve Sawbridgeworth of through-traffic on the A1184 without further exacerbating conditions in Bishop's Stortford.

The 1994 report noted that the early work on broad strategies led to the adoption of a scheme to provide a link connecting the A414 to the M11 north of Harlow, and a Sawbridgeworth bypass ('Strategy E'). Strategy E comprised 3 elements:

i. An Eastwick to Harlow Mill link;
ii. A Harlow Mill to M11 link; and
iii. A Sawbridgeworth bypass.

Following further public consultation in 1992, Herts County Council Environment Committee agreed on the optimal routes for each element (i. Route C, ii. Route D, iii. Routes A or B, both these alternatives also included a Spellbrook bypass). However, while ECC Members accepted Route C for the Eastwick to Harlow Mill section, they rejected all routes developed for the Harlow Mill to M11 section, taking the view that the environmental impact was unacceptable; they had no view on the Sawbridgeworth bypass element as it was wholly within Herts. As agreement had not been reached both authorities agreed that further investigation was required to try and identify a more environmentally acceptable solution.

This formed the remit for the 1993 Study which reported in January 1994. Three possible route corridors were identified, which would avoid significant demolition of property:

- Original Harlow Mill to M11 corridor, Route D, with vertical alignment modifications, including passing over the railway and under the M11;
- Area between Sawbridgeworth and Spellbrook; and
- Area to south-east of Bishop's Stortford.

All three corridor options were to take into account the routes retained for other sections of the scheme and any consequential effects. It should be noted that the Sawbridgeworth bypass element was the subject of a separate report [unseen]. Within each of these corridors specific routes were identified and these, plus one additional route, were taken forward for more detailed investigation, including the production of 1:2500 scale drawings, longitudinal sections and environmental constraint plans [also unseen]. Subsequently, additional traffic modelling was supplied for two further modifications, one of which was the replacement of the proposed dual-carriageway Harlow Mill - M11 link with single carriageway, the other being an A1184-M11 link to the north of Sawbridgeworth.

A key conclusion of the report is that:

> *"In operational terms, a scheme incorporating a Harlow Mill to M11 link is much better than any other option and meets all of the objectives set for the project. The new motorway junction can be built to current design standards, and would not be opposed by the Department of Transport."*

However, the proposed scheme raised what was considered to be a significant issue:

> *"Environmentally, however, there is a major obstacle on the (then proposed) alignment where it crosses a site for which scheduled ancient monument status has been applied. This is likely to be insurmountable."*

The report therefore suggested the investigation of other alignments, but noted that these may not permit the continuous grade separated layout of the original route.

The issues around each of the options reviewed in the 1994 study are summarised in Table 6.1.

Table 6.1 1994 Study - key findings summary

Scheme	Pros	Cons
Harlow Mill to M11 Route D	Meets all objectives of project	Crosses scheduled ancient monument, other alignments would need to be investigated
Bps Stortford SE Bypass		Doesn't remove A414 primary traffic from Harlow; Attracts traffic to A414/A1184 corridor – bypass would need to be dual 3-lane; A414 west of Harlow seriously overloaded; Affects proposed M11 airport slip roads [now constructed]; Thorley St ecologically sensitive sites affected
A1184-M11 Link north of Sawbridgeworth	Meets two of three objectives	Doesn't remove A414 primary traffic from Harlow; Attracts traffic to A414/A1184 corridor; Full visibility standards of new M11 junction not achievable; Less environmental impact but still ecologically sensitive
A414-M11 link to north of Harlow only (dual A414-A1184, single A1184-M11)	Relieves Harlow of A414 traffic to lesser extent than full dualled option; Provides improved access to Airport	Only minor relief to Sawbridgeworth; Modelling indicates should be dualled throughout; Crosses scheduled ancient monument, other alignments would need to be investigated

Scheme	Pros	Cons
General		Any A1184 connection to M11 north of Sawbridgeworth effectively abandons objective of relieving Harlow of A414 traffic; would only provide access to Airport; flows not likely to be high enough to justify costs and environmental impacts

The A1184-M11 Link north of Sawbridgeworth is the option that has been included in the high-level evaluation of schemes set out in section 6.7 below, where it is referred to as the 'Northern Northern Bypass'.

6.2 The Harlow Transportation Study (2005)

The 2005 Harlow Transportation Study was undertaken by MVA on behalf of Harlow Council to test the feasibility of major population and employment growth in the Harlow area against the existing transport infrastructure. The project included development of a strategic area model, using TRAM.

Its objectives were to:

- identify existing and emerging transport problems, issues and opportunities;
- examine issues and capacity and identify broad locations and scope for more housing and employment development;
- identify additional transport schemes to enable delivery of development.

It noted that the London-Stansted-Cambridge corridor had been identified as a potential area for growth and economic regeneration through the Government's Sustainable Communities Plan and Regional Planning Guidance, and that the area between Epping, North Weald, Harlow and Stansted occupied a key position within this corridor.

When considering the current highway provision, the study report noted that:

> *"The fact that the A414, a primary east-west route, dog-legs through central Harlow, is a major influence on traffic conditions in the town.*
>
> *There are three main entry corridors through which traffic accesses and leaves Harlow: A414 to the north-west, A1184 (old A11) to the north-east, and A414 to the south.*

That Harlow is dependent on a single junction access to the strategic motorway network is unusual in towns of a similar size and character.

The location of M11 J7 to the south east of Harlow is less than optimal for serving the District and is not what was envisaged when the town was originally planned. This single junction access to the motorway causes strategic and local route choices that are to the detriment of Harlow Urban Area road users and residents."

The report also recognised that J7 had a dual function of providing access to Harlow and the wider corridor served by the A414. In particular it noted that

"Taken together, the location of J7 relative to the town and the operational limitations of the junction during peak periods result in restricted access to the motorway network from Harlow and the A414 corridor."

With regard to public transport, the study considered that the urban area of Harlow was served by a good network of local bus routes, with buses well used and facilities improving. However, it considered that there was scope for further improvement to local bus services, particularly in regard to the quality of the bus fleet, the facilities and information provided at stops, the integration of ticketing, and that some areas may be better served by different routeing patterns.

The study recognised that development of significant scale in and around the town offers the potential for a step-change in the public transport offer. It considered that improvements should be focussed not only on linking development areas to the town centre, but also connecting Harlow to areas south and east of the District, particularly creating improved accessibility to the London Underground network at Epping.

The study considered two main planning scenarios based around the construction of 19,000 new housing units over and above the then existing Local Plan commitments by the year 2021.

- Scenario 1 placed the additional development on a north:south axis, including significant residential development to the north of the A414 in the vicinity of Eastwick and Gilston Park.
- Scenario 2 placed the additional development on an east:west axis, with a smaller cluster of residential development along the B183 to the north west of the town.

Both schemes also included significant development at North Weald. It should be noted that the currently emerging Local Plan is likely to result in a planning scenario which combines major elements of both of the scenarios tested in the 2005 study. The

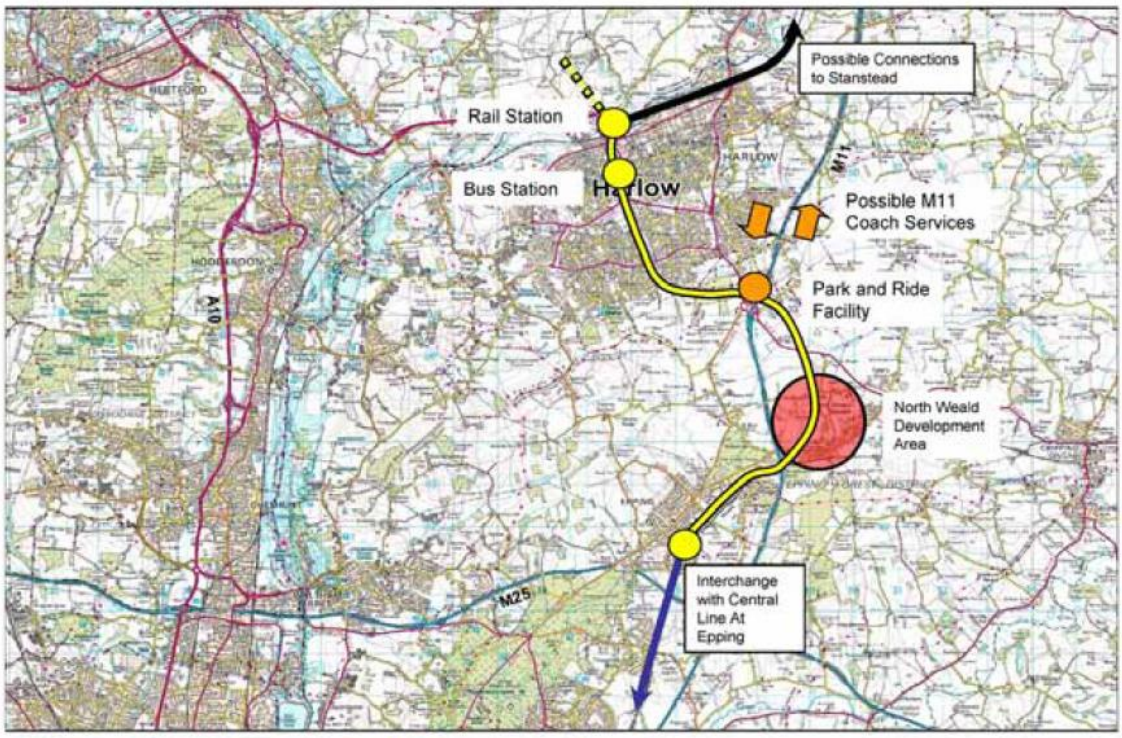
difference would be less development to the north and south, at Gilston and North Weald respectively.

The study considered two main transport schemes, as follows:

- A Northern Relief Route, linking the A414 with the M11, with sub-options for
    - A route south of Sawbridgeworth to a new junction with the M11
    - A route north of Sawbridgeworth to a new junction with the M11
    - A Sawbridgeworth western bypass with link to the Bishop's Stortford bypass
- A Southern Relief Route linking into the M11 at J7 with two sub options, each linking into the A414 either side of Roydon.

All of the highway schemes were required to include (unspecified) improvements to J7 to deliver additional capacity to alleviate current and forecast peak period congestion.

All scenarios also assumed that a high quality, 10 minute frequency, guided bus-based public transport corridor is in place, linking key development areas with Harlow Town station, the bus station, south Harlow, J7 (where a park and ride facility would be in place), North Weald and Epping Central Line station. This scheme is illustrated in Figure 6.1.



Source: Figure 3.3, Harlow Transportation Study, 2005

Figure 6.1 2005 Study High Quality Public Transport Corridor

The study noted that, given the congestion levels measured on the A414 and in the north-east quadrant, it was likely that major expansion of the town was unfeasible without major new transportation infrastructure. To maximise any opportunities, land-use and transport planning needed to be integrated to keep travel to a minimum, place less reliance on private car, increase opportunities to use sustainable modes, support regeneration and help tackle social deprivation.

The findings of the study were presented as a set of scenario and scheme appraisal matrices. The schemes were developed as outline routes rather than detailed drawings, thus there is only a high level appraisal of engineering feasibility and environmental impacts.

The report concluded that the two best performing options were:

> Planning Scenario 1, with northern relief road to the south of Sawbridgeworth between Eastwick and a new junction on the M11, with a junction on the A1184, major improvement to J7, and a high quality PT corridor; and
>
> Planning Scenario 2 with southern relief road, connecting the A414 east of Roydon to J7, with intermediary junction, major improvement to J7 and the high quality PT corridor.

The Stage 2 NATA appraisal findings for these scenarios are summarised in Table 6.2.

Table 6.2 2005 Study - key findings summary

Scenario Appraisal	PS1 (north, central & N Weald)	PS2 (dispersed south, west, east & N Weald)
Transport		
Engineering Feasibility	More extensive viaduct required; PT corridor extended to serve Gilston dev would require new rail and river bridges	

Scenario Appraisal	PS1 (north, central & N Weald)	PS2 (dispersed south, west, east & N Weald)
Operational Feasibility	Requires new M11 Jnc, resulting in new patterns of movement, would provide traffic relief to J7, reducing scale of improvement needed at J7	
Outline Capital Costs	Around 10% lower than PS2; Cost per km higher due to engineering complexity; extension of PT corridor to Gilston mean costs 20% higher	
Local Policy Objectives	Consistent with regeneration; helps strengthen potential as sub-regional centre; concentrated form enhances regional gravitational pull; all devs would be served by PT corridor; access to SRN improved to from north/east Harlow	Consistent with regeneration; helps strengthen potential as sub-regional centre; may create more dispersed town to threaten centre; local bus connections needed for some devs; access to SRN improved to from south/west Harlow
National/Regional Objectives	Broadly consistent with RSS14; don't reflect distribution of dev being consulted on for EEP	Broadly consistent with RSS14; don't reflect distribution of dev being consulted on for EEP
Appraisal: Shared Priority Targets		
Congestion	Significantly benefits A414 and A1184, some benefits to Harlow Urban Area; dev traffic concentrated on key links, causing localised congestion and lower speeds	Significant benefits to A414; benefits (and traffic) more dispersed across network;

Scenario Appraisal	PS1 (north, central & N Weald)	PS2 (dispersed south, west, east & N Weald)
Environmental Impacts	Avoids most critical env constraints; extensive viaduct needed – visual intrusion; noise impacts during and after construction; mitigation required; generates increase in emissions (40%) in urban area	Avoids most critical env constraints; requires viaduct – visual impact; noise impacts during and after construction; mitigation required; generates higher emissions (60% increase) with urban area but lower beyond; traffic more dispersed results in higher growth in vkm and so higher emissions
Accessibility and Integration	PT corridor improves accessibility to wards with highest levels of social deprivation, creates new ops for access to employment and essential services; improved access to bus and rail stations will improve integration between modes	PT corridor improves accessibility to wards with highest levels of social deprivation, creates new ops for access to employment and essential services; improved access to bus and rail stations will improve integration between modes
Other NATA Objectives		
Economic Appraisal (methodology results in over-estimation of benefits)	PVB £1037m; costs lower; PVC £339m; BCR 3.1	PVB £1679m; PVC £368m; BCR 4.6
Deliverability	5-7 years; significant contributions likely from developers; shortfall likely requiring public funds; PT corridor 7-12 years, require 25% local contribution	5-7 years; significant contributions likely from developers; shortfall likely requiring public funds; PT corridor 7-12 years, require 25% local contribution

It should be noted that the 2005 Transport Study concluded that the southern relief road scheme would also require major improvements at M11 J7 but did not provide any information on the improvement required. Accordingly the evaluation of this

scheme reported in section 6.7 of this report has not included any costs (or benefits) arising from the impact of including major improvements at J7.

6.3 J7 Harlow: Direct access with A414 (2005/6)

Irrespective of its consideration of transport infrastructure requirements, including a new junction on the M11, the 2005 Report highlighted the shortcomings of the existing M11 J7, although it didn't provide any information on possible capacity improvements. As previously stated, the A414 provides the only link to the wider highway network in the south of Harlow. It is a crucial link and its resilience is severely compromised by its routeing through J7.

2014 ANPR surveys indicate that between 5,300-5,800 vehicles pass over the junction in each peak hour, with 35-40% of that traffic either coming into or leaving Harlow via the A414, its busiest arm.

J7 is a five-arm grade separated signalised roundabout, with three circulatory lanes on its western side, but only two circulatory lanes on the eastern side, which is constricted by the width of the two motorway over-bridges. The junction provides access to the M11, the A414 to Ongar and Chelmsford, and the B1393 to Epping and Loughton.

The 2005/6 study, undertaken by Mouchel, investigated the possibility of removing some of the circulatory traffic by establishing a direct link between the A414 (Harlow) and the M11 to the south.

Four initial options were produced, including layouts which allowed free movement of northbound traffic from the M11 to the A414, but with a southbound link either restricted to 50 kph or requiring an on-line junction. Two further options were also produced with fully grade-separated southbound links, one with a bend restricted to 85 kph.

In order to minimise assessment work at this stage Option C was selected for further evaluation as part of this options assessment.

6.4 A414-M11 Link Road Feasibility Report (2007)

The 2007 Feasibility Study noted that the A414-M11 link had been investigated a number of times over the previous 10-20 years, and looked at the feasibility of two possible solutions to address the requirements of the East of England Plan which recommended an urgent need to address the existing traffic congestion problems within Harlow.

As with the 1993/4 study, the main purpose of the 2007 study was to assess the feasibility of constructing a link road from the A414 dual carriageway north of Harlow through to the M11. Whereas in 1993/4 the objective had been better access to Stansted and relief of through traffic, the key objective was to open up development potential within and around Harlow.

A key driver for the study was the opportunity put forward by site promoters for a mixed-use development north of Harlow, comprising 10,000 homes with commercial, industrial and retail premises providing up to 12,000 jobs.

Other sites had also been identified for possible development in Harlow by both the Draft East of England Plan and at its subsequent Examination in Public. One of these areas, known as New Hall, is situated east of Harlow and had the potential to provide approximately 5,000 dwellings.

Thus the 2007 study introduced a second distinct objective:

> *"The other objective … is to investigate the feasibility of providing a link into the east of Harlow as an alternative to the A414-M11 link. This alternative deals with completely separate issues, which are currently faced with on the existing road network within Harlow."*

The options considered were therefore:

- Providing a link from the existing A414 north of Harlow to the M11 (A414 – M11 strategic link);
- Providing a link from the M11 to the east of Harlow (local link into east Harlow).

The Study report stated that:

> *"The proposed housing developments that have been identified in the Draft East of England Plan play a major role in the proposed route alignments that have been identified in this report. The A414-M11 link (option 1) allows for the possibility of a major housing development to the north of Harlow and is likely to improve traffic conditions within Harlow, while the link into east Harlow (option 2) simply provides better access between the M11 and any proposed development to the east of Harlow."*

In common with the 1993/4 study, this report investigated the feasibility of several alignment options for both the A414-M11 link, and the eastern access link, both of which required a new junction on the M11, now referred to as J7a.

6.5 Harlow Eastern Access Study (2011)

Aecom were commissioned by ECC to undertake traffic modelling work to assess various schemes to provide additional eastern access opportunities from Harlow to the M11. This assessment work looked at:

- Long northern bypass, connecting A414 just east of Stanstead Abbots, skirting around the north of the Gilston development, crossing the A1184 just south of Redricks Lane, connecting with the M11 south of the Sheering Road overbridge;
- Short northern bypass, connecting from A414 at Eastwick, to the A1184 and to the M11 in the same locations as the long northern bypass;
- Southern bypass, from The Pinnacles, west of Katherines, and south of the urban area of Harlow, connecting through to the J7 gyratory;
- New link with A414 500m south of B183 Gilden Way across to new junction on M11;
- New link with B183 Gilden Way utilising the existing B183/London Road roundabout across to new junction on M11.

The study provided an overall summary of the options against performance indicators as set out in Table 6.3.

Table 6.3 2011 Harlow Eastern Access Study Summary

Scheme	Delays	Volume to Capacity	Journey Times
M11 J7a Green	Some performance increase	Limited/No performance increase	Some performance increase
M11 J7a Blue	Some performance increase	Limited/No performance increase	Some performance increase
Southern Bypass	Some performance increase	Limited/No performance increase	Some performance increase
Long Northern Bypass	Performs well	Performs well	Performs well
Short Northern Bypass	Performs well	Some performance increase	Some performance increase
New Link from A414	Limited/No performance increase	Limited/No performance increase	Some performance increase
New Link from Gilden Way	Limited/No performance increase	Limited/No performance increase	Some performance increase

The conclusion at that stage was that the Long Northern Bypass was the best performing option based on the assumptions used and modelled assessment method. It was recommended that additional scenario testing be undertaken to assess the effect of alternative development and planning options.

However, the Short Northern Bypass is closest to the Northern Bypass option included in the evaluation of schemes set out in section 6.7 below.

6.6 Harlow Junction 7a Feasibility Study (2011)

During 2010/11 a suite of reports and technical notes was produced by Mouchel, documenting work undertaken for ECC to assess the feasibility of a new junction on the M11 between junctions 7 and 8, together with a new link road connecting into the existing Harlow road network.

The initial package included four reports:

- Harlow J7a: Feasibility Study (August 2011, updated March 2012)
- Harlow J7a: Junction Location Optimisation (June 2011)
- Harlow J7a: Unlocking Harlow's Development Opportunities (June 2011, amended and reissued March 2012)

- Harlow Eastern Access - Gilden Way Extension, Technical Note (October 2011)

A subsequent report set out details of costing and design.

Whereas earlier studies had considered a new junction on the M11 in the wider context of strategic links to the A414 and wider development strategies, the focus of the 2011 feasibility study was more limited:

> *"The study will only assess J7a and its link road within a study area that has been specified by ECC. As such, it will not confirm that a J7a-related scheme is necessarily the most appropriate highway infrastructure improvement scheme for Harlow. It will simply demonstrate whether there is a feasible J7a scheme."*

A crucial difference between this study and previous schemes was the extent of the associated link road. All the previous schemes had envisaged a new more strategic link road from the M11 at least as far as the A1184 at Harlow Mill, and generally without an interchange on the B183. In complete contrast, this study envisaged that the connection to the new junction should be provided by an extension and possible upgrading of B183 Gilden Way to provide a more local link.

The aim of the 2011 Development Opportunities report was to strengthen the business case for the junction and associated extension of Gilden Way, by tying the scheme into potential, committed or proposed developments, and as a tool for unlocking new developments, to generate further economic benefits in line with wider long-term plans for Harlow's development.

The study made recommendations on the optimum locations for J7a, and the associated infrastructure required to connect into the local highway network.

6.7 Option Identification

As set out in this section, a number of options have been identified which could fulfil some or all the scheme objectives. For the purposes of this assessment, the options have been refined to the following, which broadly cover the range and extent of the schemes devised to date:

Option 1: New M11 junction to east of Harlow, J7a, with local link to B183 Gilden Way;

Option 2: Improved M11 J7;

Option 3: Both Option 1 and Option 2;

Option 4: 'Northern Bypass', which includes the Option 1 J7a scheme together with a dual carriageway link from J7a through to A414 at Eastwick, and an additional single carriageway access into Harlow via River Way;

Option 5: 'Northern Northern Bypass', which comprises a dual carriageway link from A414 at Eastwick, aligned to the south of Gilston, and then to the west of Sawbridgeworth, connecting with the M11 via a new junction south of Little Hallingbury;

Option 6: 'Southern Relief Road', which comprises a dual carriageway link from the A414 east of Roydon, skirting the western and southern edges of Harlow, and connecting with J7 via the B1393. Please note that the capacity improvement required at J7 in conjunction with this scheme has not been modelled or assessed.

These options are illustrated in Figure 6.2. It should be noted that at this stage in the option development process, the alignments of all of the bypass schemes are conceptual in nature as extremely limited scheme design has been undertaken. For J7, the scheme drawn up by Mouchel has been used which will be superseded by scheme(s) identified by the Stage 0 study for J7 currently being undertaken for HE.

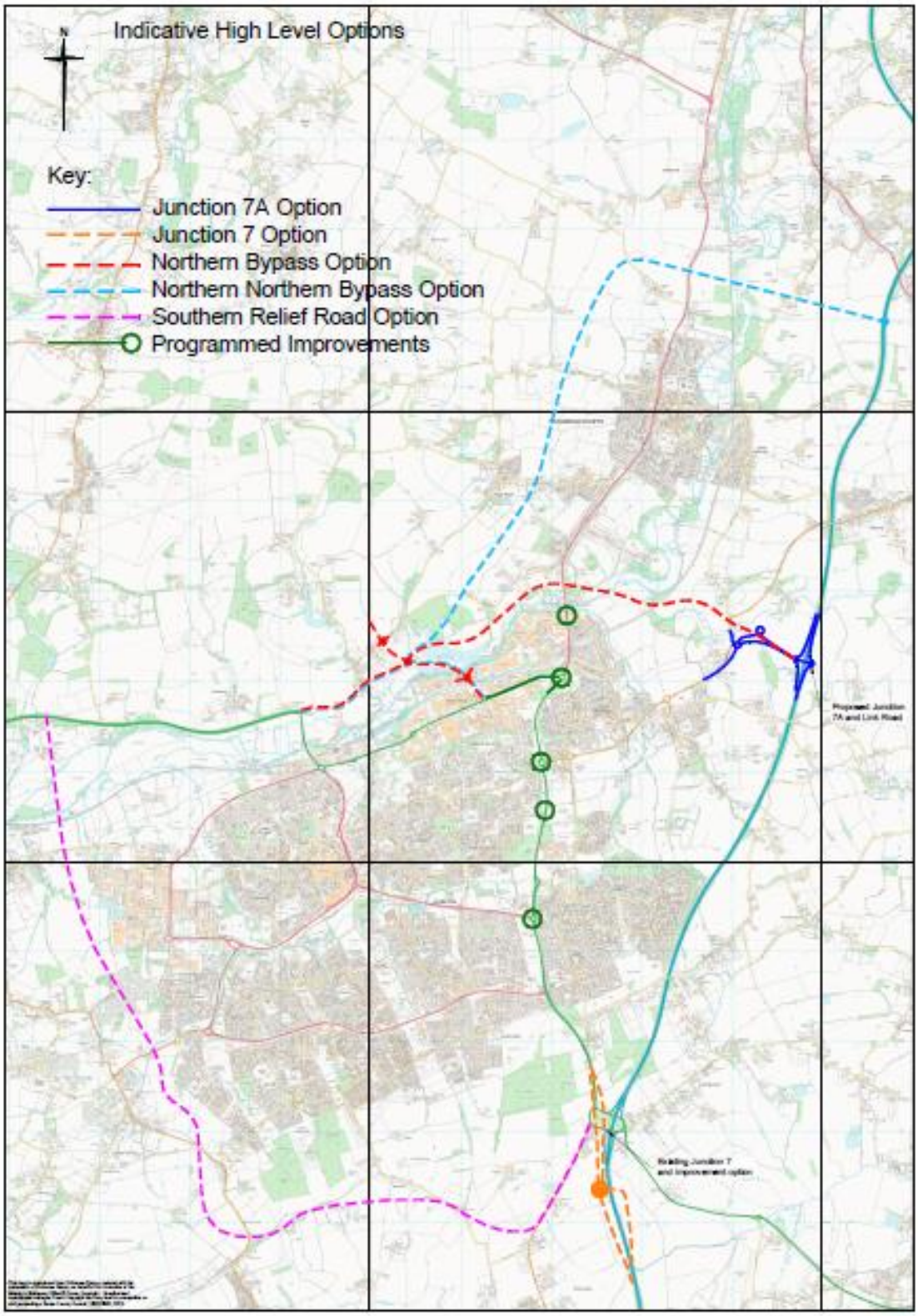


Figure 6.2 High Level Intervention Options – indicative configurations

7 Initial Sifting

7.1 Scheme Objectives

The scheme objectives have been derived from the policy documents referenced in section 2. These are:

- To provide connectivity to and within urban areas to support self-contained (ie solely within Harlow) employment and housing growth and regeneration;
- To provide good connectivity within Essex and with adjacent major areas, maximising benefit to the local economy of international gateways and strategic links to London, the East and South East;
- To address network infrastructure capacity issues and improve network resilience;
- To reduce congestion and improve traffic management within Harlow and along the A414 corridor and at M11 J7;
- To enable housing and employment growth and regeneration;
- To unlock development land.

7.2 Option Evaluation - Methodology

A number of methodologies have been used to assess the available options and to identify which schemes to take forward for more detailed assessment. The detailed methodologies are set out in the following sections and comprise:

- Highway assignment modelling of options;
- Economic appraisal to estimate BCR and VfM;
- EAST evaluation and weighting.

7.3 Do Something Model Development

These potential intervention options have been assessed using the VISUM forecast traffic models; the modelling methodology follows that set out in the ASR and uses an early version of the model, as reported in the MFR. Each option has been modelled individually. The 2021 and 2036 Do Minimum scenarios establish a forecast of traffic conditions within the study area, against which infrastructure interventions have been assessed comparatively in terms of total vehicle hours for the model area.

Use of the highway assignment modelling has enabled the wider strategic impacts of the various options to be assessed.

The benefits of each option, in terms of time benefits (changes in total vehicle hours from those in the Do Minimum scenarios), have been extracted from the VISUM modelling for the opening and design years, which are assumed to be 2021 and 2036 respectively. No other benefits have been included in the assessment.

The total vehicle hours for each user class in the fully model area have been extracted in order to capture the full benefits of each option. These wider model benefits for all of the options are set out within each option assessment section.

The user classes used in the modelling are set out in Table 7.1.

Table 7.1 VISUM Model User Class Classification

Purpose	User Class (UC)
Car: Home Based Work (HBW)	UC1
Car: Home Based Employers' Business (HBEB)	UC2
Car: Home Based Other (HBO)	UC3
Car: Non-Home Based Other (NHBO)	
LGV	UC4
HGV	UC5

The Do Minimum total vehicles hours are set out in Table 7.2. It should be emphasised that all of the options being assessed are likely to lead to a reduction in time over the Do Minimum, no intervention, scenario as they either provide shorter routeing, or additional faster links. Of more importance is the effect that they have on access to and within Harlow, and how each of the options meet the scheme objectives.

Table 7.2 VISUM Model Outputs: Do Minimum

Total Time	Do Min Opening Year (2021) Total Time (veh hrs)	Do Min Design Year (2036) Total Time (veh hrs)
AM UC1	23,653	28,796
AM UC2	2,967	3,723
AM UC3	11,020	16,827
AM UC4	6,556	9,478
AM UC5	1,748	2,284
IP UC1	6,715	7,952
IP UC2	2,282	2,899
IP UC3	12,563	19,853
IP UC4	4,843	6,856
IP UC5	791	989
PM UC1	22,533	27,707
PM UC2	3,164	4,063
PM UC3	12,929	20,157
PM UC4	6,478	9,479
PM UC5	767	988

7.4 Option Modelling: 2036 Unconstrained

The following sections provide high level commentary of plotted key flow differences for each option when compared with the 2036 Do Minimum scenario.

The option assessment modelling reported here was carried out in 2015 and has been subject to further refinement during the subsequent stage of the more detailed evaluation, which has since taken place. As such, the development and infrastructure assumptions used, differ from those used since in the most recent stage of the scheme assessment, when the modelling had been improved.

It should also be noted that the model, at this stage, is considered to be suitable for assessing strategic impacts, but is less suitable for more localised impacts. These impacts will be better understood once more detailed modelling becomes available for the next stage of options assessment.

7.4.1 Option 1 - Junction 7a

The effects of Option 1 J7a on total vehicle hours, when compared with the Do Minimum scenarios are set out in Table 7.3.

Table 7.3 VISUM Model Outputs: Option 1 Without and With J7a

Total Time (Veh Hrs) User Class	Do Min 2021	Do J7a 2021	Diff with J7a 2021	Do Min 2036	Do J7a 2036	Diff with J7a 2036
AM UC1	23,653	23,525	-127	28,796	28,602	-194
AM UC2	2,967	2,958	-9	3,723	3,697	-26
AM UC3	11,020	10,922	-98	16,827	16,677	-151
AM UC4	6,556	6,524	-32	9,478	9,403	-76
AM UC5	1,748	1,746	-2	2,284	2,293	9
IP UC1	6,715	6,686	-29	7,952	7,919	-33
IP UC2	2,282	2,278	-4	2,899	2,892	-7
IP UC3	12,563	12,511	-52	19,853	19,767	-86
IP UC4	4,843	4,828	-15	6,856	6,833	-23
IP UC5	791	788	-3	989	991	2
PM UC1	22,533	22,338	-195	27,707	27,431	-276
PM UC2	3,164	3,146	-19	4,063	4,028	-36
PM UC3	12,929	12,824	-105	20,157	19,965	-192
PM UC4	6,478	6,431	-47	9,479	9,384	-95
PM UC5	767	769	2	988	991	3

It can be seen that Option 1, the J7a scheme, results in a reduction in total vehicle hours for virtually all user classes and in all time periods.

With regard to changes in flows on key links, as shown in Figure 7.1 and Figure 7.2, implementation of Option 1 is likely to significantly affect flows on the M11 north of Harlow, but has only limited impact on the M11 between J7 and J7a. More traffic would be expected to be attracted to the M11 through J8 and J8a via the A120, and some additional traffic would use the A414. It is likely that increases on both these strategic routes are as a result of traffic switching from more minor routes, evidenced by the reduction in flows on these routes either side of the M11 both north and south of Harlow.

Within Harlow, traffic would be expected to generally increase on the routes in the vicinity of J7a (B183 Gilden Way, A414 Edinburgh Way, First Avenue), and decrease on routes to the south of J7a (A414 London Rd north of J7), to reflect the reassignment of southern trips which currently use J7, or northern trips which currently use less suitable routes.

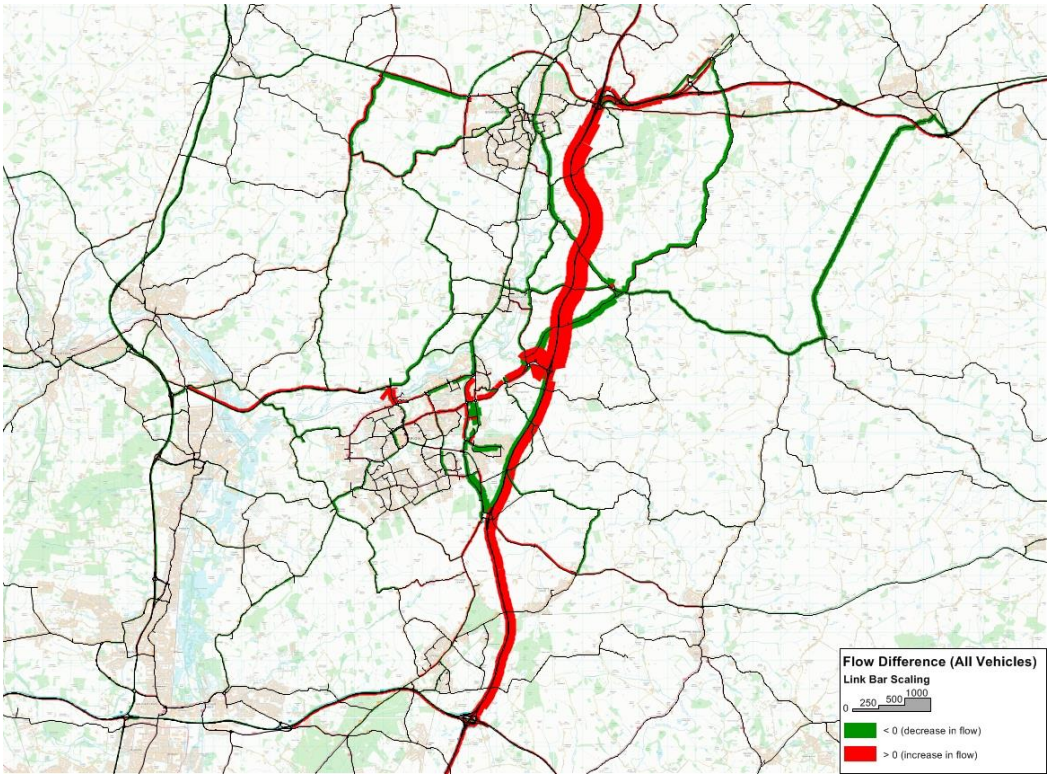


Figure 7.1 2036 Option 1 - With J7a Flow Differences: AM

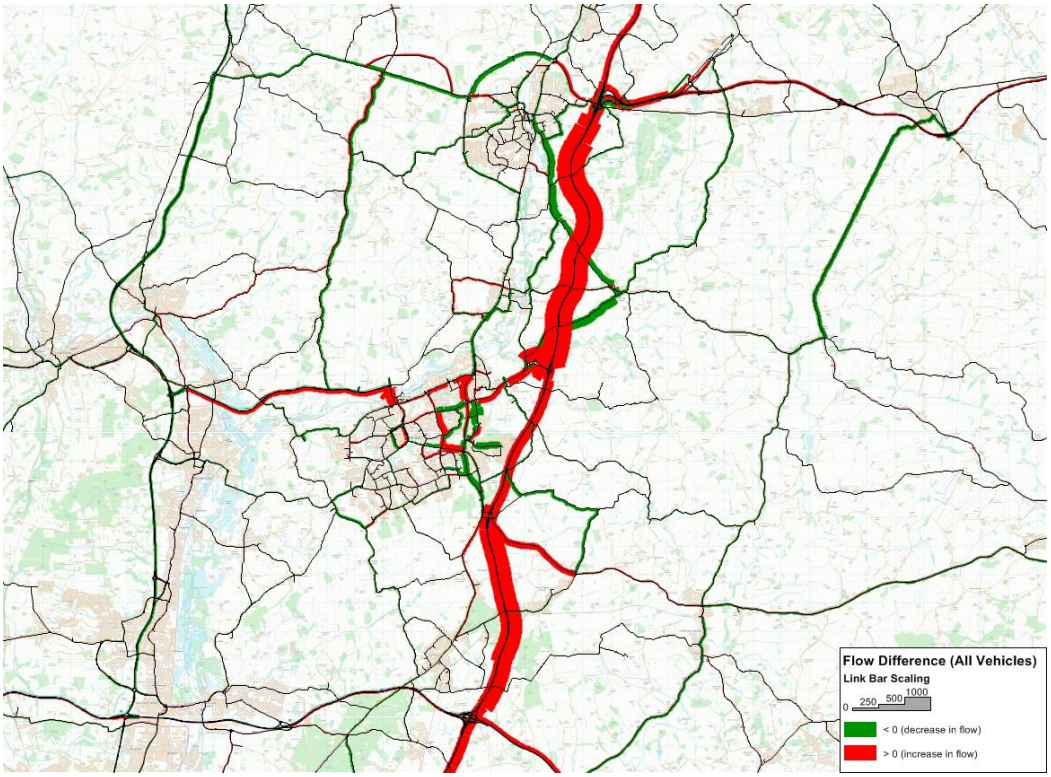


Figure 7.2 2036 Option 1 - With J7a Flow Differences: PM

A key benefit of J7a is that the majority of the less suitable, more minor routes around Harlow would be expected to become less used as rat-runs, as these journeys would become more attractive via the M11. This is particularly evident for the A1060 and B183 Sheering Rd/The Street and Dunmow Rd, B184 Ongar Rd to the east of the M11, and the B1004 Gt Hadham Rd and High Wych Ln.

Select link analysis (SLA) of peak period traffic using the new link to J7a is set out in the following four figures: Figure 7.3, Figure 7.4, Figure 7.5 and Figure 7.6. These show the origins and destinations of traffic using the scheme.

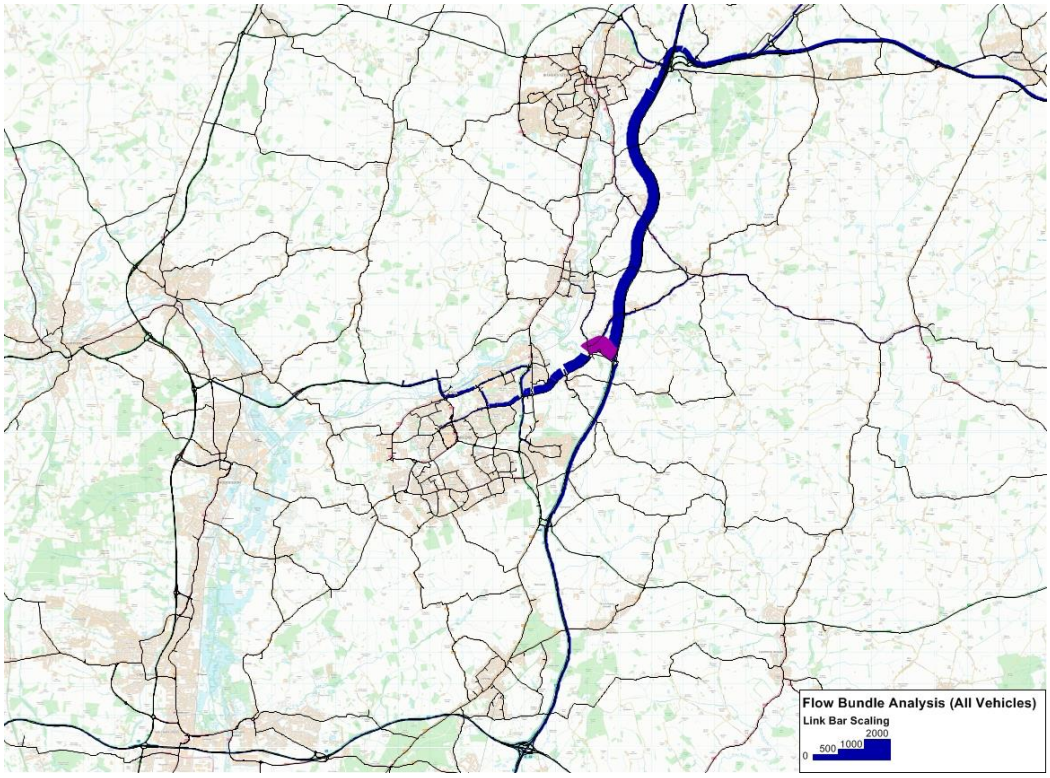


Figure 7.3 2036 Option 1 - With J7a SLA: Eastbound AM

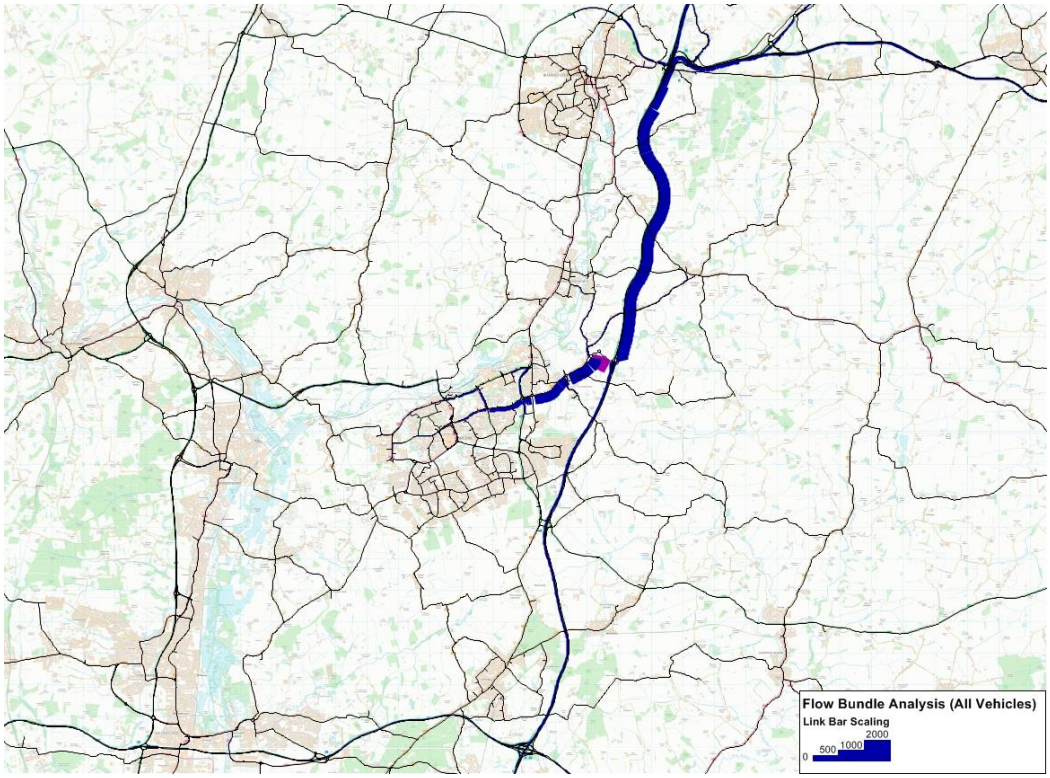


Figure 7.4 2036 Option 1 - With J7a SLA: Westbound AM

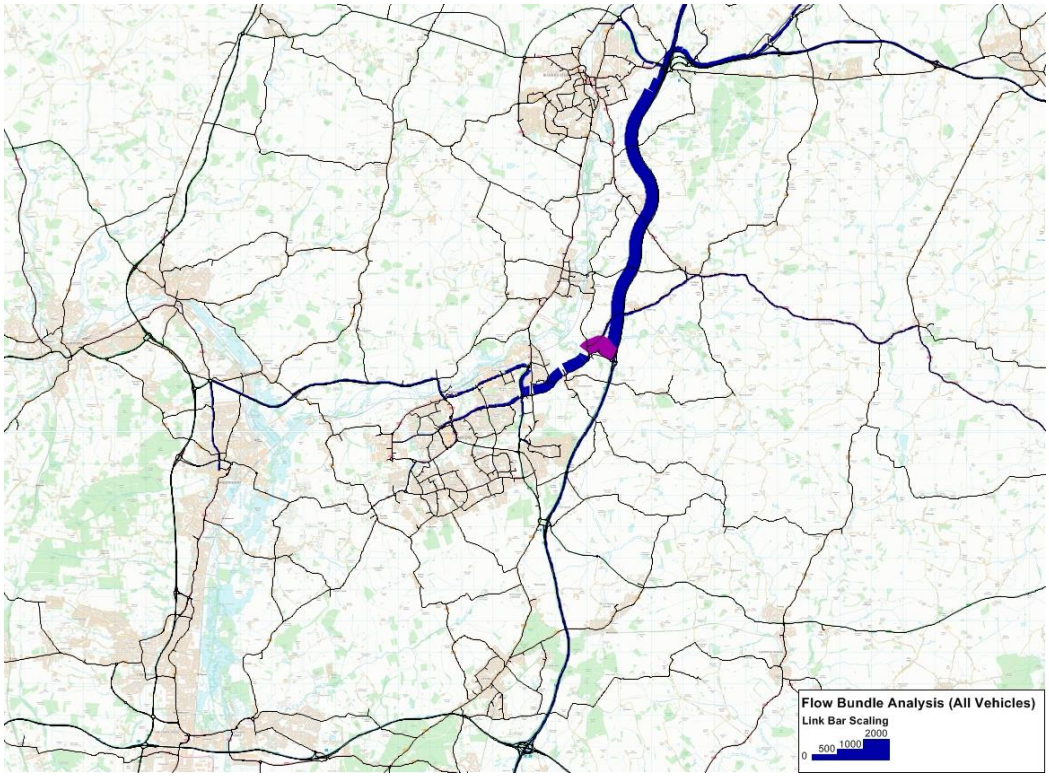


Figure 7.5 2036 Option 1 - With J7a SLA: Eastbound PM

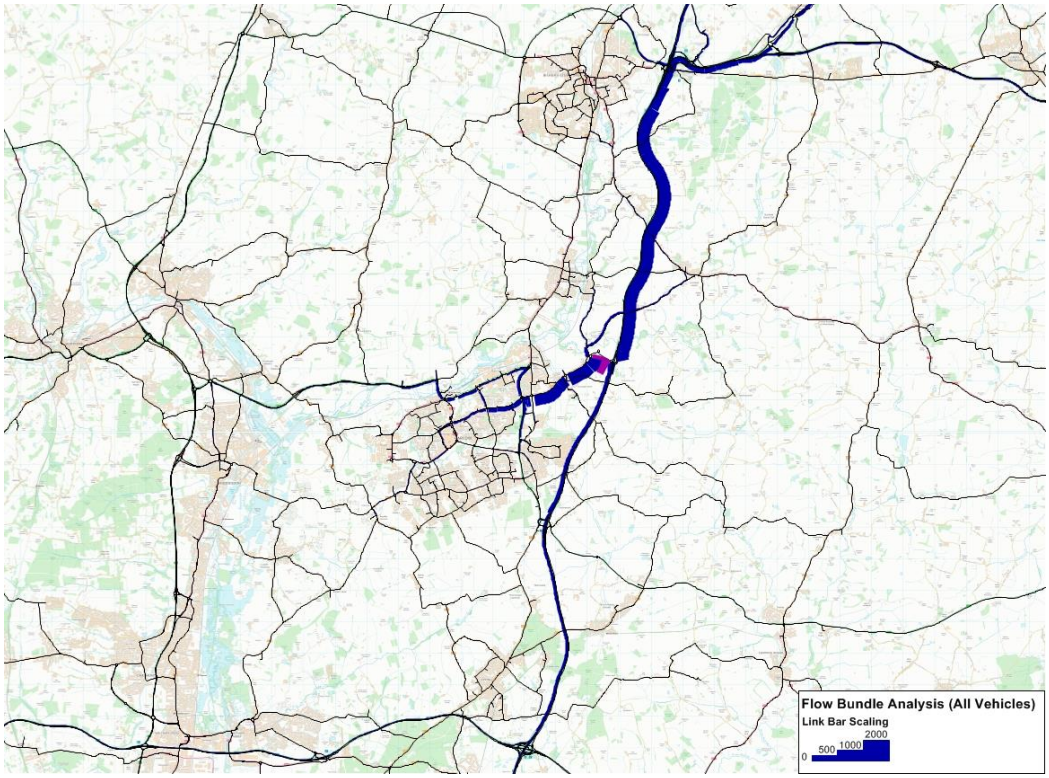


Figure 7.6 2036 Option 1 - With J7a SLA: Westbound PM

During both the AM and PM peak periods it can be seen that the majority of traffic in both directions using the new link to J7a have either an origin or destination within Harlow, with very little traffic passing straight through the town.

This indicates that this option would improve access to Harlow without attracting additional through-traffic.

7.4.2 Option 2 - Junction 7

The Junction 7 scheme that was modelled for the Option Assessment is taken from the latest available information at the time of the modelling. As such it is likely to be superseded by the scheme that is currently being studied by Highways England. The historic scheme design that has been modelled focuses on improving access between Harlow and the southern M11, at the same time freeing up capacity on the signalised motorway roundabout.

The effects of Option 2, J7, on total vehicle hours, when compared with the Do Minimum scenarios are set out in Table 7.4. It can be seen that while the J7 scheme results in a reduction in total vehicle hours for virtually all user classes and in all time periods, these reductions are not as great as those resulting from the J7a scheme.

Table 7.4 VISUM Model Outputs: Option 2 Without and With J7

Total Time (Veh Hrs) User Class	Do Min 2021	Do J7 2021	Diff with J7 2021	Do Min 2036	Do J7 2036	Diff with J7 2036
AM UC1	23,653	23,605	-48	28,796	28,659	-137
AM UC2	2,967	2,963	-5	3,723	3,706	-17
AM UC3	11,020	10,984	-36	16,827	16,661	-166
AM UC4	6,556	6,542	-14	9,478	9,418	-61
AM UC5	1,748	1,745	-3	2,284	2,278	-6
IP UC1	6,715	6,703	-12	7,952	7,916	-35
IP UC2	2,282	2,280	-2	2,899	2,893	-6
IP UC3	12,563	12,535	-28	19,853	19,741	-112
IP UC4	4,843	4,835	-8	6,856	6,828	-28
IP UC5	791	789	-1	989	999	10
PM UC1	22,533	22,408	-125	27,707	27,535	-172
PM UC2	3,164	3,151	-14	4,063	4,049	-14
PM UC3	12,929	12,861	-68	20,157	20,013	-144
PM UC4	6,478	6,441	-37	9,479	9,418	-61
PM UC5	767	772	5	988	991	2

For network effects, as shown in Figure 7.7 and Figure 7.8, the J7 improvement scheme is likely to significantly increase northbound trips on the M11 south of J7 during both the AM and PM peak periods, and southbound during the PM peak. North of J7, there would be a slight increase in traffic on the motorway during the AM, and a larger increase northbound during the PM.

On the A414 south-east of the town, there is likely to be an increase in northbound traffic north of J7 in both time periods. South of J7 there would also be an increase in A414 northbound flows approaching J7 during the PM peak. West of the town, flows on the A414 decrease slightly, with this traffic likely to be re-routeing via the M25 and M11.

There is little overall impact on the wider network; A120 east flows may reduce slightly in the AM and increase slightly east and west in the PM peak period; A10 flows may also reduce slightly in the AM.

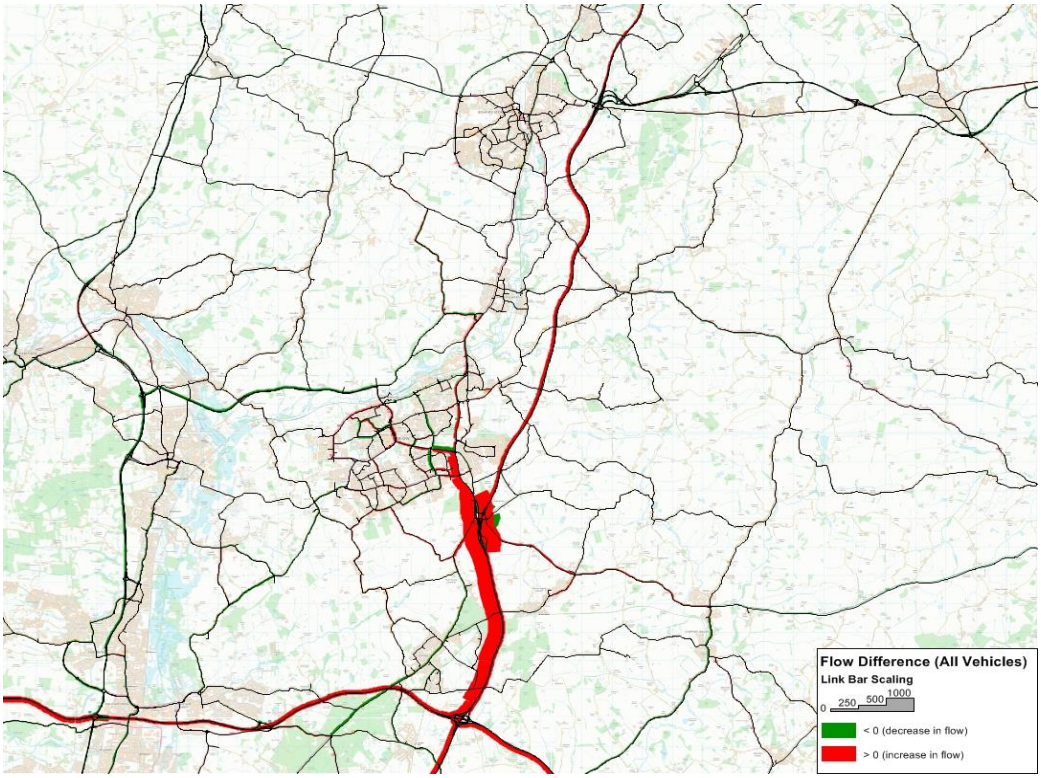


Figure 7.7 2036 Option 2 - With J7 Flow Differences: AM

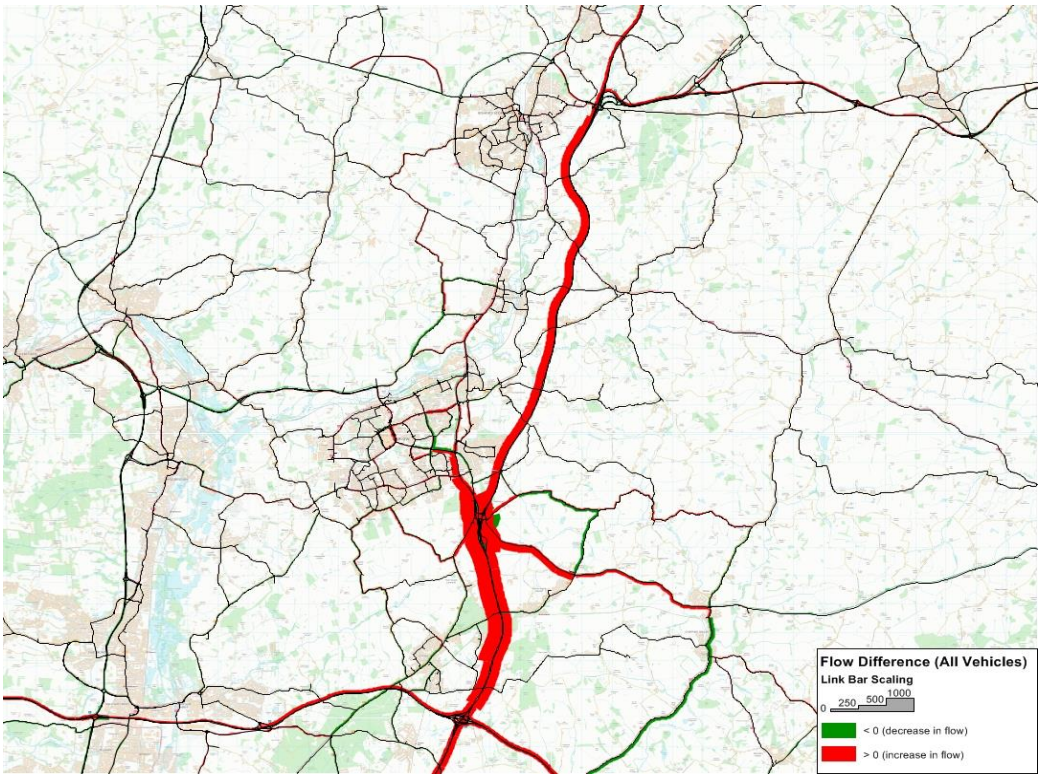


Figure 7.8 2036 Option 2 - With J7 Flow Differences: PM

Within Harlow, there is no clear pattern of changes in vehicle flows. During the AM flows on the A414 London Rd, A1025 Second Ave and A1019 Velizy Ave would be likely to increase slightly, while flows on parallel routes would reduce slightly due to traffic reassigning across the town to avoid congested areas. During the PM there would be additional east:west flows on A1025 Second Ave and First Ave, and on A1019 Velizy Ave.

Select link analysis (SLA) of Option 2 peak period traffic using the section of the A414 immediately north of J7 is set out in the following four figures: Figure 7.9, Figure 7.10, Figure 7.11 and Figure 7.12. These show the origins and destinations of Harlow-related traffic using the J7 scheme.

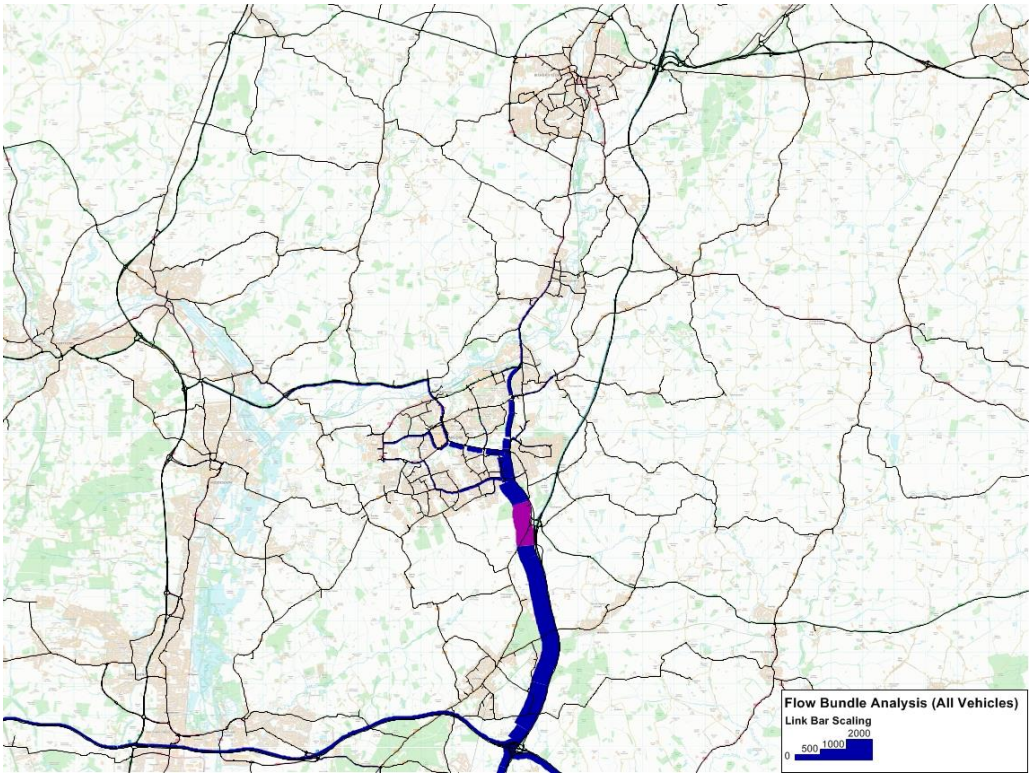


Figure 7.9 2036 Option 2 - With J7 SLA: Northbound AM

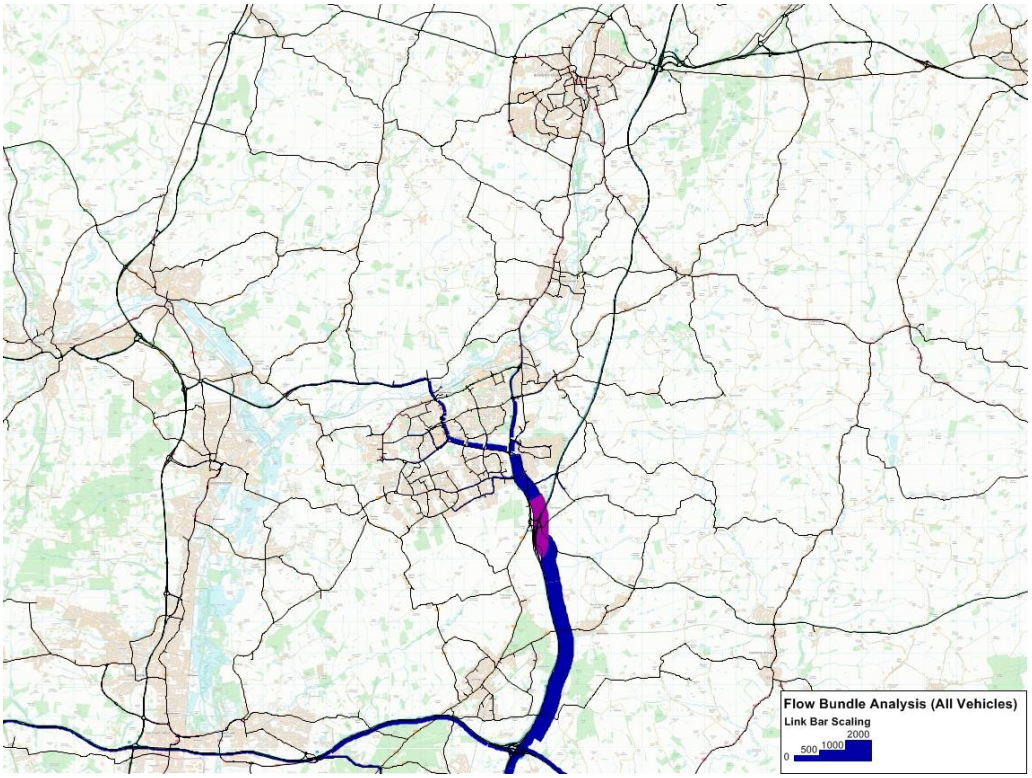


Figure 7.10 2036 Option 2 - With J7 SLA: Southbound AM

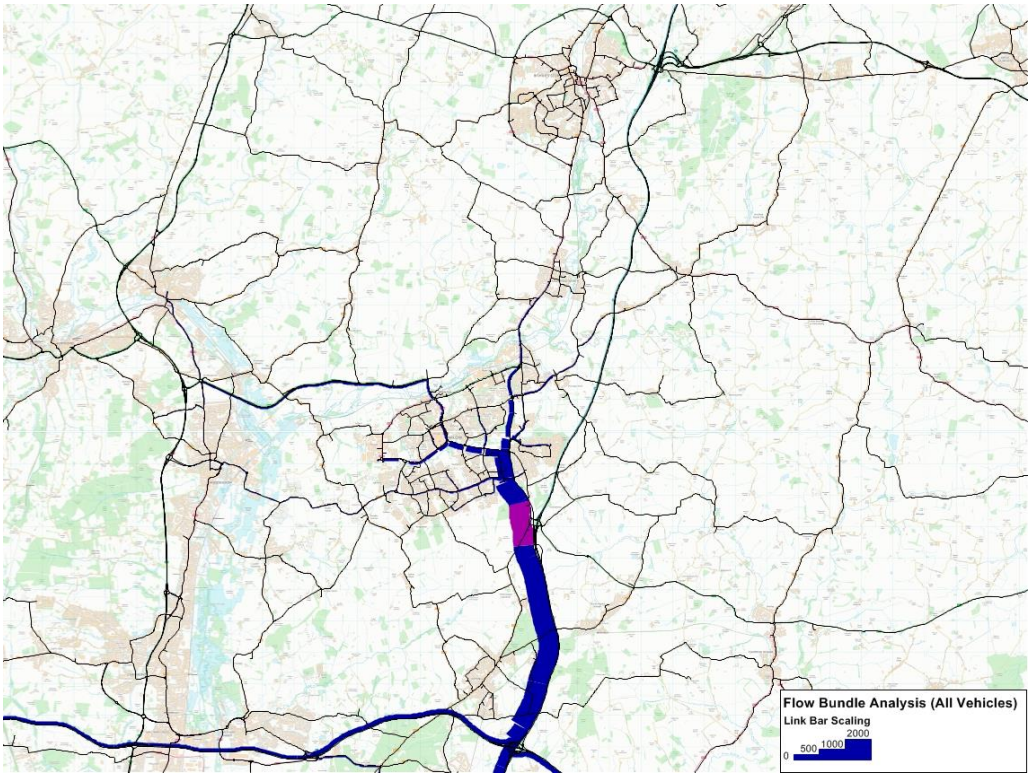


Figure 7.11 2036 Option 2 - With J7 SLA: Northbound PM

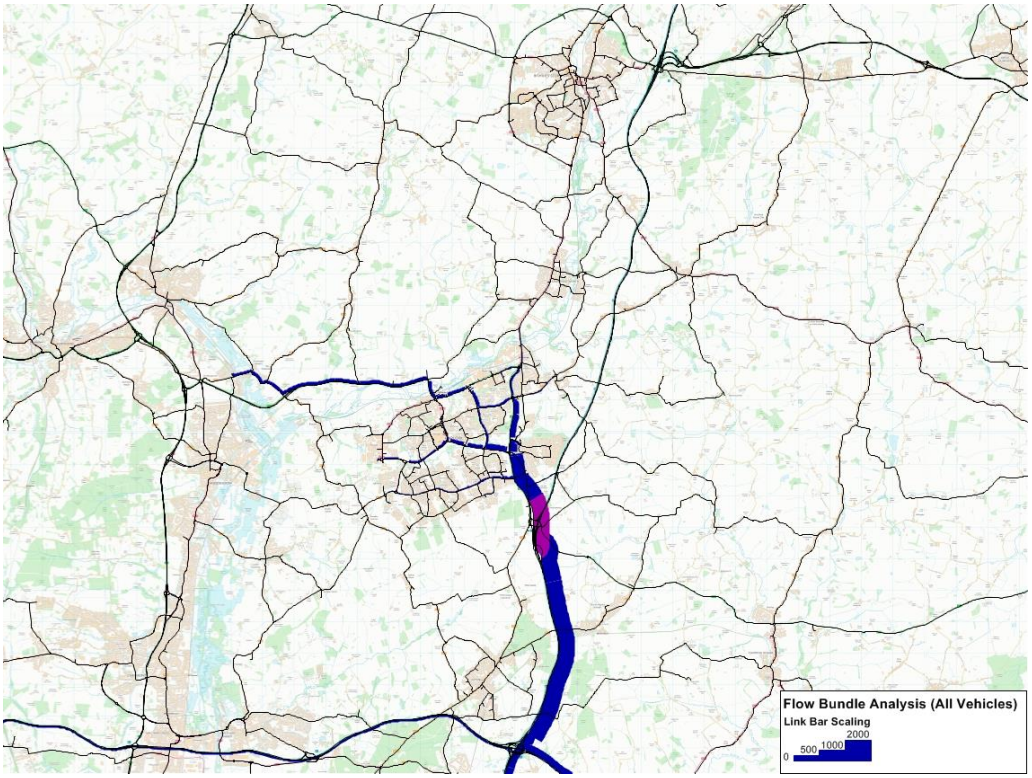


Figure 7.12 2036 Option 2 - With J7 SLA: Southbound PM

Analysis of the origins and destinations of the traffic using Option 2, the J7 scheme, shows that, like the J7a scheme, the majority of the trips on the A414 are Harlow-related, but primarily to and from the south via M11 J6. This is likely to be influenced by the scheme design used, which is likely to be more beneficial to trips to and from the south. Slightly more of the J7 scheme traffic would be likely to use the A414 west than with the J7a scheme during both the AM and PM peak periods, but these through trips form only a small proportion of the scheme traffic.

It is concluded that while this scheme provides some additional capacity at J7, it has little impact on Harlow itself, and does not provide any relief to the pattern of trips within the town.

7.4.3 Option 3 - Junction 7 and Junction 7a

The implementation of both Junction 7 and Junction 7a schemes have been modelled in order to assess their likely combined effects.

The effects of Option 3, J7 and J7a in combination, on total vehicle hours, when compared with the Do Minimum scenarios are set out in Table 7.5.

It can be seen that, like the individual evaluations of Options 1 and 2, Option 3 results in reductions in total vehicles hours in virtually all time periods and for all classes. It should be noted, however, that the combined schemes in Option 3 result in greater time savings than either Option 1 or 2 alone, indicating that the combination of these 2 options would result in greater time benefits on the network.

Table 7.5 VISUM Model Outputs: Option 3 Without and With J7 & J7a

Total Time (Veh Hrs) User Class	Do Min 2021	Do J7a_J7 2021	Diff with J7a&J7 2021	Do Min 2036	Do J7a_J7 2036	Diff with J7a&J7 2036
AM UC1	23,653	23,488	-165	28,796	28,548	-248
AM UC2	2,967	2,954	-13	3,723	3,686	-37
AM UC3	11,020	10,893	-127	16,827	16,583	-244
AM UC4	6,556	6,512	-43	9,478	9,362	-117
AM UC5	1,748	1,744	-4	2,284	2,279	-5
IP UC1	6,715	6,676	-39	7,952	7,892	-59
IP UC2	2,282	2,277	-6	2,899	2,887	-12
IP UC3	12,563	12,489	-74	19,853	19,687	-166
IP UC4	4,843	4,822	-21	6,856	6,811	-45
IP UC5	791	787	-4	989	999	10
PM UC1	22,533	22,270	-263	27,707	27,338	-369
PM UC2	3,164	3,142	-23	4,063	4,023	-40
PM UC3	12,929	12,791	-138	20,157	19,884	-273
PM UC4	6,478	6,412	-66	9,479	9,358	-121
PM UC5	767	771	4	988	994	5

For changes in flows, as shown in Figure 7.13 and Figure 7.14, implementation of both of the motorway junction schemes has broadly the same impacts as would be expected from their combined effects.

During the AM period for the strategic routes, the A120 west would be unaffected by the schemes, the A120 east is likely to have slightly more eastbound trips, the A414 south of J7 is likely to have a reduction in westbound flows, while the eastbound increase remains the same as for the separate schemes. The A414 west of Harlow indicates a slightly greater reduction in eastbound flows, which is an improvement over the J7a slight increase.

On the A414 north of Burnt Mill there is likely to be a lower increase in flows in both time periods than would be the case with just J7a in place.

On the A1184/B1393 corridor there is a lower reduction in flows in both time periods through both Sawbridgeworth and Epping with both schemes in place, and a corresponding lower impact on trips rat-running between Bishop's Stortford and Harlow to the west of the corridor. Reductions in flows on the minor links to the east of the corridor are consistent with those for the individual schemes.

With both schemes in place, routeing along the A414 to the north of the town more consistently increases in both time periods, and there is less tendency for rat-running around the western side of the town.

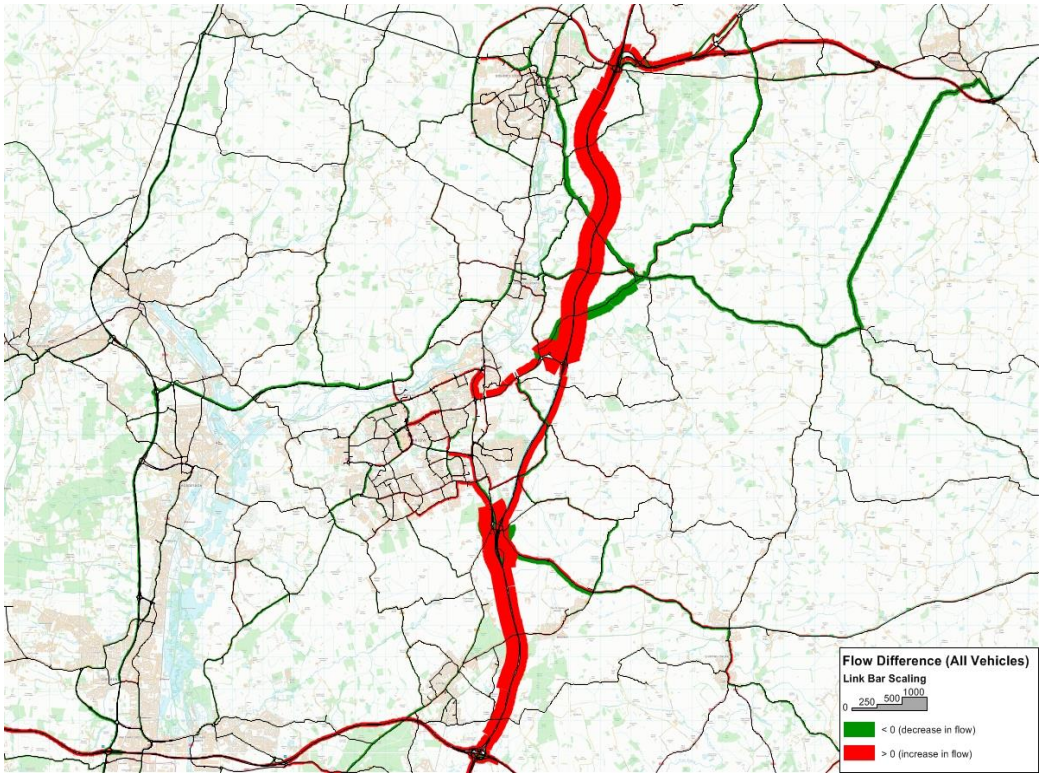


Figure 7.13 2036 Option 3 - With both J7 & J7a Flow Differences: AM

During the PM peak northbound flows on the A414 immediately north of J7 show a slightly lower increase than with just J7, while southbound flow reductions are shown to be consistent with those anticipated with just J7a in place.

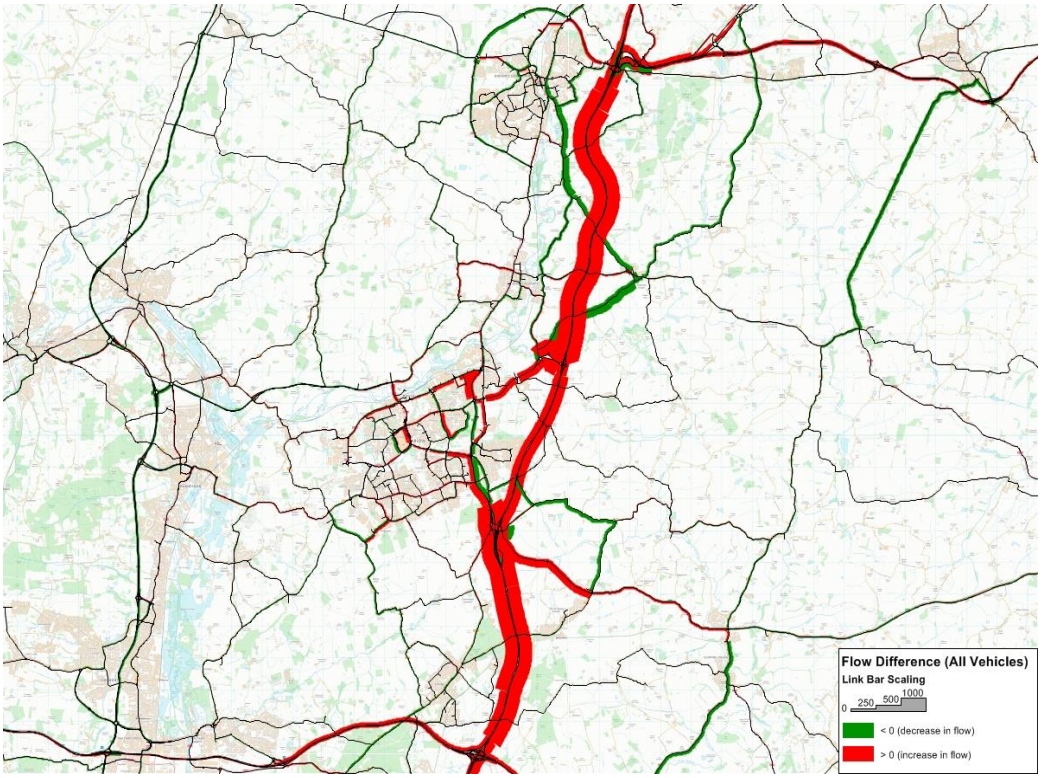


Figure 7.14 2036 Option 3 - With both J7 & J7a Flow Differences: PM

Select link analysis (SLA) of peak period traffic using the section of the A414 immediately north of J7 is set out in the following figures: Figure 7.15, Figure 7.16, Figure 7.17, Figure 7.18, Figure 7.19, Figure 7.20, Figure 7.21 and Figure 7.22. These show the origins and destinations of M11 traffic to both the north and south of Harlow and their use of Option 3, the combined J7 and J7a scheme.

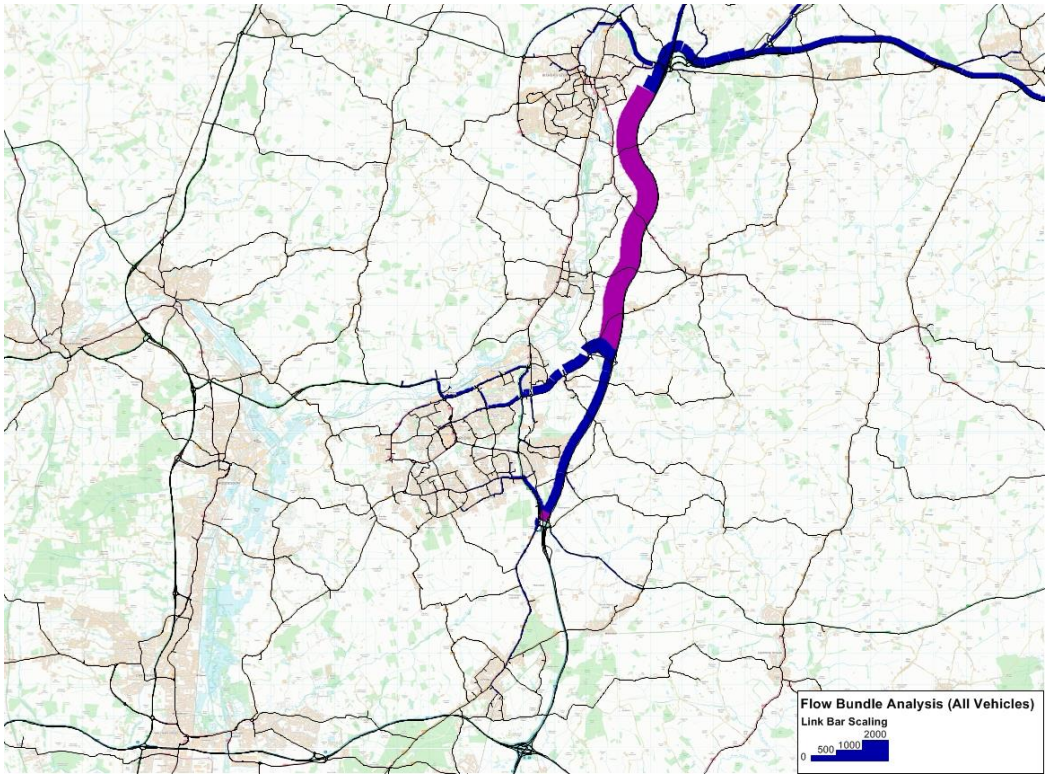


Figure 7.15 2036 Option 3 - With J7 & J7a SLA M11 North of Harlow: Northbound AM

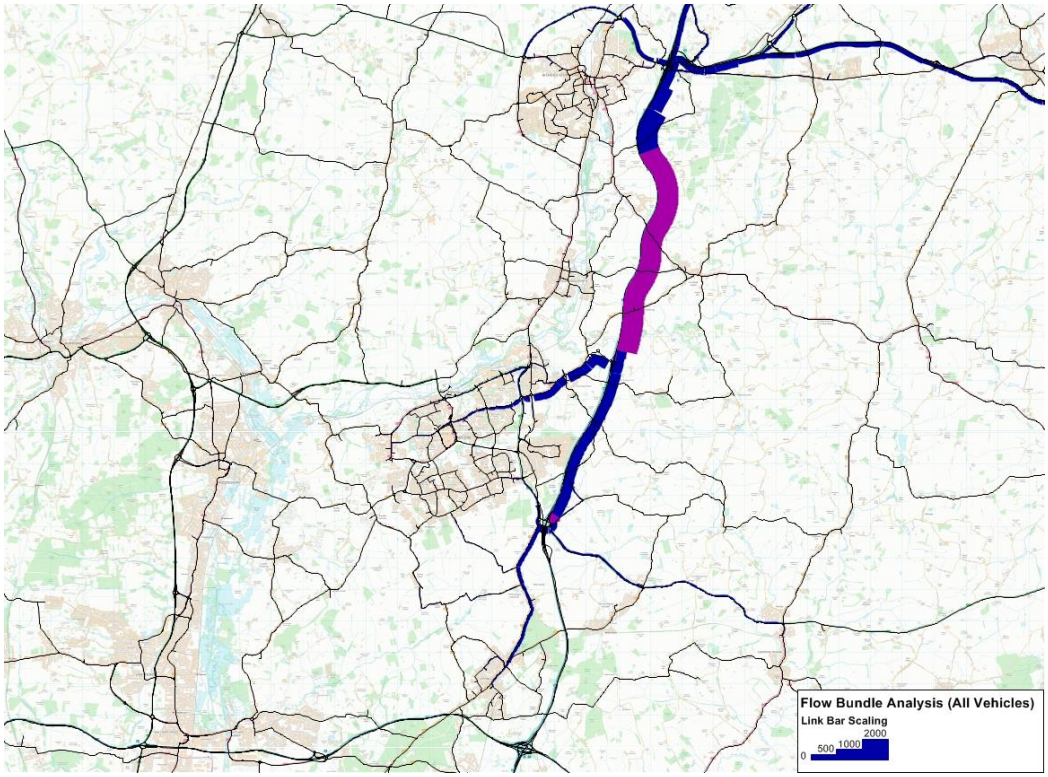


Figure 7.16 2036 Option 3 - With J7 & J7a SLA M11 North of Harlow: Southbound AM

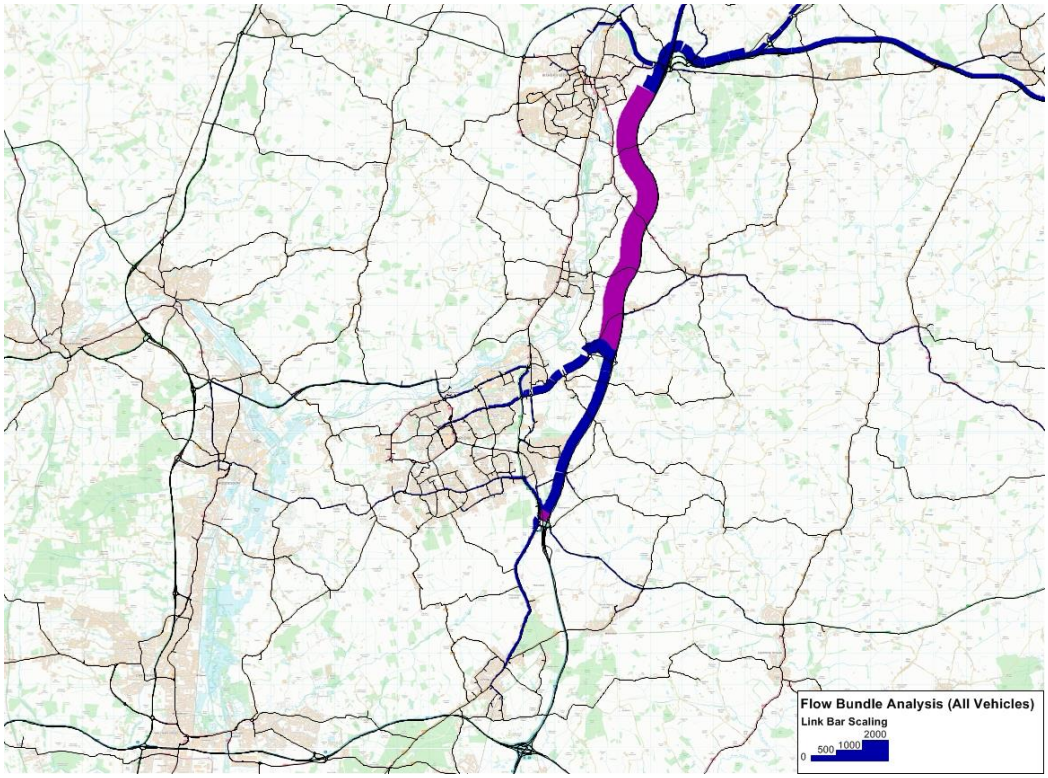


Figure 7.17 2036 Option 3 - With J7 & J7a SLA M11 North of Harlow: Northbound PM

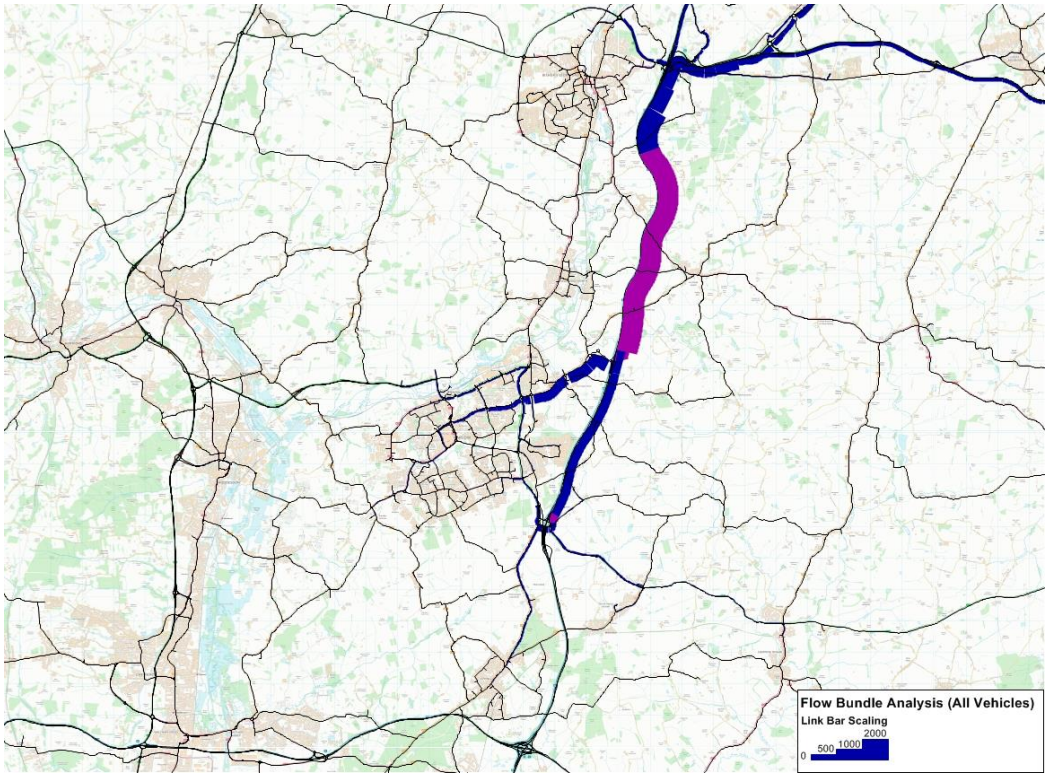


Figure 7.18 2036 Option 3 - With J7 & J7a SLA M11 North of Harlow: Southbound PM

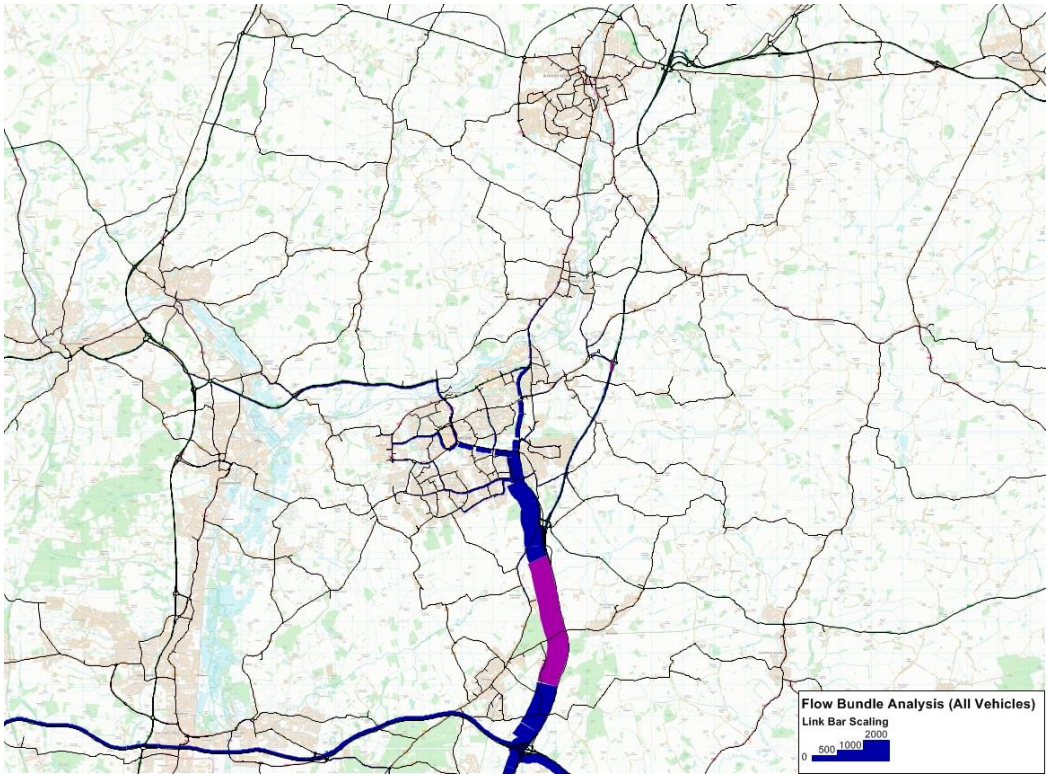


Figure 7.19 2036 Option 3 - With J7 & J7a SLA M11 South of Harlow: Northbound AM

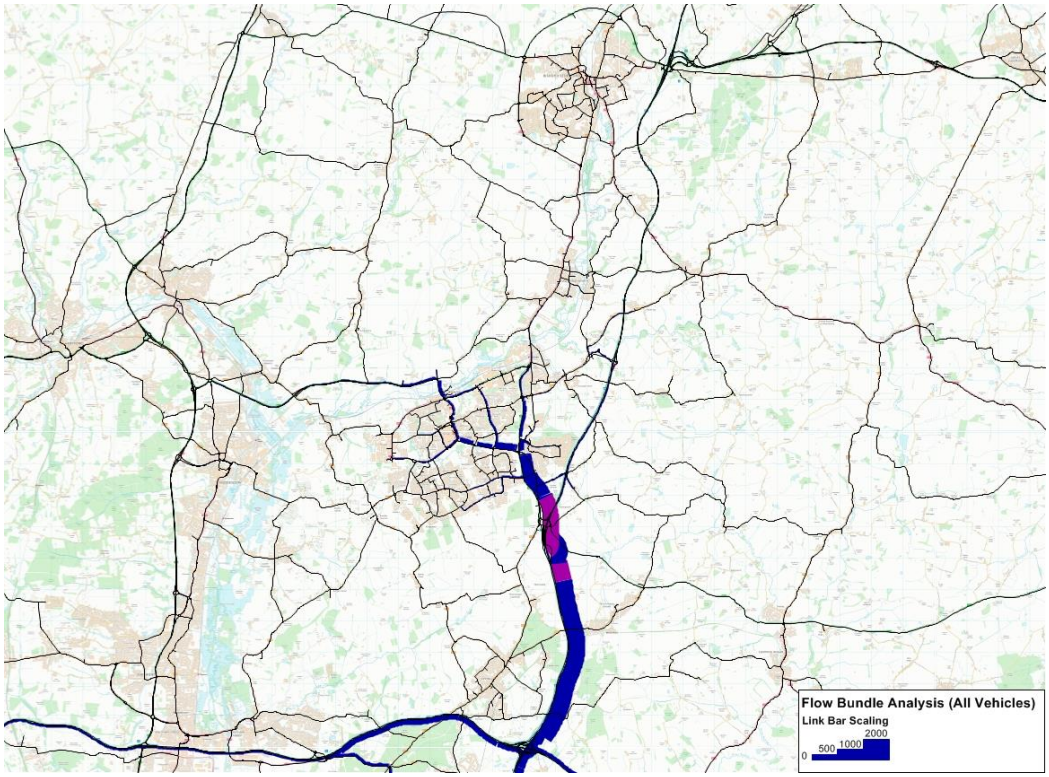


Figure 7.20 2036 Option 3 - With J7 & J7a SLA M11 South of Harlow: Southbound AM

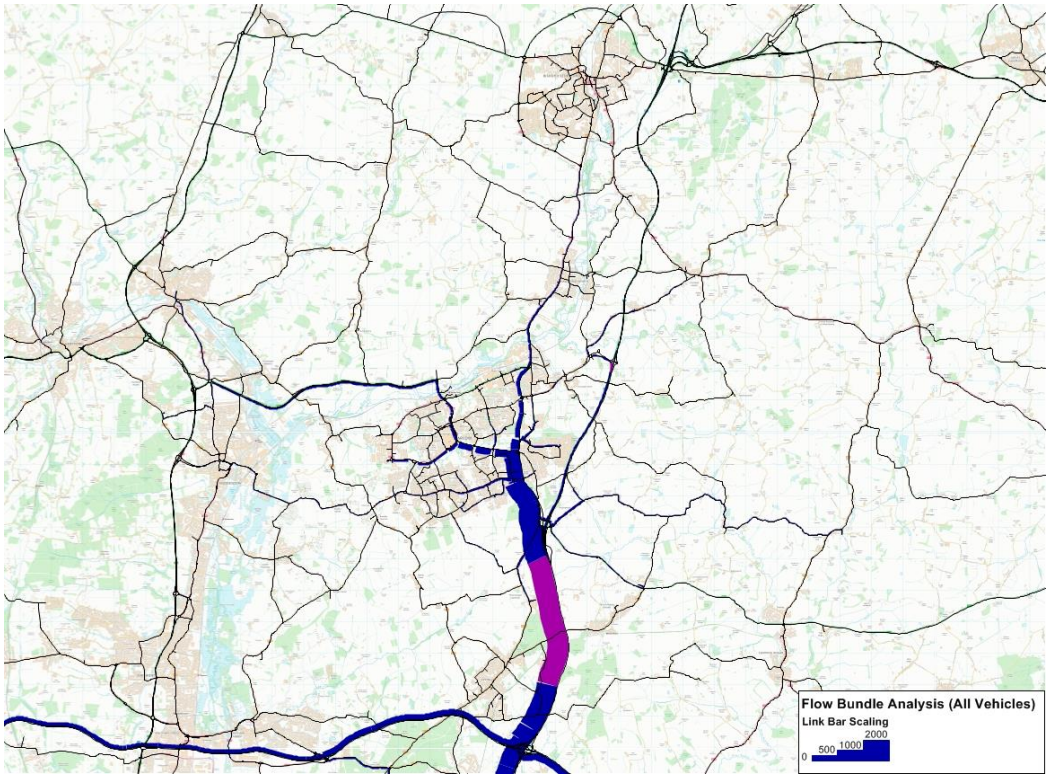


Figure 7.21 2036 Option 3 - With J7 & J7a SLA M11 South of Harlow: Northbound PM

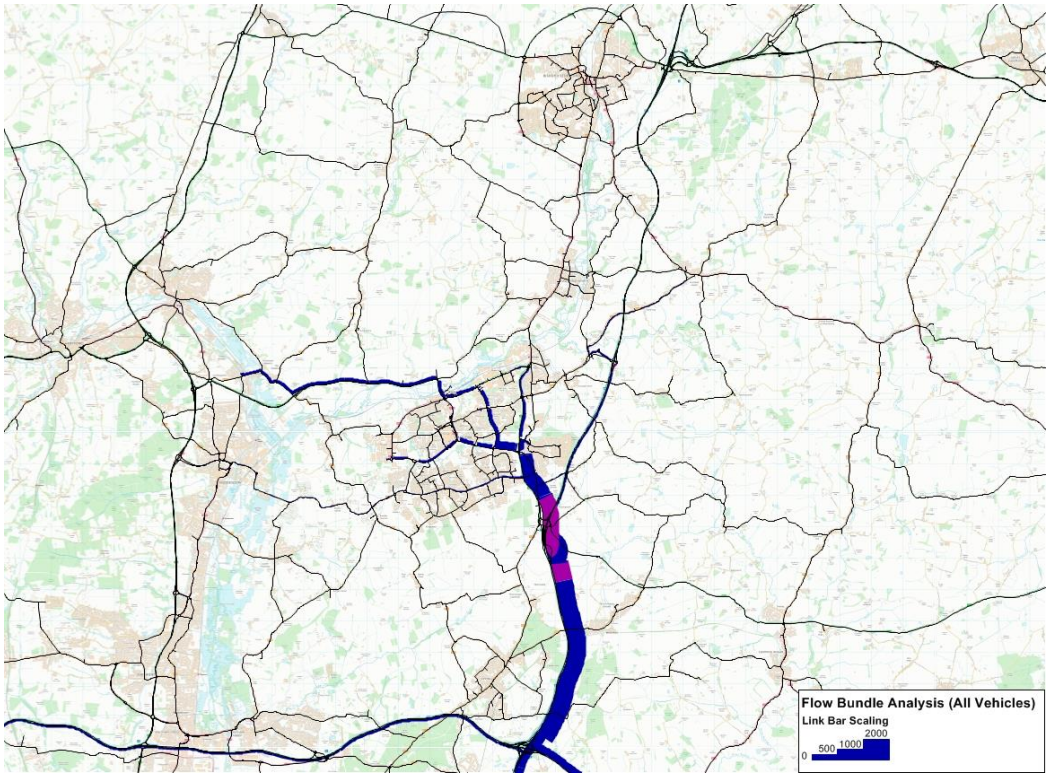


Figure 7.22 2036 Option 3 - With J7 & J7a SLA M11 South of Harlow: Southbound PM

The figures above indicate similar flows on the links to and from Harlow to those in each of the Option 1, J7a, and Option 2, J7, schemes, with limited through-traffic evident, the majority of traffic entering or leaving Harlow having either their origin or destination within the town, in both time periods.

Given that the J7 scheme modelled is unlikely to be implemented in the layout modelled, the Visum model outputs have provided a broad indication of the combined effects of having both schemes in place, and it is considered that these are generally consistent with or better than the impacts of the individual schemes.

7.4.4 Option 4 - Northern Bypass (& J7a)

No detailed scheme design of the bypass element of this option has been undertaken and the modelling is based on schematic assumptions with regard to its route and connections.

The effects of Option 4, a northern bypass of Harlow connected to the M11 via J7a, on total vehicle hours, when compared with the Do Minimum scenarios are set out in Table 7.6.

Table 7.6 VISUM Model Outputs: Option 4 Northern Bypass & J7a

Total Time (Veh Hrs) User Class	Do Min 2021	Do NB&J7a 2021	Diff with NB&J7a 2021	Do Min 2036	Do NB&J7a 2036	Diff with NB&J7a 2036
AM UC1	23,653	23,427	-226	28,796	28,258	-538
AM UC2	2,967	2,942	-26	3,723	3,660	-62
AM UC3	11,020	10,873	-147	16,827	16,430	-397
AM UC4	6,556	6,485	-71	9,478	9,289	-189
AM UC5	1,748	1,733	-15	2,284	2,295	11
IP UC1	6,715	6,641	-75	7,952	7,854	-98
IP UC2	2,282	2,271	-11	2,899	2,881	-18
IP UC3	12,563	12,422	-141	19,853	19,604	-249
IP UC4	4,843	4,807	-36	6,856	6,792	-64
IP UC5	791	785	-5	989	992	3
PM UC1	22,533	22,132	-402	27,707	27,126	-581
PM UC2	3,164	3,132	-32	4,063	4,000	-63
PM UC3	12,929	12,699	-230	20,157	19,729	-428
PM UC4	6,478	6,389	-90	9,479	9,301	-178
PM UC5	767	771	4	988	990	2

It can be seen that Option 4, the Northern Bypass with J7a, results in even greater reductions in total vehicles hours in virtually all time periods and for all classes than for options 1-3.

The modelling of the Northern Bypass, in combination with the J7a scheme, as shown in Figure 7.23 and Figure 7.24, indicates that Option 4 leads to greater impact on flows on the M11 in both directions and time periods, than would Option 1 in isolation. This is likely to be as a result of some more strategic trips transferring to use the new link which improves the connection between the M11 and the A10. This is supported by the reduction in flows on the A120 west, and on the A10, and increases in flows on the A414 west of Harlow.

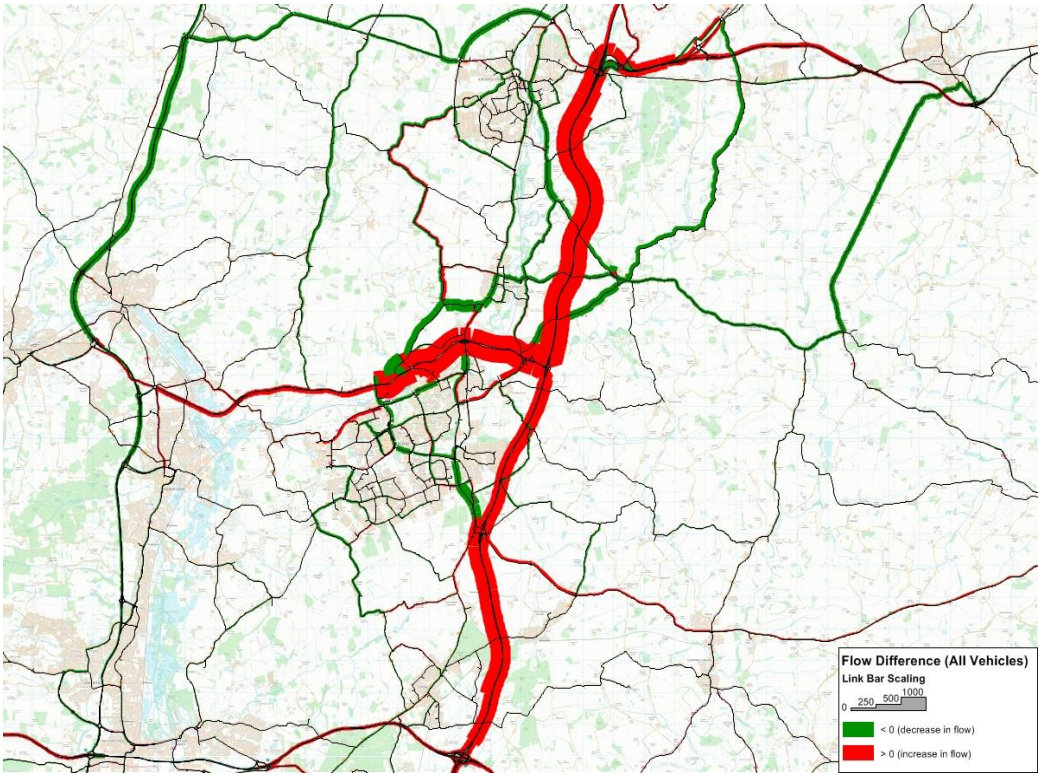


Figure 7.23 2036 Option 4 - With Northern Bypass & J7a Flow Differences: AM

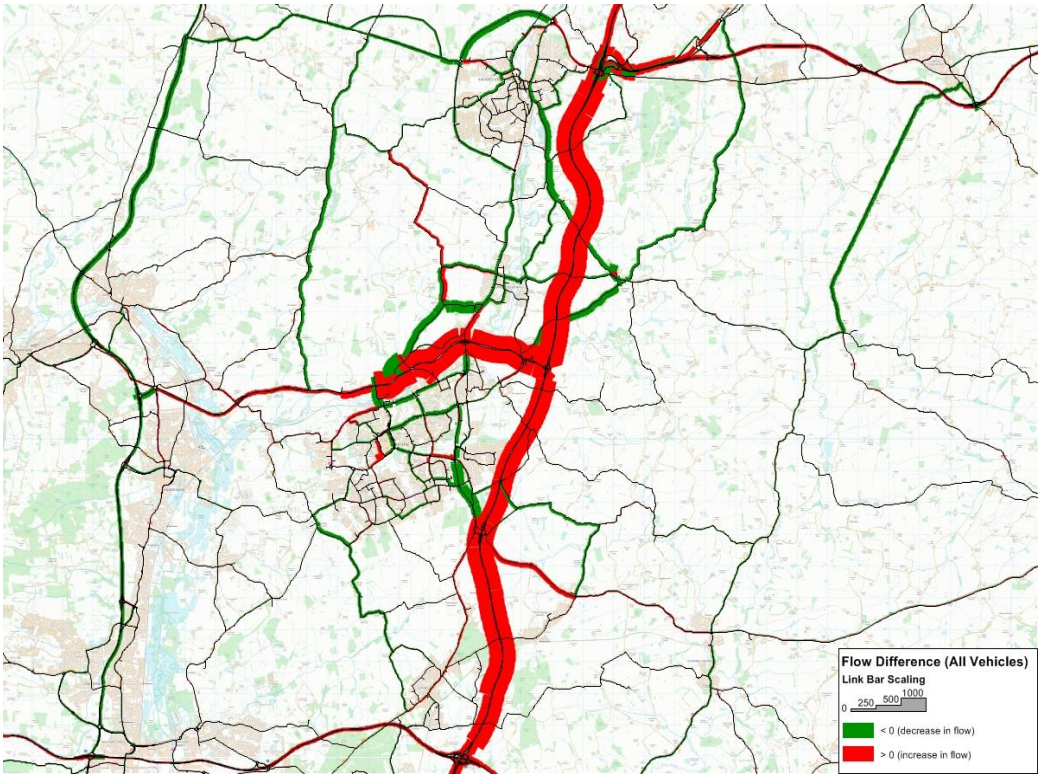


Figure 7.24 2036 Option 4 - With Northern Bypass & J7a Flow Differences: PM

For the A1184/B1393 corridor there would be likely to a slightly greater reduction in flows through Sawbridgeworth, and very little change on flows through Epping, in both time periods.

The flows on High Wych Rd are likely to significantly reduce as a result of traffic switching to the bypass, however some rat-running through villages to the west of the A1184 corridor may increase in both time periods.

On the immediate approaches to Harlow, there is likely to be a reduction in flows on all key links to the town, ie the A414 at Burnt Mill and immediately north of J7, and on the A1184 Cambridge Rd. Flows on B183 Gilden Way during the AM peak are still likely to be higher than for the Do Minimum scenario, and slightly reduced during the PM peak.

Select link analysis (SLA) of Option 4 peak period traffic using the Northern Bypass is set out in the following four figures: Figure 7.25, Figure 7.26, Figure 7.27 and Figure 7.28. These show the origins and destinations of traffic using the Northern Bypass element of Option 4. It should be noted that the traffic which would use J7a and Gilden Way to reach Harlow is not shown on these figures.

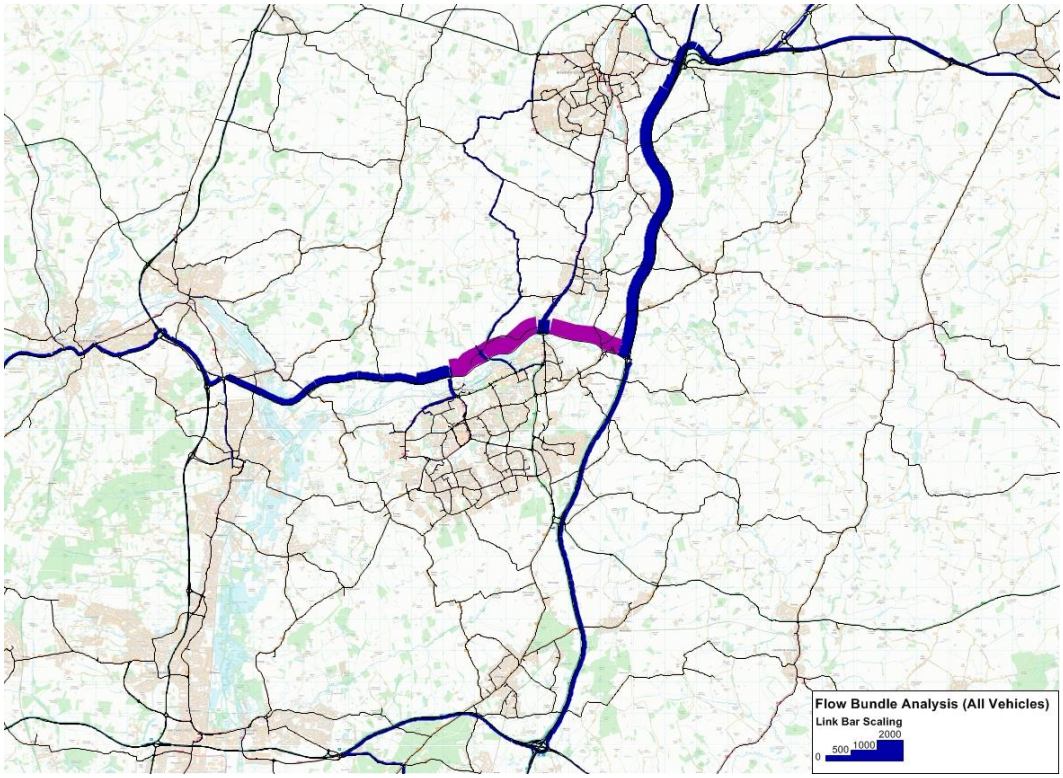


Figure 7.25 2036 Option 4 - With Northern Bypass SLA: Eastbound AM

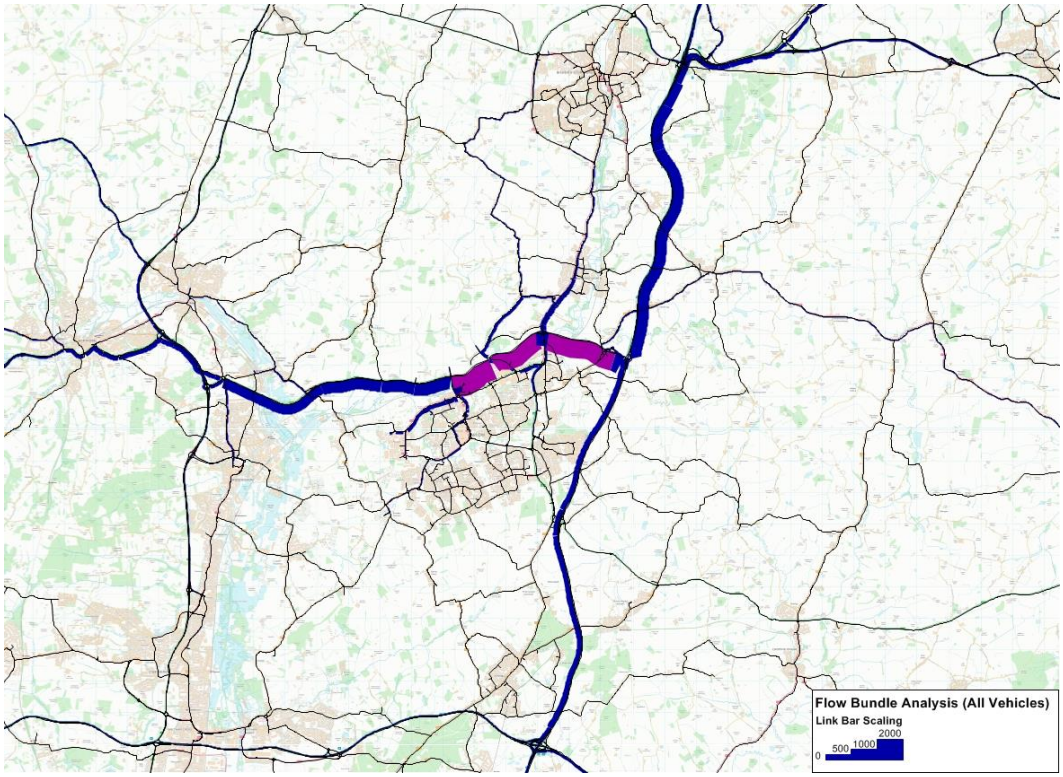


Figure 7.26 2036 Option 4 - With Northern Bypass SLA: Westbound AM

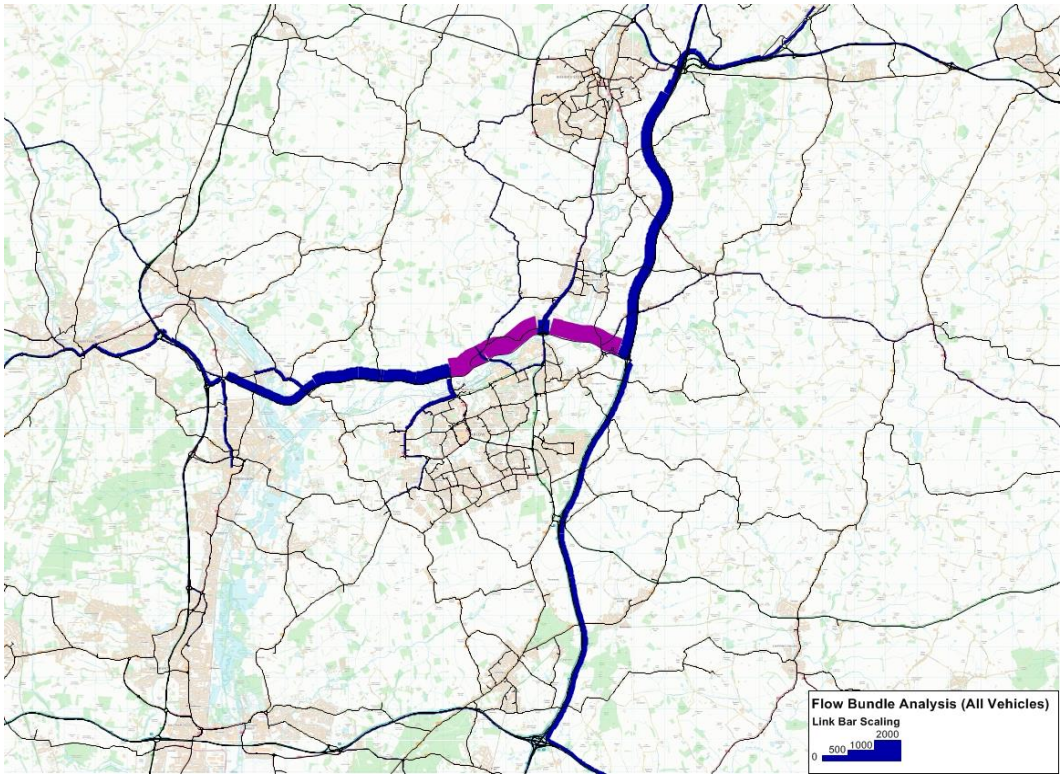


Figure 7.27 2036 Option 4 - With Northern Bypass SLA: Eastbound PM

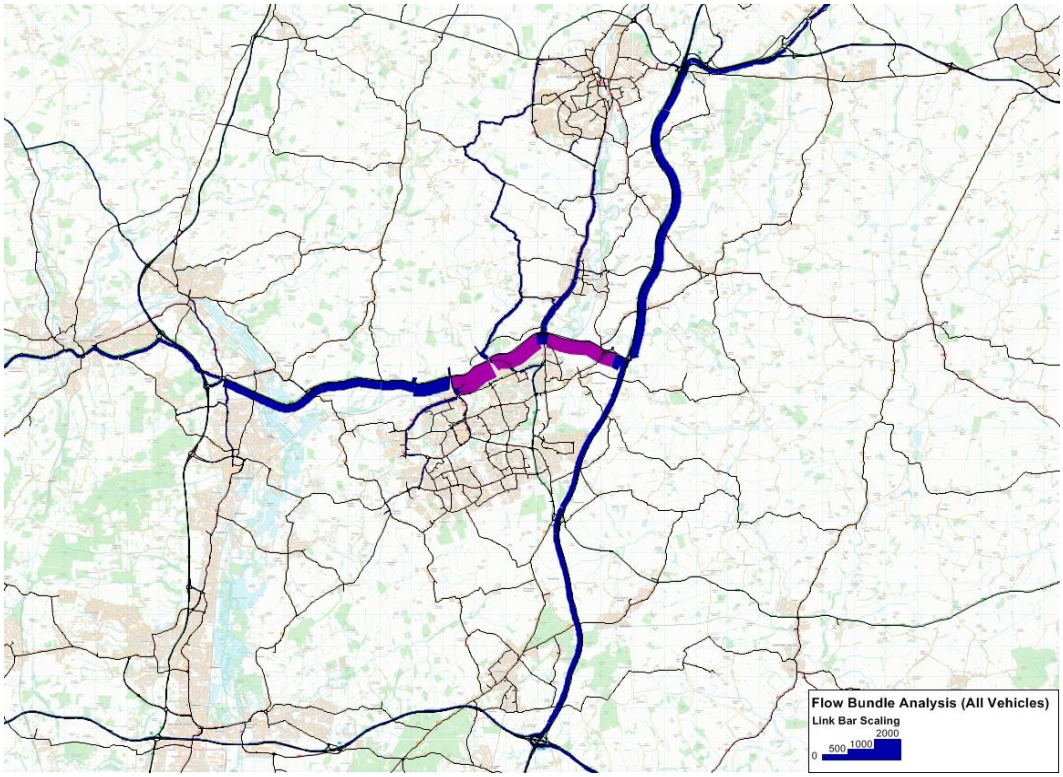


Figure 7.28 2036 Option 4 - With Northern Bypass SLA: Westbound PM

Analysis of the origins and destinations of the traffic using Option 4, the Northern Bypass scheme, shows that very little of the traffic would be Harlow-related, as almost all of the trips using the link appear to be strategic in nature. The key connecting links used are the motorway north of J7a, A414 west of Harlow, and the motorway south of J7a. Of the more local roads, the main connecting link is the A1184 through Sawbridgeworth, and the High Wych Rd. Within Harlow the main connections are with The Pinnacles, the town centre, and the eastern end of A414 Edinburgh Way.

It is concluded, therefore, that Option 4, the Northern Bypass scheme, would have little overall effect on the level of traffic within Harlow itself, but would facilitate more strategic movements around the town. It would not improve the accessibility of Harlow for the majority of trips on the local network, which either have origins or destinations within the town, as shown in 3.2.2.

7.4.5 Option 5 - Northern Northern Bypass

The modelling of the more extensive Northern Northern Bypass (NNB), to the west and north of Sawbridgeworth has made use of schematic drawings. The design is broadly based on historic studies, with the addition of the link through to River Way to provide an additional link across the River Stort, to correspond with that included in the Northern Bypass scheme. No detailed scheme design has been undertaken.

The effects of Option 5 on total vehicle hours, when compared with the Do Minimum scenarios are set out in

Table *7.7*.

While the Northern Northern Bypass scheme results in time savings for all time periods and user classes, these are not as great as those which are likely to be achieved with Option 4, the Northern Bypass, in all scenarios except in 2021 AM.

Table 7.7 VISUM Model Outputs: Option 5 Northern Northern Bypass

Total Time (Veh Hrs) User Class	Do Min 2021	Do NNB 2021	Diff with NNB 2021	Do Min 2036	Do NNB 2036	Diff with NNB 2036
AM UC1	23,653	23,291	-362	28,796	28,355	-441
AM UC2	2,967	2,937	-30	3,723	3,669	-54
AM UC3	11,020	10,827	-193	16,827	16,529	-298
AM UC4	6,556	6,473	-82	9,478	9,332	-147
AM UC5	1,748	1,734	-14	2,284	2,279	-5
IP UC1	6,715	6,648	-67	7,952	7,883	-69
IP UC2	2,282	2,273	-9	2,899	2,886	-13
IP UC3	12,563	12,444	-119	19,853	19,699	-154
IP UC4	4,843	4,811	-32	6,856	6,812	-44
IP UC5	791	787	-3	989	986	-3
PM UC1	22,533	22,206	-327	27,707	27,180	-527
PM UC2	3,164	3,140	-25	4,063	4,009	-54
PM UC3	12,929	12,756	-173	20,157	19,802	-355
PM UC4	6,478	6,407	-71	9,479	9,319	-160
PM UC5	767	765	-2	988	984	-5

The flow difference outputs for this option are illustrated in Figure 7.29 and Figure 7.30. When compared with the likely effects of the Northern Bypass, the modelling of the NNB indicates that this scheme would be likely to have a similar impact on the M11 south of J8, but would have a lower impact on northbound traffic on the motorway south of J7.

The NNB scheme would be likely to attract more traffic from the A120 west and A10 than would the Northern Bypass scheme. The A1184 through Sawbridgeworth would have reduced flows, while flows on the B1393 through Epping are broadly similar to those with the Northern Bypass scheme.

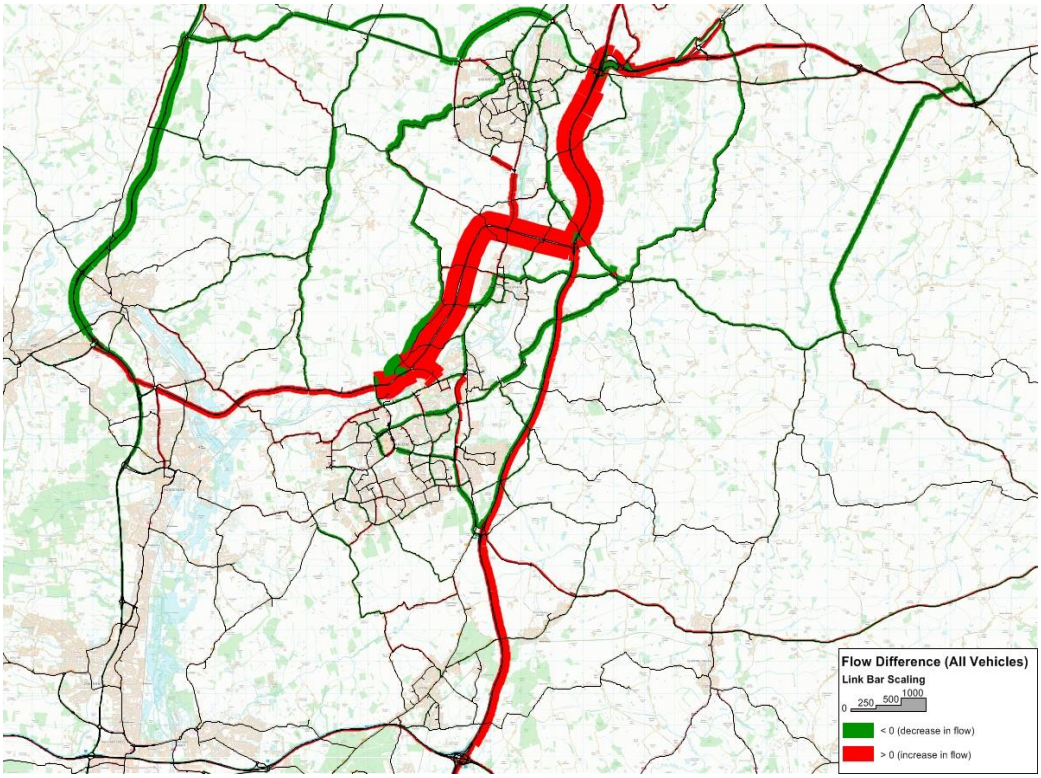


Figure 7.29 2036 Option 5 - With Northern Northern Bypass Flow Differences: AM

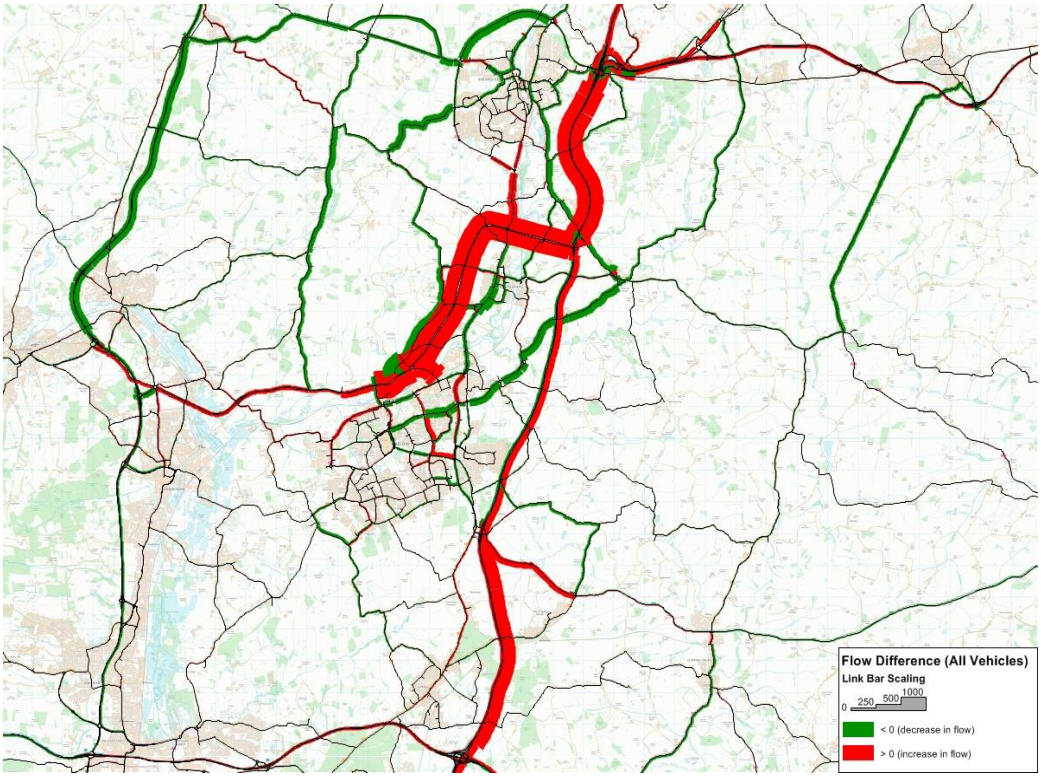


Figure 7.30 2036 Option 5 - With Northern Northern Bypass Flow Differences: PM

On the immediate approaches to Harlow, there is likely to be a lower level of flow reduction on the existing links to the town (A414 Burnt Mill, A1184, A414 south), and more traffic using the River Way link with the NNB in place in both time periods. Flows on B183 Gilden Way would be likely to be reduced with the NNB in place in both time periods.

Select link analysis (SLA) of peak period traffic using Option 5, the Northern Northern Bypass, is set out in the following four figures: Figure 7.31, Figure 7.32, Figure 7.33 and Figure 7.34. These show the origins and destinations of traffic using the Northern Northern Bypass element of Option 5.

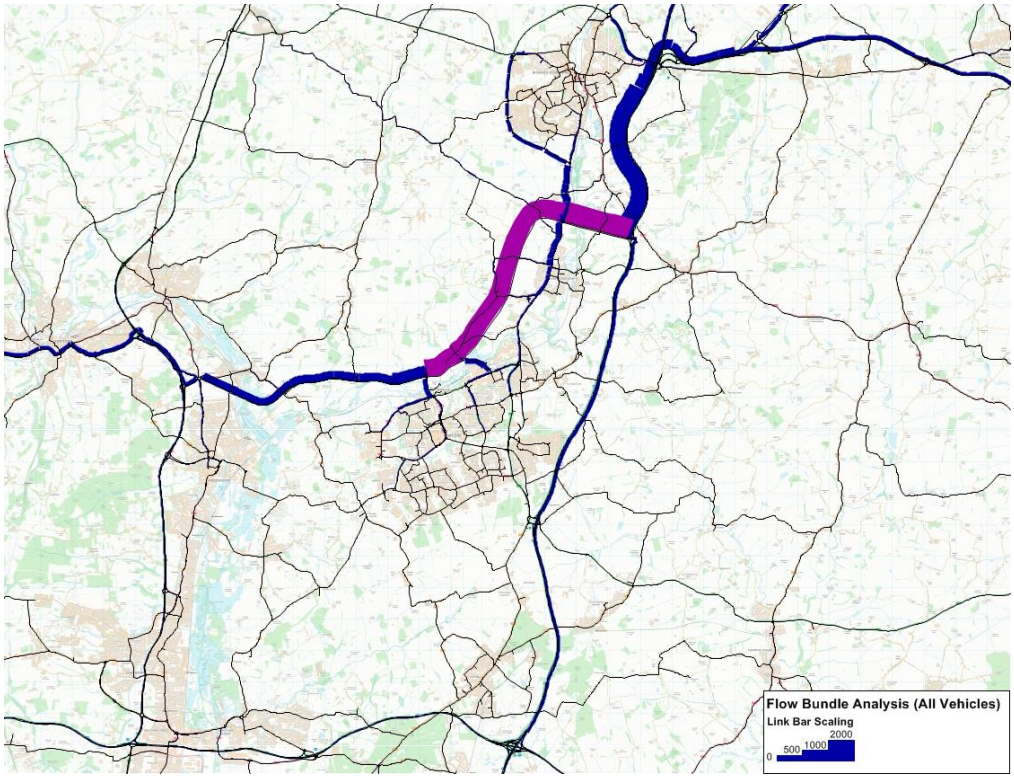


Figure 7.31 2036 Option 5 - With Northern Northern Bypass SLA: Northbound AM

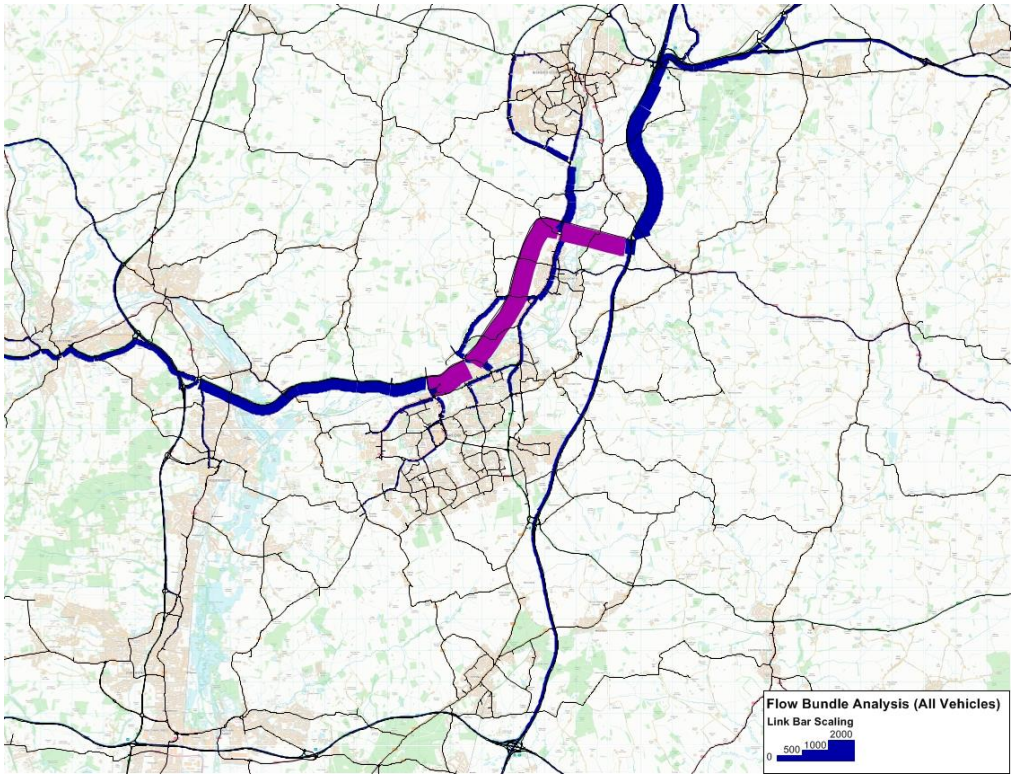


Figure 7.32 2036 Option 5 - With Northern Northern Bypass SLA: Southbound AM

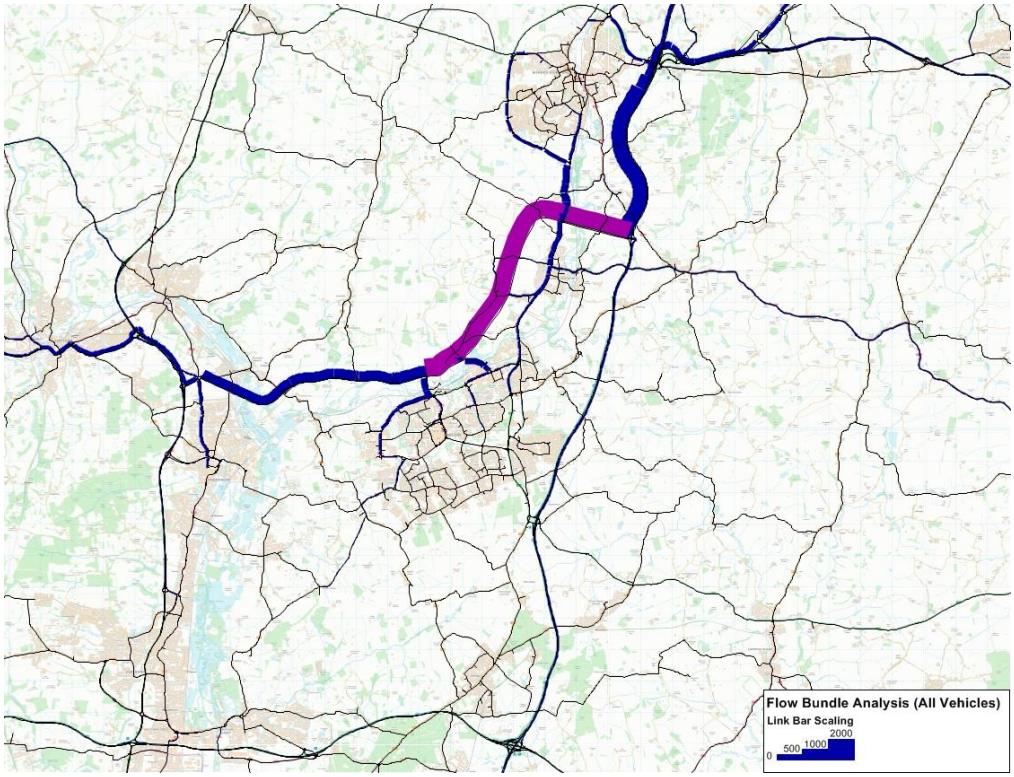


Figure 7.33 2036 Option 5 - With Northern Northern Bypass SLA: Northbound PM

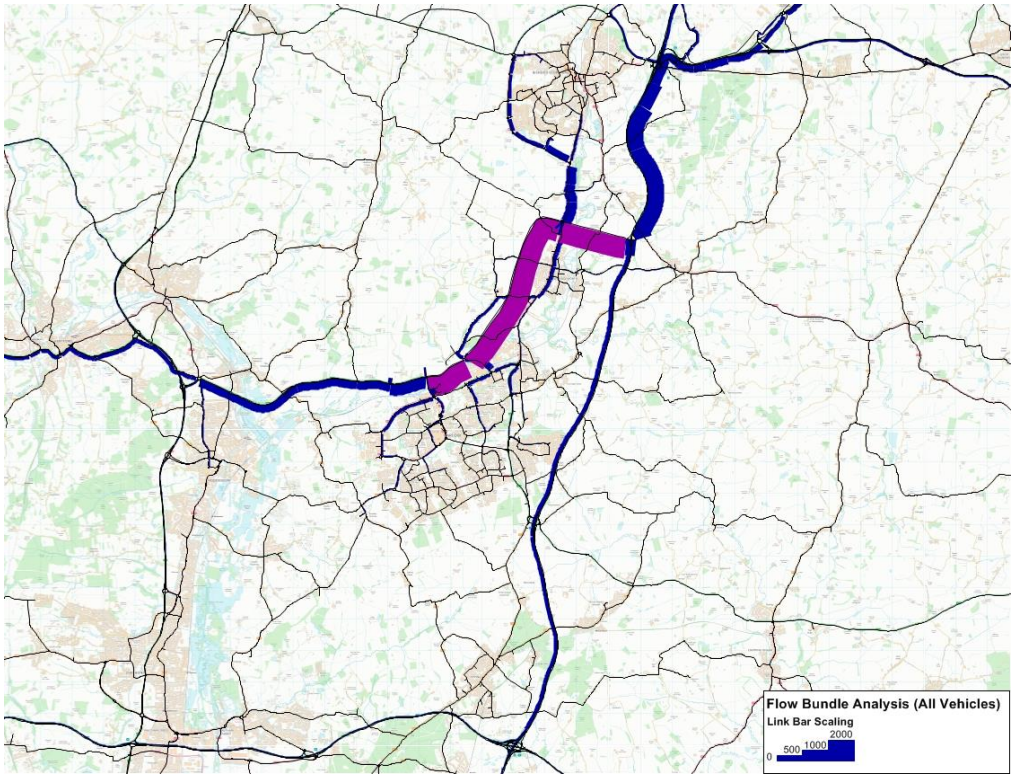


Figure 7.34 2036 Option 5 - With Northern Northern Bypass SLA: Southbound PM

Analysis of the origins and destinations of the traffic using the NNB scheme indicates that the majority of traffic using the scheme appears to be strategic in nature. The key connecting links used would be the motorway north of its connection with the M11, the A414 west of Harlow, and the A120 east of J8.

The level of traffic attracted to the bypass appears to be higher than to Option 4 the Northern Bypass, for all time periods but particularly westbound in the PM peak. This also results in higher flows on the A414 west as well as through Hertford.

There also appear to be more trips accessing the NNB from Bishop's Stortford and Sawbridgeworth than from Harlow, indicating that the scheme is less attractive to Harlow-related traffic than to these settlements in East Herts.

It is concluded that the Northern Northern Bypass scheme would have a lower overall effect on the level of traffic within Harlow than the Northern Bypass, and would be likely to attract more strategic movements around the town. It would not, therefore, improve the accessibility of Harlow for the majority of trips on the local network, which either have origins or destinations within the town, as shown in 3.2.2.

7.4.6 Option 6 - Southern Relief Road

The modelling of the Southern Relief Road (SRR) has been based on a schematic design, and no detailed design has been undertaken.

The effects of Option 6, the Southern Relief Road, on total vehicle hours, when compared with the Do Minimum scenarios are set out in Table 7.8.

This option is likely to achieve lower time savings than Option 4, the Northern Bypass, in all time periods and years. It also performs less well than Option 3, J7 and J7a, in almost all time periods and years, the exception being 2021 AM. It also performs less well when compared with Option 5, the Northern Northern Bypass.

Table 7.8 VISUM Model Outputs: Option 6 Southern Relief Road

Total Time (Veh Hrs) User Class	Do Min 2021	Do SRR 2021	Diff with SRR 2021	Do Min 2036	Do SRR 2036	Diff with SRR 2036
AM UC1	23,653	23,447	-206	28,796	28,601	-195
AM UC2	2,967	2,951	-17	3,723	3,704	-18
AM UC3	11,020	10,935	-85	16,827	16,730	-97
AM UC4	6,556	6,504	-51	9,478	9,420	-59
AM UC5	1,748	1,741	-8	2,284	2,278	-6
IP UC1	6,715	6,689	-26	7,952	7,921	-31
IP UC2	2,282	2,275	-7	2,899	2,893	-6
IP UC3	12,563	12,512	-51	19,853	19,769	-84
IP UC4	4,843	4,826	-17	6,856	6,833	-23
IP UC5	791	788	-2	989	985	-4
PM UC1	22,533	22,411	-123	27,707	27,487	-220
PM UC2	3,164	3,153	-12	4,063	4,043	-20
PM UC3	12,929	12,820	-109	20,157	19,955	-202
PM UC4	6,478	6,438	-40	9,479	9,392	-88
PM UC5	767	766	-1	988	984	-5

The flow difference outputs for the Southern Relief Road are illustrated in Figure 7.35 and Figure 7.36.

The option has very little impact on M11 flows; flows north of J7 may reduce slightly in the AM and increase slightly in the PM; south of J7 flows would be likely to reduce slightly during the AM, with southbound flows increasing in the PM period. At J7 flows on almost all arms reduce slightly during the AM peak, and increase on all arms during the PM peak.

There would be little or no impact on the A120 and A10, while flows on the A414 west of Harlow would be likely to increase more than for any other option during both time periods. To the east of Harlow, flows on the A414 east of J7 are unchanged in the AM, and westbound flows would be likely to increase with the SRR in place.

Flows on the A1184 through Sawbridgeworth show little change. Southbound flows on the B1393 immediately south of J7 would be likely to increase in both time periods, and through Epping the southbound flows are slightly higher in the AM and higher in the PM.

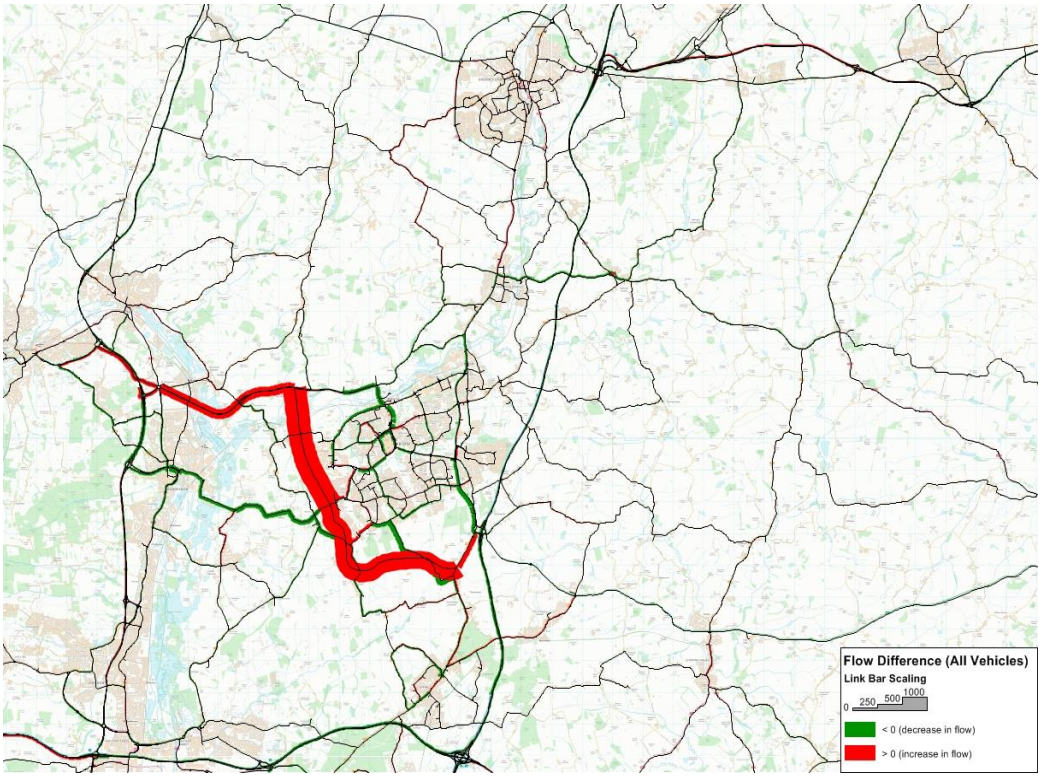


Figure 7.35 2036 Option 6 - With Southern Relief Road Flow Differences: AM

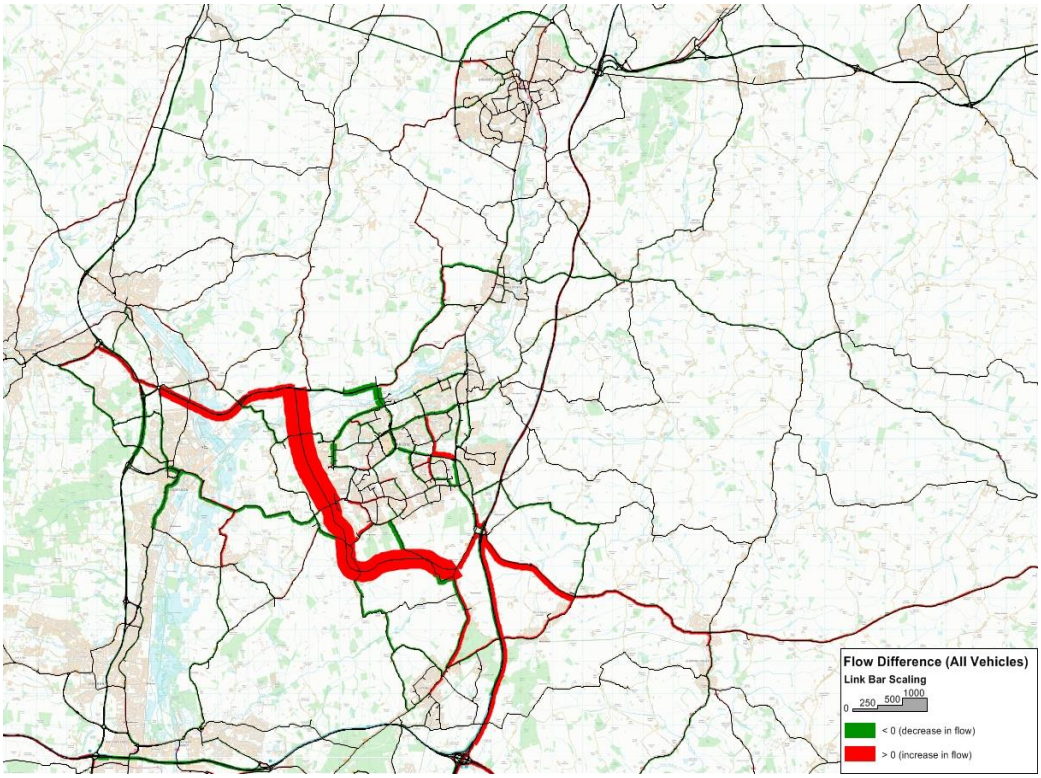


Figure 7.36 2036 Option 6 - With Southern Relief Road Flow Differences: PM

Over the wider local network there is likely to be very little difference to the Do Minimum scenario, with the level of traffic using less suitable routes unchanged with the SRR in place. On the immediate approaches to Harlow flows on the A414 at Burnt Mill and north of J7 would reduce in both time periods, but there would be little or no change on flows on the A1184.

Select link analysis (SLA) of peak period traffic using Option 6, the Southern Relief Road, is set out in the following four figures: Figure 7.37, Figure 7.38, Figure 7.39 and Figure 7.40. These show the general origins and destinations of traffic using the Southern Relief Road.

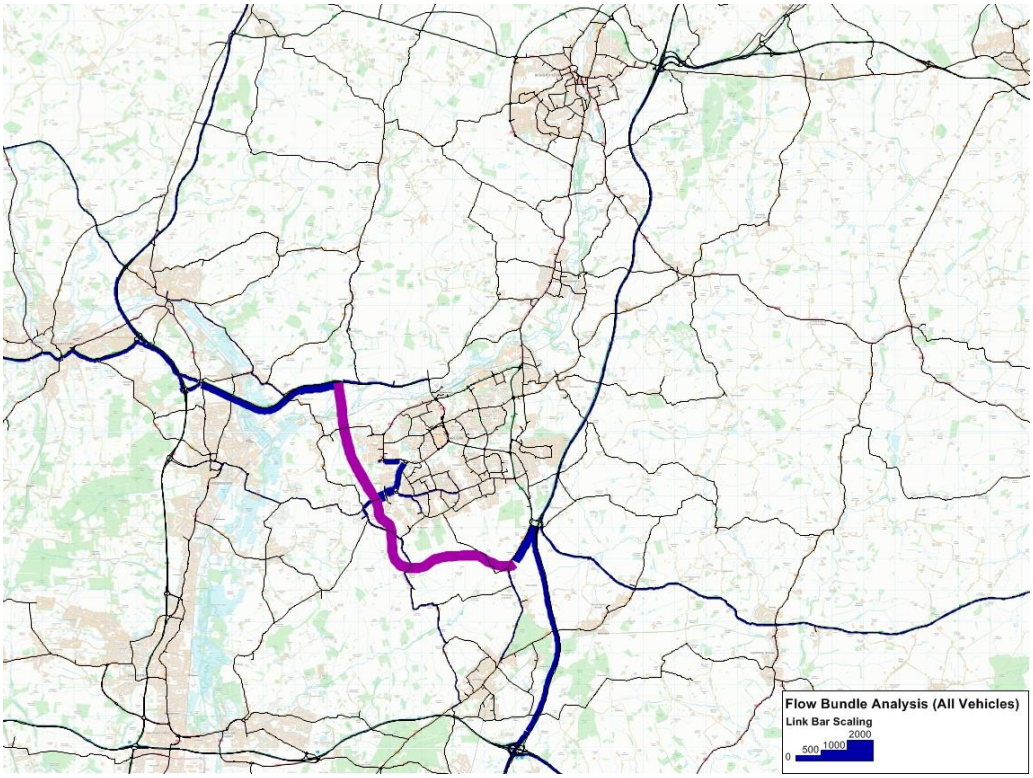


Figure 7.37 2036 Option 6 - With Southern Relief Road SLA: Northbound AM

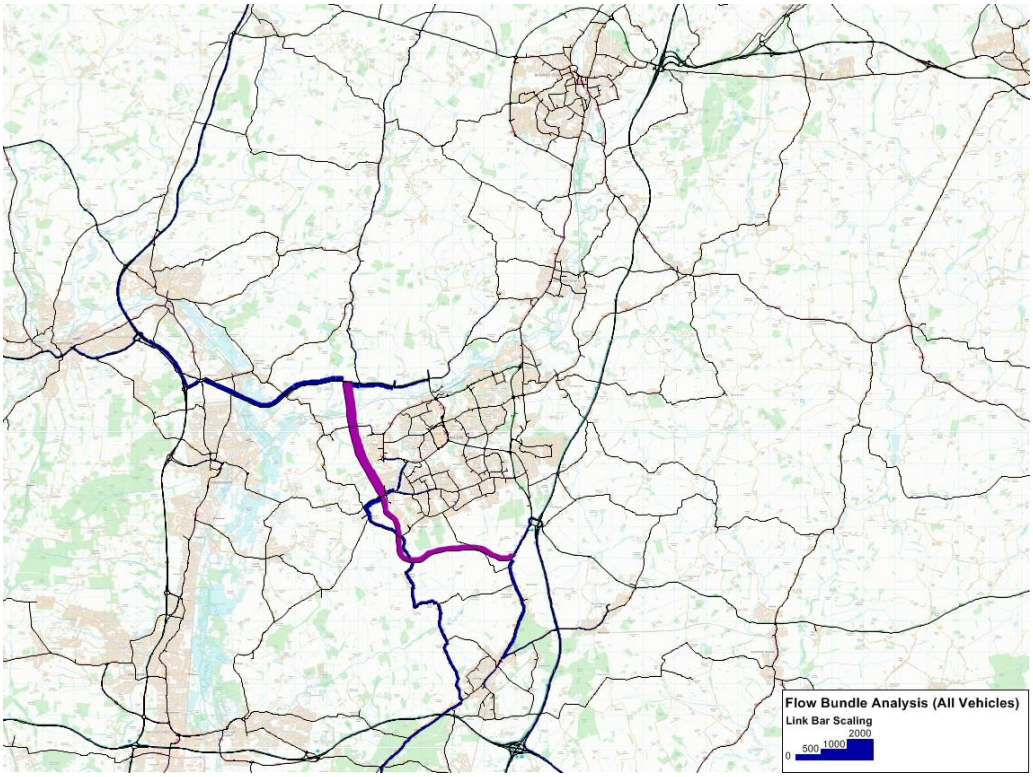


Figure 7.38 2036 Option 6 - With Southern Relief Road SLA: Southbound AM

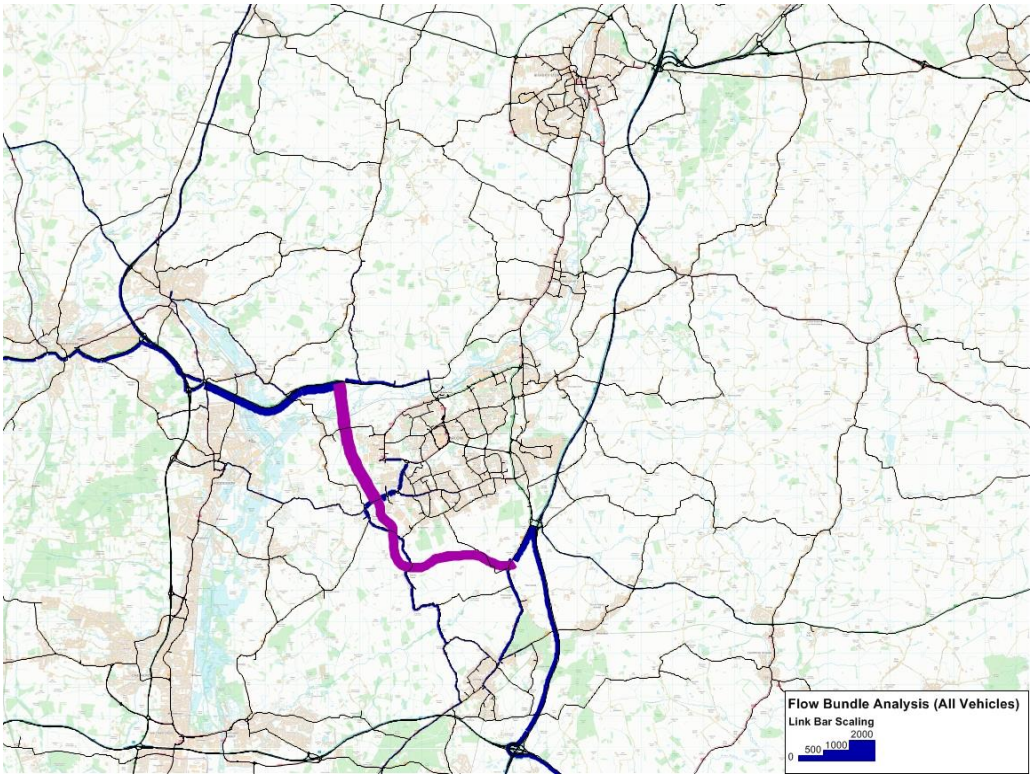


Figure 7.39 2036 Option 6 - With Southern Relief Road SLA: Northbound PM

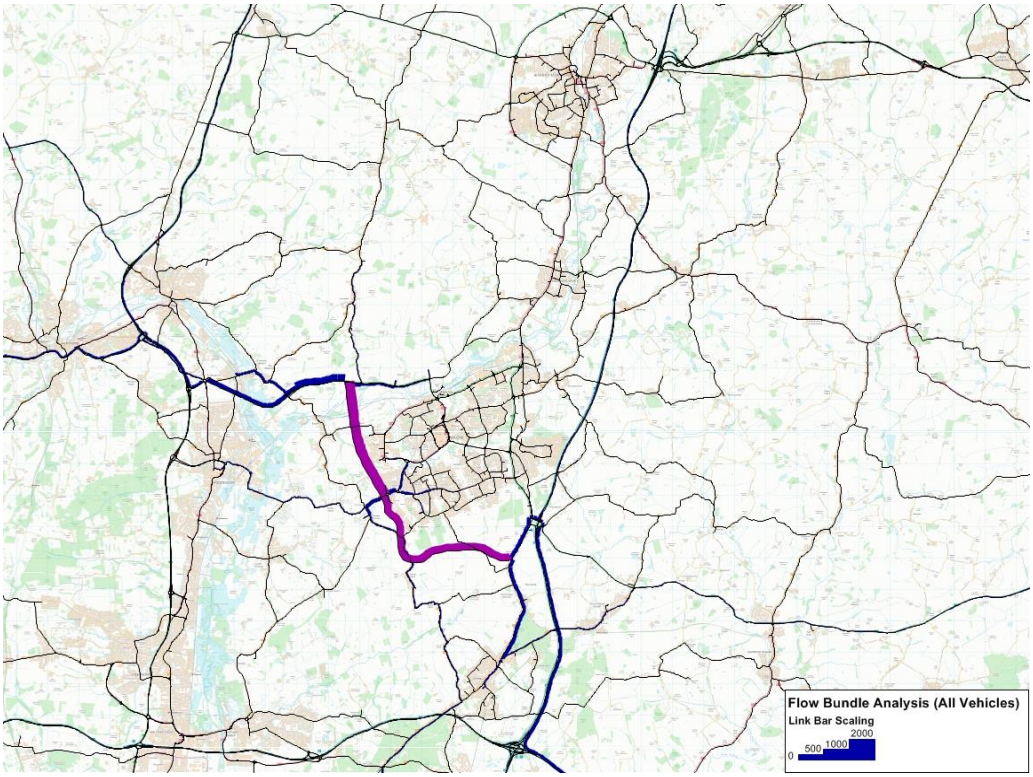


Figure 7.40 2036 Option 6 - With Southern Relief Road SLA: Southbound PM

Origins and destination analysis of the traffic using Option 6 indicates that, as with the other bypass schemes, the majority of traffic using the scheme appears to be strategic in nature. The key connecting links would be the motorway south of J7 via the B1393, and the A414 west of Harlow. Some traffic is attracted from west Harlow and from Epping in both time periods,

It is evident from modelling analysis that flows using Option 6 are likely to be much lower than for the other two bypass schemes (Options 4 and 5). This could be partly the result of this scheme having the least design information available of all the options, and that no improvement of J7 was included in the modelling. However, it is considered that the modelling has provided an adequate indication of general scheme impacts on the network.

It is concluded that Option 6, the Southern Relief Road scheme, would have the least overall effect on the level of traffic within Harlow than all of the options being assessed, and would also attract fewer strategic movements around the town. It would not, therefore, improve the accessibility of Harlow for the majority of trips on the local network, which either have origins or destinations within the town, as shown in 3.2.2.

7.5 Options Costs

For the purposes of the economic appraisal, a set of preliminary scheme costs has been developed for each of the intervention options. These have been based on high level concept drawings, from which capital and maintenance costs have been estimated and assumptions made about the overall scheme budget.

More details of the specific design and costing considerations are set out in the 'Order of Magnitude Estimate'[25] (OME). Summarised high level cost estimates for each option are provided in Table 7.9, the more detailed costs breakdown are contained in the OME. It should be noted that Optimism Bias has been included at 44%.

[25] Order of Magnitude Estimate, Rev 2, 28 May 2015, Jacobs, Harlow Relief Road Options, ECC

Table 7.9 High Level Option Costings (Q2 2015, rounded to £0.1m)

Element	Junction 7a	Junction 7	Junctions 7 & 7a	Northern Bypass	Northern Northern Bypass	Southern Relief Road
Construction	44.3	48.1	92.4	234.6	190.3	155.1
Land	2.2	2.0	4.2	9.4	7.3	7.1
Preparation	8.2	8.9	17.1	43.5	25.3	28.7
Supervision	2.2	2.0	4.2	9.4	7.3	6.1
Maintenance	27.0	20.5	47.5	114.7	87.7	150.5
Total (£m)	83.8	81.6	165.4	411.6	327.8	346.5

Capital and operating/maintenance cost estimates, as set out in Table 7.9, have been used in the economic assessment.

7.6 Economic Appraisal

Time benefits for each option resulting from the difference between the Do Minimum and each Do Something scenario for both forecast years have been monetised using standard WebTAG Values of Time (VoT). These are shown in Table 7.10 for different vehicle and journey types.

Table 7.10 Journey Purpose Proportions and VoT [26]

Vehicle Type	VoT (2010 prices, undiscounted):	AM		IP		PM	
		α	VoT	α	VoT	α	VoT
Car	Employers Business	15%	£31.56	16%	£30.81	11%	£30.34
	Commute	37%	£7.83	9%	£7.77	33%	£7.65
	Other	29%	£10.06	54%	£10.46	38%	£10.74
LGV	Employers Business	11%	£14.62	11%	£14.62	11%	£14.62
	Commute	0%	£9.15	0%	£9.15	0%	£9.15
	Other	1%	£9.15	1%	£9.15	1%	£9.15
OGV1		3%	£14.35	3%	£14.35	2%	£14.35
OGV2		3%	£14.35	4%	£14.35	2%	£14.35
PSV		1%	£96.24	1%	£92.02	1%	£96.86

[26] Source: WebTAG data book (November release, v1.3b), sheet A1.3.5

Vehicle proportions have been extracted from the Visum model for the opening and design years, as set out in Table 7.11 and Table 7.12 respectively.

Table 7.11 2021 Opening Year Model Vehicle Proportions (All Options)

Vehicle Type	AM	IP	PM
Car	78.1%	76.9%	82.3%
LGV	17.1%	19.6%	15.7%
HGV	4.8%	3.5%	2.0%
PSV	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

Table 7.12 2036 Design Year Model Vehicle Proportions (All Options)

Vehicle Type	AM	IP	PM
Car	76.6%	77.0%	81.0%
LGV	18.8%	19.9%	17.1%
HGV	4.6%	3.1%	1.9%
PSV	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

Once the benefits from each option are monetised, these are compared to produce the NPV and BCR. The output BCR is an important value when used to assess how a scheme is sifted in order to ensure that only schemes that are economically viable are taken forward for more detailed evaluation.

Figure 7.41 illustrates how the outputs from the Cost Benefit Analysis (CBA) feed in the appraisal process and Value for Money categories.

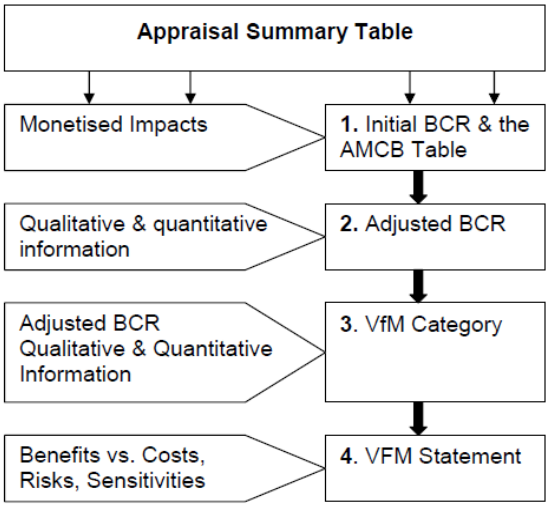


Figure 7.41 Cost Benefit Analysis and Value for Money [27]

The calculated benefits resulting from the analysis have been factored up to an annual period to produce a yearly benefit for each scheme for both opening and forecast years. These values are then interpolated and projected over the standard 60 year appraisal period as illustrated in Figure 7.42.

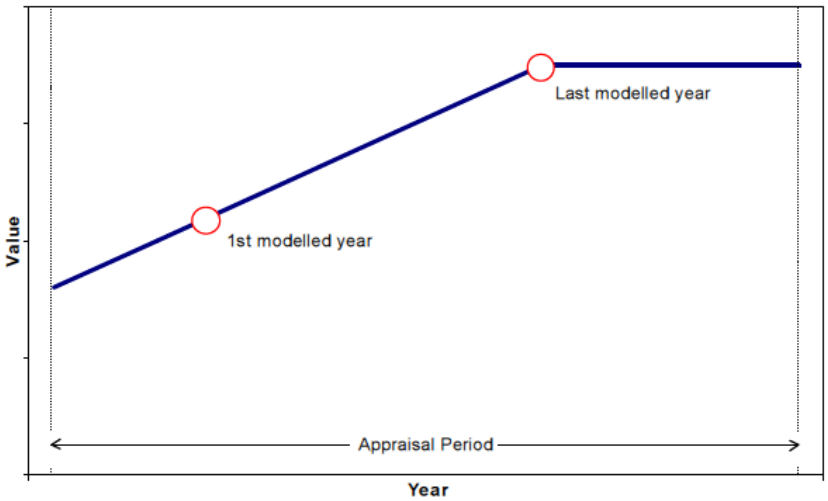


Figure 7.42 Interpolation and Projection of Benefits

The annualisation values used to factor the AM, IP and PM 'time slices' to an annual benefit are shown in Table 7.13.

[27] Taken from DfT (2013) Value for Money Assessment: Advice Note for Local Transport Decision Makers

Table 7.13 Annualisation Factors applied to Highway Model Output Data

Annualisation Factor	Factor
Day to Year Factor	253
AM to AM Period Factor	2
IP to IP Period Factor	6
PM to PM Period Factor	2

Calculated benefits for each of the options were then discounted to 2010 values, as outlined in the standard HM Treasury Green Book appraisal methodology, which were then compared with the 2010 discounted options scheme costs to produce output values. These values include:

- Present Value of Benefits (PVB);
- Present Value of Costs (PVC);
- Net Present Value (NPV);
- Benefit Cost Ratio (BCR).

As per DfT guidance, the output BCR values from the CBA determines the VfM category which the option falls within, as defined here:

- Poor VfM if BCR less than 1.0;
- Low VfM if BCR between 1.0-1.5;
- Medium VfM if BCR between 1.5-2.0;
- High VfM if BCR between 2.0-4.0; and
- Very high VfM if BCR greater than 4.0.

This methodology and key assumptions have been used to calculate each of the options' benefits using the Visum model, and complies with standard WebTAG, DMRB and HM Treasury Green Book approaches to the assessment of public infrastructure projects.

7.7 Options VfM Results

The BCR and VfM values derived using the data and methodology as set out in the previous section is summarised in Table 7.14.

Table 7.14 High Level Economic Assessment Results

Options	PVB	PVC	NPV	BCR	VfM
M11 J7a	£288,484,020	£70,331,705	£218,152,316	4.1	Very High
M11 J7	£241,696,376	£73,119,378	£168,576,998	3.3	High
M11 J7 & J7a	£438,107,289	£143,451,083	£294,656,206	3.1	High
Northern Bypass	£714,465,552	£359,837,668	£354,627,884	2.0	Medium
Northern Northern Bypass	£570,129,757	£272,573,997	£297,555,760	2.1	High
Southern Relief Rd	£268,671,711	£259,834,862	£8,836,849	1.0	Low

The VfM values shown in this table have been input into the EAST sifting process, as set out in the next section, as one of the elements evaluated to determine the most appropriate option to take forward for more detailed assessment.

7.8 EAST High Level Evaluation

In order to provide a consistent approach to the available options use has been made of the DfT Early Assessment and Sifting Tool (EAST) guidance[28]. EAST is one of the tools available to support high level development of the evidence base for Business Case development.

The EAST spreadsheet tool has been utilised to inform the option evaluation process. EAST is consistent with Transport Business Case principles and has been developed to summarise and present evidence on options in a clear and consistent format. It utilises a simple 5-point Red/Amber/Green (RAG) system for each of the assessment areas, which aims to facilitate the early assessment and comparison of scheme options. Each of the options set out in section 4.1 have been evaluated using the EAST spreadsheet tool. The extended summary sheet for each high level option is included in Appendix B.

[28] Department for Transport DfT Early Assessment and Sifting Tool (EAST) guidance, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/4475/east-guidance.pdf

The methodology has been used to:

- help refine options by highlighting adverse impacts or unanticipated consequences;
- compare options;
- identify trade-offs between objectives;
- filter the number of options, ie to discount non-runners early on to ease the appraisal burden and avoid resources being spent unnecessarily; and
- identify key uncertainties in the analysis and areas where further appraisal effort should focus.

In addition to the use of the EAST spreadsheet tool, a further process was undertaken whereby each of the key elements of the EAST evaluation was weighted. This provided a simple scoring framework and enabled a broad spreadsheet-approach evaluation of all of the options to identify what were likely to be the most beneficial schemes to take forward for more detailed analysis.

The weighting was determined with reference to previous scheme evaluations, and comprised the averaged weighting from three independent reviewers, in order to provide as neutral a value process as possible. The assessment elements and their weighting values are contained in Appendix B.

It should be noted that the methodology used to derive the BCR and VfM values used in this sifting process is explained later in this section.

7.9 Option Evaluation – Sifting Results

The results of the EAST-weighted evaluation are summarised in Table 7.15 which shows each of the schemes' weighted totals for each business case element; the detailed weighting evaluation sheets are contained in Appendix B.

Table 7.15 High Level Option Sifting: Weighted Evaluation Summary

	Scheme Weighted Scores						
Business Case Element	**Junction 7a**	**Junction 7**	**Junctions 7 & 7a**	**Northern Bypass**	**Northern Northern Bypass**	**Southern Relief Road**	***Case Weighting Total***
Strategic Case	12.3	1.7	11.9	9.5	-1.0	0.2	*20.7*
Economic Case	23.2	5.4	18.2	17.0	3.2	1.2	*35.7*
Commercial Case	3.7	3.7	3.7	3.7	3.7	3.7	*11.7*
Financial Case	9.5	6.7	4.2	2.5	2.5	2.5	*18.3*
Management Case	10.8	7.7	6.5	5.7	4.1	4.1	*13.7*
Weighted Total	58.5	25.1	44.5	38.4	12.5	11.7	*100.0*

The results are illustrated in Figure 7.43, which shows the schemes by their relative rankings. It can be seen that J7a ranks highest by weighted score, followed by the combined J7 and J7a improvements, with the Northern Bypass ranked third.

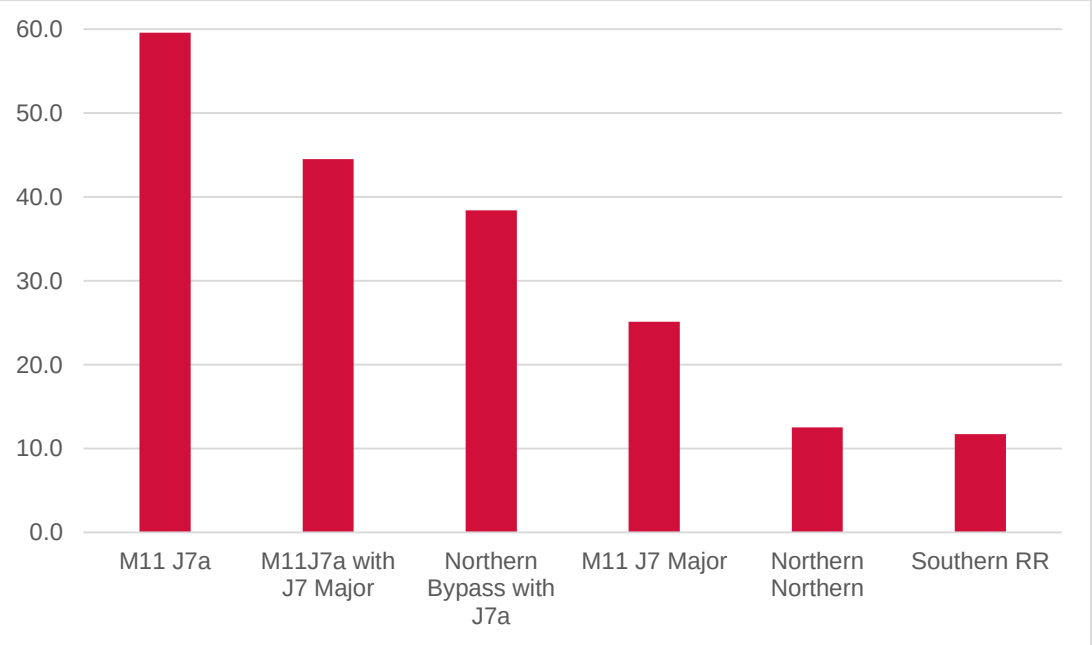


Figure 7.43 Scheme Weighting Ranked Results Summary

Comparison of the performance of these high level options shows the following main differences:

Strategic Impacts:

The J7a scheme scores highest in terms of its strategic case, as it is expected to relieve congestion on the A414 in the vicinity of J7, enable economic growth (housing and jobs) in Harlow, and improve local connectivity with the strategic road network. Other options are more likely to provide wider strategic impacts but these may not provide benefits within Harlow itself due to limited through traffic demands.

Economic Impacts:

The J7a scheme is likely to result in a more efficient transport network, reducing overall journey times and delays to travel to/from Harlow. It would also unlock housing development land in the east of Harlow and improve access to the Enterprise Zone. J7 may not address A414 congestion issues within Harlow, nor provide additional access to the SRN. J7a could have a positive impact on carbon emissions due to the relief of congestion on the A414, and reduction in journey lengths for Harlow/J8 trips. All schemes would have a significant level of embedded carbon resulting from their construction. All schemes would have generally neutral socio-distributional impacts as there would be accessibility improvements to the wider network for road users, but also some community severance, air and noise pollution, and impacts to Public Rights of Way (PRoW). J7a would have minor negative impacts on the immediate local environment on B183 but have wider positive impacts due to congestion relief.

Financial Impacts:

While J7 is a recognised scheme and has funding available, the study is at Stage 0 and so costing is uncertain. J7a does not yet have an assured funding mechanism, but the scheme is at a later stage of design and therefore costing is more certain. The other options have been subject to very high level costings, with a high level of uncertainty; their financial impact is therefore uncertain. J7a provides 'more for less' in that it provides a local access link with a very high BCR value, whereas the longer bypass schemes have higher cost implications and/or uncertainties and lower BCR values as a consequence.

Commercial Impacts:

All the options score the same in terms of their commercial case, as they all offer similar flexibility of option design. Inclusion of major infrastructure projects in Local Plans enables potential Section 106 financial contributions from site promoters.

Managerial Impacts:

J7, J7a and the combined scheme could be implemented within a similar timescale, while the longer bypass schemes would take more time to bring forward. Limited public consultation has taken place on all except the J7a scheme. Both J7a and the northern bypass have a higher quality of evidence from which to draw conclusions, the other options have greater uncertainty over feasibility, and public acceptability.

7.10 Targets

The preferred option will be expected to result in a range of measurable impacts on traffic and travel conditions. Impacts and measurable indicators relevant to improving conditions within Harlow and on its immediate strategic highway network could include:

- Delivery of identified housing and employment growth in line with the emerging Local Plans, measured by the number of homes/jobs delivered/ occupied by 2031;
- Reduced congestion and improved journey reliability, measured by traffic volume and relative difference in peak/off-peak journey times compared against the pre-scheme implementation situation (likely to be 2018);
- Improved connectivity, reflected by absolute journey times on key routes compared against the 2018 pre-scheme implementation situation;
- High quality of life and natural environment, reflected through number of collisions, carbon emissions and level of noise (dB) compared against the 2018 pre-scheme implementation situation.

Setting targets is an iterative process and these will evolve as further evidence is collected. Final targets would be developed during full Business Case development, in line with the principles listed above, and set out as 'SMART' (Specific Measurable Accepted Realistic Time-defined) targets.

7.11 Option Evaluation – Conclusions

The results of this sifting process have been used to determine which schemes are more likely to meet the targets and are therefore to be evaluated further:

- M11 J7a with B183 Gilden Way link
- M11 J7 major scheme with J7a and B183 Gilden Way link
- M11 J7a with Northern Bypass
- M11 J7 major scheme

These potential options have been taken forward for more detailed assessments. The results from the next stage of this assessment, which will use an updated version of the VISUM model, are detailed in the MFR.

The following options have not been taken forward for more detailed assessment as they are considered to be less likely to meet the requisite targets:

Northern Northern Bypass	A scheme linking the A414 at Eastwick with a new junction to the south of Bishop's Stortford, via a western Sawbridgeworth bypass would have significant risks in terms of costs and deliverability, including multiple land owners and public acceptability. It is not likely to address congestion issues within Harlow, nor unlock key development land to the east of Harlow. It also lies wholly within Hertfordshire and so is outside the control of ECC.
Southern Relief Road	A scheme linking the A414 east of Roydon with M11 J7 via a western and southern bypass of Harlow, would have significant risks in terms of costs and deliverability, including multiple land owners, and public acceptability. It would also require a major improvement at J7, would be unlikely to address congestion issues within Harlow, nor unlock key development land to the east of Harlow.

8 Summary and Conclusions

8.1 Summary

This OAR has set out the need for a scheme, together with its context. The evidence for the need for an intervention in order to meet policy and strategy objectives has been collated over a number of years.

The key objectives of the intervention are:

- To provide connectivity to and within urban areas to support self-contained employment and housing growth and regeneration;
- To provide good connectivity within Essex and with adjacent major areas, maximising benefit to the local economy of international gateways and strategic links to London, the East and South East;
- To address network infrastructure capacity issues and improve network resilience;
- To reduce congestion and improve traffic management within Harlow and along the A414 corridor and at M11 J7;
- To enable housing and employment growth and regeneration;
- To unlock development land.

Current situation

It has been demonstrated that growth within Harlow is currently constrained due to inadequate road capacity. This constraint results from a number of issues, including limited access routes into and out of the town, a single connection to the strategic road network at M11 J7 and the grid structure of the local road network. In addition, Harlow is both a key origin as well as a destination of commuting trips, which leads to peak hour pressures on junctions that are operating close to or in excess of their original design thresholds.

There is high dependency on the use of private cars, which is compounded by the ready availability of car parking in the town centre and at places of work. While the town has a comprehensive local bus network, buses are likely to be less attractive for cross-town travel due to the need to change buses in the town centre.

The opportunities and constraints are summarised as:

Constraints:

- majority of Harlow district already developed resulting in very limited opportunities to deliver required growth within boundary;
- existing highway network constraints need to be addressed before growth can occur;
- restriction on number of jobs at Enterprise Zones until strategic network access issues addressed;
- major improvement to J7 may result in unacceptable pressure on A414 junctions within town, limiting the effectiveness of the increased junction capacity;
- likelihood of adjacent districts proposing urban extensions to Harlow during current round of Local Plan development as these would provide more a sustainable growth location if network constraints can be reduced;
- physical and environmental constraints likely to reduce viability of some network congestion solutions.

Opportunities:

- Emerging Local Plans provide mechanism for delivering and funding network improvements;
- Growth in the vicinity of Harlow provides an opportunity for sustainable development due to opportunity to improve current and future public transport accessibility;
- Opportunity to open up development land within and around district for housing and employment;
- Improving network resilience will encourage private sector investment and help to deliver new jobs and homes;
- Improving network will also encourage regeneration, Harlow is in the most deprived 30% of local authorities, and is 2nd most deprived in Essex.

Future situation

There are already several large committed housing and employment developments, most of which are in the eastern side of the town, as well as significant housing development in Bishop's Stortford, and the ongoing expansion in the numbers of passengers at Stansted Airport. A number of road capacity improvement schemes in the local and wider area are scheduled, and others have been identified and are

subject to current feasibility studies, in order to address issues resulting from this committed growth.

The likely future travel demands resulting from already committed development, the 'Do Minimum' scenario, has been assessed. This shows that the situation on roads and at junctions that are already under pressure will worsen, and delays and congestion will increase.

The four key districts, Harlow, Epping Forest, Uttlesford and East Hertfordshire, are developing new Local Plans which, together require at least 37,000 new homes, and 26,000 new jobs to be delivered by 2031. This additional growth is likely to lead to increases in daily flows of between 45-75% on the key routes in the study area, further exacerbating capacity issues.

Need for intervention

The underlying drivers for intervention have been identified, and include the inability of the current highway infrastructure to accommodate existing traffic, as shown by the existing levels of peak period congestion on the road network. The resilience of the major through route, the A414, is also compromised by its routeing through M11 J7, which itself requires major capacity improvements. These constraints affect not only existing and committed growth but also compromise the ability of the network to accommodate future sustainable economic growth and regeneration, and the need to release the residential and employment potential of key sites around Harlow.

The impacts of not intervening will result in very limited scope for growth, worsening congestion at J7, and worsening connectivity both within the town and with major centres along the London-Stansted-Cambridge corridor.

Options generation

A range of highway infrastructure options have been identified and evaluated over the past 30 years, and range from extensive bypass routes, to more localised improvements. These studies include: investigation of alternative A1184-M11 connections; examination of northern relief routes and southern relief routes, all combined with high quality public transport corridors; investigations into the feasibility of more direct connections between A414 and M11; and assessment of feasibility providing additional eastern access opportunities between Harlow and the M11.

From these studies six key options, which were considered to be able to fulfil some or all of the scheme objectives, were identified. As is befitted by the early stage of this

options evaluation process, the level of detail of each of these intervention options is schematic, as no detailed designs are available, and each option has been assessed at an equally high (coarse) level of conceptual assumptions.

The six options are:

Option 1: New M11 junction to east of Harlow, J7a, with local link to B183 Gilden Way;

Option 2: Improved M11 J7 (based on 2011 Mouchel design);

Option 3: Both Option 1 and Option 2;

Option 4: 'Northern Bypass', which includes the Option 1 J7a scheme together with a dual carriageway link from J7a through to A414 at Eastwick, and an additional single carriageway access into Harlow via River Way;

Option 5: 'Northern Northern Bypass', which comprises a dual carriageway link from A414 at Eastwick, aligned to the south of Gilston, and then to the west of Sawbridgeworth, connecting with the M11 via a new junction south of Little Hallingbury;

Option 6: 'Southern Relief Road', which comprises a dual carriageway link from the A414 east of Roydon, skirting the western and southern edges of Harlow, and connecting with J7 via the B1393. Please note that the capacity improvement required at J7 in conjunction with this scheme has not been modelled or assessed.

Options Sifting

These six options have been evaluated against 'no intervention' future scenarios using a number of methodologies:

- assessment using highway assignment modelling (VISUM);
- economic appraisal to estimate benefit cost ratios (BCR) and Value for Money (VFM); and
- ranking using Department for Transport (DfT) early assessment and sifting tool (EAST) and bespoke spreadsheet analysis.

In terms of total time, all options provide modelled time savings, primarily through providing additional network capacity or reduced travel distances. The option which showed the greatest modelled time savings is Option 4, the Northern Bypass.

Option 1, Junction 7a, results in additional peak period traffic on the M11 north and south of Harlow, and on B183 Gilden Way, and on the A414 around the north of Harlow. It also results in reduced traffic on the A414 north of J7 and through to the

B183 junction. This reflects the reassignment of some trips in the southern part of the town re-routeing to use J7a. There is also evidence of less traffic on more unsuitable routes through villages around Harlow, due to traffic using the M11 to reach the town. Select link analysis also indicates that the majority of traffic attracted to Option 1 is Harlow-related, with very little evidence of through-trips increasing. The highway assignment modelling, therefore, indicates that Option 1 improves accessibility for Harlow-related trips, and could improve the network resilience particularly on the A414 north of J7.

Option 2, the Junction 7 improvement, results in modelled travel time reductions, but these are less than those for Option 1. Option 2 is likely to increase flows on the M11 south of J7, as well as on all the approaches to J7. Within Harlow there is no clear evidence of overall beneficial effects on the local road network flows. The select link analysis indicates that the majority of the trips using the J7 scheme would be Harlow-related. While Option 2 would reduce congestion at J7, it is less likely to result in improved accessibility on the local road network within Harlow, and the additional traffic on the A414 would not improve its network resilience.

Option 3, the combination of both J7 and J7a, would be likely to result in greater travel time savings than each of these individual schemes in isolation. The changes in traffic flows resulting from Option 3 are broadly the same as for each scheme, with increases in traffic on the M11 north and south of the town. There are also reductions in traffic on less suitable rural routes indicating that traffic is re-assigning to the more strategic routes. Select link analysis shows that Option 3 traffic is primarily Harlow-related. It is concluded that implementation of Option 3 would result in improved accessibility for Harlow-related trips and could improve network resilience on the A414 and through the town.

Option 4, the Northern Bypass with J7a, results in higher levels of traffic on the M11 than for J7a in isolation, and leads to greater use by strategic traffic, rather than Harlow-related traffic. Traffic on less suitable rural routes to the east of Harlow is likely to reduce but there are indications that these could increase on rural routes to the north-west of the town. On the immediate approaches to Harlow there is likely to be a reduction in flows on the key links, however the northern bypass itself is most attractive to strategic trips, with the more local Harlow-related trips more likely to access the town via B183 Gilden Way and J7a. Therefore the key benefits of the scheme in relation to improving access to Harlow are achieved through J7a, with the bypass itself likely to provide network resilience benefits.

Option 5, the Northern Northern Bypass, results in lower time savings than Option 4 in almost all time periods and years. The option would attract more strategic traffic, from the A10 and A120, particularly to the north of its connection to the M11 than other options. On the immediate approaches to Harlow, there is likely to be less benefit to Harlow-related traffic, although flows on B183 Gilden Way are likely to be lower. The key areas that would be likely to benefit from Option 6 appear to be in Bishop's Stortford and Sawbridgeworth. Option 6 is less likely to improve accessibility to Harlow, although it could provide strategic network resilience.

Option 6, the Southern Relief Road, performs less well than both Option 4 and Option 5 in terms of time savings likely to be achieved. It would have little impact on the level of traffic on the M11 but flows on the A414 west of Harlow would be likely to increase. Select link analysis indicates that the majority of traffic using Option 6 would be strategic in nature. It is concluded that this option would have the least overall effect on the level of traffic within Harlow and therefore would not improve accessibility within the town.

Economic appraisal of the options, using the highway assignment model outputs and indicative scheme costs have found that Option 1 would have Very High Value for Money (VfM), Options 2, 3 and 5, would have High VfM, Option 4 would have medium and Option 6 would have Low VfM. All of the options, with the exception of Option 6, would have Benefit Cost Ratios (BCR) values greater than 2.

Early Assessment Sifting Tool analysis, which evaluates each option against their fit with standard business case elements has enabled the six options to be ranked using weighted scores. This analysis has been summarised in Table 7.15, which is reproduced Table 8.1. This shows that Option 1 is ranked first, followed by Option 3, then Option 4. It should be noted that the evaluation of Options 2, 5 and 6, is based on highly schematic high level design assumptions. In the case of Option 2, the J7 scheme, this is currently being studied by Highways England and the resulting scheme design may achieve much better results than that used in the high level options assessment process reported herein.

Table 8.1 High Level Option Sifting: Weighted Evaluation Summary

	Scheme Weighted Scores						
Business Case Element	**Junction 7a**	**Junction 7**	**Junctions 7 & 7a**	**Northern Bypass**	**Northern Northern Bypass**	**Southern Relief Road**	***Case Weighting Total***
Strategic Case	12.3	1.7	11.9	9.5	-1.0	0.2	*20.7*
Economic Case	23.2	5.4	18.2	17.0	3.2	1.2	*35.7*
Commercial Case	3.7	3.7	3.7	3.7	3.7	3.7	*11.7*
Financial Case	9.5	6.7	4.2	2.5	2.5	2.5	*18.3*
Management Case	10.8	7.7	6.5	5.7	4.1	4.1	*13.7*
Weighted Total	58.5	25.1	44.5	38.4	12.5	11.7	*100.0*
Ranking	1	4	2	3	5	6	

The outcome of the Options Assessment is that three options, Option 1, Option 2, and Option 3, will be taken forward for more detailed modelling and evaluation. Option 4 will also be further evaluated in order to determine when this scheme would be needed, however, given its scale, this is unlikely to be within the period of the currently emerging Local Plans.

Results from the later stages of the traffic modelling will be reported in the Model Forecast Report.

Appendices

Appendix A: Model Inputs

Planning and Network Assumptions

Table A-2: Uncertainty Log Development Summary

DISTRICT	Development Probability	DEVELOPMENT LOCATION	Medium Growth Housing 2021	Medium Growth Jobs 2021	Medium Growth Housing 2036	Medium Growth Jobs 2036
East Herts:	Near Certain	Bishop's Stortford	284	129	1027	517
	Reasonably Foreseeable	Bishop's Stortford	687	470	3477	1880
	Reasonably Foreseeable	Sawbridgeworth	75	0	400	0
	Near Certain	Hertford	53	0	211	0
	Reasonably Foreseeable	Hertford & Welwyn GC	626	0	2684	0
	Near Certain	Ware	81	0	81	0
	Hypothetical	Ware	0	0	3050	0
	Near Certain	Harlow	200	0	200	0
	Hypothetical	Harlow	1188	0	3500	0
	Near Certain	Watton-at-Stone	28	0	111	0
	Near Certain	Puckeridge	58	0	58	0
	More than Likely	Buntingford	70	0	280	0
	Hypothetical	Buntingford	0	0	480	0
East Herts		***Sub-Total***	***3350***	***599***	***15559***	***2397***
Epping Forest:	Reasonably Foreseeable	Buck Hill/Chigwell/Loughton /Debden/T Bois	185	0	659	0
	Reasonably Foreseeable	Ch Ongar/N Weald	353	561	1262	2243
	Deliverable	N Weald/Epp Up	50	0	87	0
	Reasonably Foreseeable	Epping/Thornwood	163	55	682	218
	Deliverable	Roydon	35	0	35	0
	Reasonably Foreseeable	Roydon/Nazeing/W Abbey	476	504	1663	2016
	Reasonably Foreseeable	Lwr Sheering/Sheering	24	0	85	0
	Reasonably Foreseeable	Harlow	202	0	0	0
	Deliverable	Harlow	130	304	0	1215
	Developable	Harlow	838	407	2100	4045
	Hypothetical	Harlow	0	0	0	0
Epping Forest		***Sub-Total***	***2455***	***1830***	***6573***	***9737***

DISTRICT	Development Probability	DEVELOPMENT LOCATION	Medium Growth Housing 2021	Medium Growth Jobs 2021	Medium Growth Housing 2036	Medium Growth Jobs 2036
Harlow:	Near Certain	Harlow	1882	1566	3402	5899
	More Than Likely	Harlow	257	0	384	0
	Reasonably Foreseeable	Harlow	700	0	1060	0
	Hypothetical	Harlow	0	0	0	0
Harlow		***Sub-Total***	***2839***	***1566***	***4846***	***5899***
Uttlesford:	Near Certain	Saffron Waldon	292	400	1019	2000
	More than likely	Saffron Waldon	333	0	333	0
	Near Certain	Takeley	70	0	438	0
	More than likely	Takeley	25	0	25	0
	Near Certain	Gt Dunmow/Stebbing/Fl Grn	809	100	5319	500
	More than likely	Felsted	0	0	68	0
	Reasonably Foreseeable	Great Dunmow	29	0	100	0
	More than likely	Elsenham	57	0	57	0
	Near Certain	Elsenham/Henham	128	0	464	0
	Reasonably Foreseeable	Elsenham	300	78	800	390
	Near Certain	Stansted Mountfitchet	86	0	331	0
	More than likely	Stansted Mountfitchet	22	0	22	0
	Reasonably Foreseeable	Stansted Mountfitchet	0	86	0	432
	Reasonably Foreseeable	Stansted Airport	0	377	0	1884
	Hypothetical	Stansted Airport	0	1143	0	2286
	More than likely	Rest of UDC	130	0	208	0
	Near Certain	Rest of UDC	80	25	1271	127
	Reasonably Foreseeable	Rest of UDC	0	27	0	133
Uttlesford		***Sub-Total***	***2361***	***2236***	***10455***	***7751***
Housing Market Area		**TOTALS**	**11005**	**6230**	**37433**	**25784**

Table A-1: Uncertainty Log Highway Schemes

DISTRICT	Log Ref	SCHEME DESCRIPTION	SCHEME PROBABILITY	PRIMARY DEVELOPMENT TYPE	DEVELOPMENT LOCATION
East Herts	1	A120 Little Hadham By-pass	More than Likely	Highway	East Herts
East Herts	3	London Road / Whittington Way S163 Refurbishment	More than Likely	Highway	Bishop's Stortford
East Herts	4	London Road South / Thorley Hill S155 Signal Refurbishment	More than Likely	Highway	Bishop's Stortford
East Herts	5	Cambridge Road near Leventhorpe School S150 Signal Refurbishment	More than Likely	Highway	Sawbridgeworth
East Herts	7	High Street / Near East Street S146 Signal Refurbishment	More than Likely	Highway	Ware
East Herts	8	Hertford Road / Near Walton Road S148 Signal Refurbishment	More than Likely	Highway	Ware
East Herts / Uttlesford	16	M11 J8 short term capacity improvements	More than Likely	Highway	Uttlesford
East Herts	17	A120 / B1383 Capacity Improvements	More than Likely	Highway	Bishop's Stortford
East Herts	18	A120 / A1250 Capacity Improvements	More than Likely	Highway	Bishop's Stortford
East Herts	29a	Bishop's Stortford North Development, Access onto Hadham Road	Near Certain	Highway	Bishop's Stortford
East Herts	29b	Bishop's Stortford North Development, Access onto A120	Reasonably Foreseeable	Highway	Bishop's Stortford
East Herts	29c	Bishop's Stortford North Development, Access onto Rye Street	Reasonably Foreseeable	Highway	Bishop's Stortford
Harlow / East Herts	55	A414 Eastwick to Burnt Mill dualling	Hypothetical	Highway	Harlow

Appendix B: Early Assessment & Sifting Tool

DfT Summary Sheets

Weighted Summary Sheets

Early Assessment and Sifting Tool (EAST) - *Expanded Print View*

Option Name/No.	**Do Nothing**
Date	16/04/2015
Description	No major infrastructure schemes to be delivered in the next Local Plan period

Strategic

Identified problems and objectives	On the strategic and local road network congestion is severe at peak times and a number of junctions are operating close to capacity or in excess of their original design thresholds. The ability of the transport system to accommodate growth has emerged as one of the single biggest barriers to accommodating the level of development needed in Harlow. M11 J7 is currently operating close to its planned capacity and any significant growth in the Harlow area will cause the junction to exceed this capacity. Harlow EZ jobs area already capped as a consequence of existing network capacity issues. With a single access for Harlow to the SRN, growth would also impact on A414 junctions. Unless major highway infrastructure improvements are implemented it will be very difficult to meet economic needs and deliver growth in housing and jobs, and Harlow will become a less attractive location for residents and businesses. According to national RTF2015 forecasts, congestion is forecast to grow in broadly the same proportions as traffic demand; traffic growth concentrated in already areas and times of day will naturally have a greater impact than growth that is spread more evenly. Harlow already experiences peak congestion, and Local Plan growth is likely to be concentrated within its immediate vicinity, thereby adding to likely congestion.	
Scale of impact	3	Congestion will increase significantly, journey times will increase and become even less reliable, and network resilience will be severely affected
Fit with wider transport and government objectives	1. Low	Does not fit with local or government objectives; London-Harlow-Stansted-Cambridge corridor key area for economic growth will be adversely affected
Fit with other objectives	1. Low	Does not deliver economic growth, and would probably lead to economic decline in the local economy; impact of increased carbon emissions levy and European carbon emissions trading, with impact on national budgets. Worsening network resilience, adverse impact on emergency services response times.
Key uncertainties	Continued deterioration of network reliability	
Degree of consensus over outcomes	1. Little	No consultation has taken place; existing situation includes frequent gridlock events; incidents on M11 (and M25) result in major impact on Harlow road network

Economic

Economic growth	**1. Red**	No intervention will hinder economic growth
Carbon emissions	**2. Red/amber**	Network congestion will significantly increase
Socio-distributional impacts and the regions	**2. Red/amber**	Increasing network congestion will negatively impact on accessibility to goods and services, and AQ and noise.
Local environment	**3. Amber**	
Well being	**2. Red/amber**	Will increase journey times, driver stress and accidents; adverse impact on public health; reduce journey time reliability; negative impact on noise and AQ
Expected VfM category		

Managerial

Implementation timetable		Not applicable
Public acceptability	Don't know	No consultation has taken place, not likely to be acceptable
Practical feasibility	1. Low	Not applicable?

What is the quality of the supporting evidence?	4	Refer to Harlow Model
Key risks	Not assessed	

Financial

Affordability		Not applicable
Capital Cost (£m)		Not applicable
Revenue Costs (£m)		Not applicable? Increased maintenance costs?
Cost profile		
Overall cost risk		
Other costs		

Commercial

Flexibility of option	Don't know	Not applicable?
Where is funding coming from?	Not applicable	
Any income generated? (£m)		

Early Assessment and Sifting Tool (EAST) - *Expanded Print View*

Option Name/No.	**M11J7a B183 Gilden Way Link**
Date	16/04/2015
Description	New grade separated motorway junction and single carriageway link road connecting to B183 Gilden Way via 5-arm roundabout

Strategic

Identified problems and objectives	On the strategic and local road network congestion is severe at peak times and a number of junctions are operating close to capacity or in excess of their original design thresholds. Ability of the transport system to accommodate growth has emerged as one of the single biggest barriers to accommodating the level of development needed in Harlow. Single access to SRN at M11 J7 adversely affects resilience of local road network. J7 on the M11 is operating close to its planned capacity and any significant growth (housing and/or employment) in the Harlow area will cause the junction to exceed this capacity. Additional access to SRN, ie new junction on the M11 (J7a) would unlock development site and help to deliver growth and regeneration in and around the town, reduce congestion and improve network resilience.	
Scale of impact	4	Expected to significantly relieve congestion at J7 and on the A414 corridor between J7 and A1025 Second Avenue (refer to Harlow Model); moderate adverse impact on B183 Gilden Way
Fit with wider transport and government objectives	4	Scheme enables economic growth (housing & jobs); demonstrates 'more for less' as is local access road rather than a strategic link; improves network resilience
Fit with other objectives	4	Provides improved connectivity to SRN while minimising the attraction to additional through traffic; facilitates improved access to EZ, enables economic growth and unlocks development land
Key uncertainties	Does J7a and link provide sufficient additional network capacity given high level of growth coming forward; can Gilden Way accommodate traffic demand. Will become clearer once detailed Vissim modelling available; is scheme acceptable to the public	
Degree of consensus over outcomes	3	Some consultation has taken place, which is ongoing; local feeling that scheme adversely affects the immediate area without benefiting the wider area, consensus should increase when more detailed information released

Economic

Economic growth	**5. Green**	Scheme would result in a more efficient transport network, reducing journey times/delays to travel to/from Harlow. Scheme would unlock significant housing development in East Harlow and improve access to the Harlow Enterprise Zones
Carbon emissions	**3. Amber**	Significant construction, so high levels of embedded carbon. Not likely to induce additional car trips; journey lengths of Harlow/J8 trips would reduce.
Socio-distributional impacts and the regions	**3. Amber**	Loss of farmland area. Noise and air quality impacts on B183 Gilden Way to be fully mitigated through vegetation planting and acoustic barriers where required. There will be improvements for road users accessing the wider network. Other issues: severance: minor impact (mitigation); accessibility: minor improvement (peds/cycle); accidents: no information; user benefits ?; personal affordability: no impact.
Local environment	**3. Amber**	The scheme would produce some negative landscape and visual impacts from some receptors after mitigation (eg from footpath 204-17). Some negative impacts on existing Tree Preservation Orders (TPOs). No direct impact to heritage features expected. Not expected to have an effect on local ecology after mitigation. No European or nationally significant ecological sites present. Expected to have a neutral impact on flooding after mitigation.

Well being	**6. No Impact**	Scheme will have positive impact on AQ due to relief of J7 and A414 corridor. There is potential for a positive impact on AQ for small number of properties near The Campions in the operational period as the new road will be offset from its existing alignment. Potential for negative impact on AQ along B183 Gilden Way although few properties face onto the link. Noise and air quality impacts to be fully mitigated through vegetation planting and acoustic barriers where required. Minimal recreational and community impact on non-motorised users (NMUs). Physical activity no impact; transport accidents, no information; crime, terrorism no change; access to services minor improvement; severance impact (mitigation)
Expected VfM category	1. Very High >4	this is BCR, so doesn't include non-monetised impacts (regen & envir effects)

Managerial

Implementation timetable	5. 2-5 years	
Public acceptability	4	Ongoing consultation; public perception of need for northern bypass needs to be dealt with.
Practical feasibility	4	Possible issues around Section 6; CPO process?
What is the quality of the supporting evidence?	4	Analysis based on initial model outputs, will improve when detailed outputs received
Key risks	Low, QRA actively being managed to limit risks;	

Financial

Affordability	3	A number of funding streams have been identified; delivers 'more for less'
Capital Cost (£m)	06. 50-100	
Revenue Costs (£m)	05. 25-50	Based on Jacobs maintenance estimates
Cost profile	Risk at 15%; OB at 44%	
Overall cost risk	4	
Other costs		

Commercial

Flexibility of option	4	Scheme has already been optimised and demonstrates clear association with future link to a northern bypass; scheme could be redesigned to link more directly to B183 Gilden Way
Where is funding coming from?	Range of options available, with contributions possible from: LEP/HE, developers through S106, forward funding by ECC	
Any income generated? (£m)	No	

Early Assessment and Sifting Tool (EAST) - *Expanded Print View*

Option Name/No.	**M11 J7 Improvement**
Date	16/04/2015
Description	Upgrade of existing M11 motorway junction and its immediate approaches as a result of existing capacity issues, and peak period knock-on impact on M11 mainline. HE currently undertaking Stage 0 review to identify optimal junction improvement scheme. Assessment has used historic junction improvement proposal as HE Stage 0 report not yet available.

Strategic

Identified problems and objectives	On the strategic and local road network congestion is severe at peak times and a number of junctions are operating close to capacity or in excess of their original design thresholds. The ability of the transport system to accommodate growth has emerged as one of the single biggest barriers to accommodating the level of development needed in Harlow. Intervention required to unlock development land. J7 on the M11 is operating close to its planned capacity and any significant growth (housing and/or employment) in the Harlow area will cause the junction to exceed this capacity. EZ LDO already capped due to J7 capacity issue. Therefore a scheme to significantly improve its capacity is required to deliver committed and future growth in and around Harlow. With a single access for Harlow to SRN, growth will also impact on A414 corridor and other junctions through the town, which may require mitigation, not included in this scheme. The J7 upgrade is included in HE RIS1.	
Scale of impact	2	Expected to relieve congestion at J7 and on the approach arms. Still likely to be congestion issues on A414 Harlow corridor (refer to Harlow Model), would not unlock development land and would not improve network resilience
Fit with wider transport and government objectives	2	Scheme in isolation not likely to improve connectivity for Harlow to wider road network nor relieve congestion on A414 Harlow corridor, so reduced ability to deliver economic growth, does not unlock development land
Fit with other objectives	1. Low	Would not unlock development land; may not relieve congestion on local road network; does not increase attractiveness of Harlow for prospective businesses
Key uncertainties	Impact of scheme on A414 through Harlow, issue of single access to SRN remains; network resilience; buildability given possibly significant levels of traffic management to accommodate traffic during construction.	
Degree of consensus over outcomes	1. Little	Little or no consultation has yet taken place

Economic

Economic growth	**2. Red/amber**	Scheme would not facilitate economic growth without significant additional infrastructure improvements on A414 corridor; does not unlock development land; does not improve network resilience; ongoing maintenance costs
Carbon emissions	**3. Amber**	No change as any benefits from reduced congestion at J7 offset by increased congestion on A414 corridor; initial model outputs indicate J7 reduces vehhrs the least
Socio-distributional impacts and the regions	**3. Amber**	Would not affect any Public Rights of Way. No noise and AQ impacts expected. Scheme likely to have some impact on local users, offset by shifting journey times across the wider network.
Local environment	**3. Amber**	Neutral landscape and visual impacts expected after mitigatioin. No impacts to heritage assets expected. No European or nationally significant ecological sites present.
Well being	**6. No Impact**	Noise and AQ impacts would be fully mitigated; Accidents?
Expected VfM category	2. High 2-4	Costs exclude any mitigation of A414 junctions which may be impacted

Managerial

Implementation timetable	5. 2-5 years	
Public acceptability	3	Not considered likely to be an issue, no consultation to date
Practical feasibility	3	? significant TM isues during construction, may require CPOs, may affect viability/deliverability of employment development site
What is the quality of the supporting evidence?	3	Initial outputs from high level modelling
Key risks	Likely need for significant additional wider transport infrastructure improvements to improve access to Harlow to facilitate growth;	

Financial

Affordability	4	Scheme included in HE Road Investment Strategy
Capital Cost (£m)	06. 50-100	Based on Mouchel scheme
Revenue Costs (£m)	05. 25-50	Based on Jacobs maintenance estimates
Cost profile	15% risk; 44% OB	
Overall cost risk	2	
Other costs	Feasibility/scheme currently being reviewed; cost could increase or decrease; additional mitigation schemes not included	

Commercial

Flexibility of option	3	Scaling not likely due to capacity improvement extent required
Where is funding coming from?	HE	
Any income generated? (£m)	No	

Early Assessment and Sifting Tool (EAST) - *Expanded Print View*

Option Name/No.	**M11J7MajorPlusJ7a**
Date	06/07/2015
Description	Deliver both J7 major scheme and new junction J7a with Gilden Way link

Strategic

Identified problems and objectives	On the strategic and local road network congestion is severe at peak times and a number of junctions are operating close to capacity or in excess of their original design thresholds. Single access to SRN reduces network resilience. Ability of transport system to accommodate growth has emerged as one of the single biggest barriers to accommodating the level of development needed in Harlow and unlock development land. Unless major highway infrastructure improvements are implemented it will be very difficult to meet economic needs and deliver growth in housing and jobs, and Harlow will become a less attractive location for residents and businesses	
Scale of impact	4	Combination of schemes will provide additional connection to SRN, address congestion issues at J7 and mitigate impact on A414 junctions
Fit with wider transport and government objectives	4	Meets wider and government objectives, unlocking land, increasing access to SRN, reducing congestion, increasing attractiveness of Harlow for economic growth
Fit with other objectives	5. High	Delivers economic growth, and helps to make Harlow more attractive to existing and new employers
Key uncertainties	Acceptability of delivering two major schemes; funding; public acceptability	
Degree of consensus over outcomes	Don't know	No consultation has taken place

Economic

Economic growth	**5. Green**	Improves connectivity to CBD, reliability, network resilience; reduces journey times; positive impact on regional economic growth
Carbon emissions	**4. Amber/green**	Reduced vkm and congestion; significant embedded carbon with construction
Socio-distributional impacts and the regions	**3. Amber**	No change in accessibility to local goods and services
Local environment	**3. Amber**	Reduction in congestion; slight adverse impact on noise; J7a negative impact on low value environment
Well being	**6. No Impact**	Severance, physical activity, crime, terrorism: no impact; injury deaths minor impact; accessibility to goods/services, day-to-day journey variability: improves; does not encourage sustainable travel
Expected VfM category	2. High 2-4	

Managerial

Implementation timetable	5. 2-5 years	
Public acceptability	Don't know	No consultation has taken place
Practical feasibility	3	Delivery of J7 element: tm issues during construction; impact on employment development site; CPO likely
What is the quality of the supporting evidence?	3	From initial outputs from Harlow model
Key risks	Public acceptability; funding; costs; timescales	

Financial

Affordability	3	Same funding sources as individual schemes, used lesser of two levels

Capital Cost (£m)	07. 100-250	Simple addition of both scheme costs
Revenue Costs (£m)	06. 50-100	Simple addition of both maintenance costs
Cost profile	Risk at 15%; OB at 44%	
Overall cost risk	2	
Other costs		

Commercial

Flexibility of option	3	
Where is funding coming from?	Combination of J7a and J7 funding sources: HE; SELEP; developer contributions; ECC	
Any income generated? (£m)	No	

Early Assessment and Sifting Tool (EAST) - *Expanded Print View*

Option Name/No.	**NorthernBypassWithJ7a**
Date	06/07/2015
Description	New M11 junction and dual carriageway link through to A414 at Eastwick, together with single carriageway link to Gilden Way

Strategic

Identified problems and objectives	On the strategic and local road network congestion is severe at peak times and a number of junctions are operating close to capacity or in excess of their original design thresholds. Single connection to SRN adversely impacts network resilience. Ability of transport system to accommodate growth has emerged as one of the single biggest barriers to accommodating the level of development needed in Harlow. Unless major highway infrastructure improvements are implemented it will be very difficult to meet economic needs and deliver growth in housing and jobs, and Harlow will become a less attractive location for residents and businesses	
Scale of impact	4	Would provide additional connection to SRN and relieve A414 corridor; may attract additional through traffic;
Fit with wider transport and government objectives	3	New connection to M11 fits with objectives; doesn't demonstrate 'more for less' due to scheme cost; significant adverse environmental impact
Fit with other objectives	4	Unlocks larger area of development land helping to deliver economic growth, and helps to make Harlow more attractive to existing and new employers, help to relieve congestion on urban network
Key uncertainties	Acceptability of delivering major infrastructure in sensitive environmental areas; funding; environmental impact	
Degree of consensus over outcomes	1. Little	Little consultation, strong reasons to suggest that outcome would be controversial

Economic

Economic growth	**5. Green**	Would make Harlow much more attractive to new and existing businesses; Harlow DC commissioned "Future Prospects Study: Linking Regeneration & Growth" NLP Aug 2013, and, with specific reference to new towns, reported that 'bigger populations can sustain more diverse economies which are better placed to endure economic decline and attract inward investment'.
Carbon emissions	**3. Amber**	Would increase vkm, induced traffic [would need to be mitigated with LSTF/demand management/smarter choices (not within scope of this assessment)]
Socio-distributional impacts and the regions	**3. Amber**	Should improve accessibility to local goods and services; facilitate regeneration. Loss of significant amount of farmland and open space. Noise and AQ impacts for north Harlow residents would be fully mitigated. Dissects two PRoW. Improvements for road users accessing wider network.
Local environment	**1. Red**	Increase in noise, reduction in air quality, significant adverse impact on natural environment, route runs through major floodplain of River Stort. Potential contaminated land issues as route passes through historic landfill. Potential heritage impact as route runs close to listed buildings at Gilston. Potential ecological impacts.
Well being	**4. Amber/green**	Sustainable travel, severance, physical activity, crime, terrorism: no change; injuries may increase; journey times and day-to-day journey variability should improve; decreased driver stress. Accidents?
Expected VfM category	2. High 2-4	

Managerial

Implementation timetable	5. 2-5 years	
Public acceptability	2	No consultation has taken place, likely to be controversial
Practical feasibility	3	
What is the quality of the supporting evidence?	4	From initial outputs from Harlow model
Key risks	Public acceptability; funding; costs; timescales	

Financial

Affordability	1. Not affordable	Not affordable now; no funding identified; developments contribution unlikely to fund whole scheme; next LP period
Capital Cost (£m)	07. 100-250	Simple addition of both scheme costs
Revenue Costs (£m)	06. 50-100	Simple addition of both scheme costs
Cost profile	Risk at 15%; OB at 44%	
Overall cost risk	1.High risk	
Other costs		

Commercial

Flexibility of option	3	
Where is funding coming from?	Not identified	
Any income generated? (£m)	No	

Early Assessment and Sifting Tool (EAST) - *Expanded Print View*

Option Name/No.	**Northern Northern Bypass**	
Date	06/10/2015	
Description	Dual c'way link from A414 at Eastwick, new Stort Crossing to River Way, dual c'way bypass west of Sawbridgeworth with new M11 south of Spellbrook junction. Majority of scheme would be within Hertfordshire.	

Strategic

Identified problems and objectives	On the strategic and local road network congestion is severe at peak times and a number of junctions in Herts on the A1184 corridor are operating close to capacity or in excess of their original design thresholds. This leads to inappropriate use of minor roads in Herts during peak periods. The need to unlock east Harlow development area, improve access to SRN for Harlow and to improve local network resilience and reliability, are not addressed by this scheme, which is likely to attract traffic to the A414/A1184 corridor.	
Scale of impact	1. Small impact	Does not address key objectives of unlocking land and additional connection to the SRN; is likely to attract additional traffic onto A414 and A1184 corridor
Fit with wider transport and government objectives	1. Low	Low, conflicts with local or government objectives, as would be unlikely to deliver growth to Harlow, nor relieve congestion
Fit with other objectives	1. Low	Poor, doesn't unlock land or improve access to SRN, nor improve network resilience in Harlow
Key uncertainties	Deliverability and viability of scheme; public acceptability; environmental impact	
Degree of consensus over outcomes	Don't know	No recent consultation has taken place

Economic

Economic growth	**2. Red/amber**	Would not unlock development land, nor improve access for Harlow to the SRN, may relieve congestion on A414, would exacerbate situation at M11 J7
Carbon emissions	**4. Amber/green**	Would reduce vkm and congestion in some areas
Socio-distributional impacts and the regions	**3. Amber**	Not likely to affect accessibility to local goods and services nor facilitate regeneration. Loss of significant amount of farmland and open space. Noise and AQ impacts for north Harlow residents would be fully mitigated. Dissects four PRoW. Route splits village of High Wych in two, ie community severance.
Local environment	**1. Red**	Significant landscape, noise, and light pollution issues. Route runs through River Stort major floodplain. Potential contaminated land issues as passes through two historic landfills. Potential ecological impacts
Well being	**6. No Impact**	Route splits village, negative noise and AQ impacts. Decreased drivers stress. Accidents?
Expected VfM category	2. High 2-4	

Managerial

Implementation timetable	6. 5-10 years	
Public acceptability	Don't know	No consultation has taken place
Practical feasibility	4	Scheme uses proven designs
What is the quality of the supporting evidence?	3	From initial outputs from Harlow model
Key risks	Public acceptability; funding; costs; timescales	

Financial

Affordability	1. Not affordable	Not affordable within 15-20 years
Capital Cost (£m)	07. 100-250	

Revenue Costs (£m)	07. 100-250	
Cost profile	Risk at 15%; OB at 44%	
Overall cost risk	1.High risk	
Other costs		

Commercial

Flexibility of option	4	
Where is funding coming from?	Unknown	
Any income generated? (£m)	No	

Early Assessment and Sifting Tool (EAST) - *Expanded Print View*

Option Name/No.	**Southern Relief Road**	
Date	15/06/2015	
Description	Dual c'way link connecting A414 east of Roydon, west and south of Harlow, to B1393 and M11 J7	

Strategic

Identified problems and objectives	On the strategic and local road network congestion is severe at peak times and a number of A414 junctions are operating close to capacity or in excess of their original design thresholds. Single connection to SRN adversely impacts network resilience. Ability of transport system to accommodate growth has emerged as one of the single biggest barriers to accommodating the level of development needed in Harlow. Unless major highway infrastructure improvements are implemented it will be very difficult to meet economic needs and deliver growth in housing and jobs, and Harlow will become a less attractive location for residents and businesses. Need to unlock east Harlow development area, improve access to SRN and improve local network resilience and reliability	
Scale of impact	2	May provide some relief to A414 junctions, but does not provide additional access to SRN nor unlock development land
Fit with wider transport and government objectives	1. Low	Low, conflicts with local or government objectives
Fit with other objectives	1. Low	Poor, doesn't unlock land or improve access to SRN, exacerbates situation at J7
Key uncertainties	Deliverability and viability of scheme; public acceptability; environmental impact	
Degree of consensus over outcomes	Don't know	No consultation has taken place

Economic

Economic growth	**2. Red/amber**	Would not make Harlow more attractive to businesses, nor unlock development land
Carbon emissions	**4. Amber/green**	Would reduce vkm and some congestion
Socio-distributional impacts and the regions	**3. Amber**	Loss of significant amount of farmland and open space. Noise and AQ impacts for the west of Harlow would be fully mitigated. Dissects several PRoW. Improvements for road users accessing the wider network. Would not affect accessibility to local goods and services; nor facilitate regeneration
Local environment	**2. Red/amber**	Route runs through River Stort major floodplain. Route runs through registered park and garden and directly adjacent to a listed building.
Well being	**6. No Impact**	Decreased driver stress for relieved journeys. Accidents?
Expected VfM category	4. Low 1-1.5	

Managerial

Implementation timetable	6. 5-10 years	
Public acceptability	Don't know	No consultation has taken place
Practical feasibility	4	Use of proven designs and technology
What is the quality of the supporting evidence?	3	From initial outputs from Harlow model
Key risks	Public acceptability; funding; costs; timescales	

Financial

Affordability	1. Not affordable	Not affordable within 15-20 years
Capital Cost (£m)	07. 100-250	

Revenue Costs (£m)	07. 100-250	
Cost profile	Risk at 15%; OB at 44%	
Overall cost risk	1.High risk	
Other costs		

Commercial

Flexibility of option	4	
Where is funding coming from?	Unknown	
Any income generated? (£m)	No	

			Eastern Harlow Access Scheme Ranking - Weights		
			Level 1		
			Strategic Case (Case for Change)	20.67	Total of 100
			Economic Case (Value for Money)	35.67	
			Commercial Case (Commercial Viability)	11.67	
			Financial Case (Financial Affordability)	18.33	
			Management Case (Achievability)	13.67	
		Scale	Level 2		
Case for Change					
Strategic Case	S1	1 to 5	Scale of impact / address identified problem	28.33	Total of 100
	S2	0 to 5	Fit with wider transport and government objectives	20.00	
	S3	0 to 5	Fit with objectives of the overall project	23.33	
	S4	-2 to 1	Key Uncertainties	13.33	
	S5	1 to 5	Consensus over outcomes	15.00	
Value for Money					
Economic Case			***Economic Growth***		
	E1	-1 to 1	Connectivity	13.00	Total of 100
	E2	-2 to 1	Connectivity during construction	2.67	
	E3	-1 to 1	Reliability	10.00	
	E4	-1 to 1	Resilience	5.33	
	E5	0 to 1	Delivery of Housing	13.33	
	E6	0 to 1	Delivery of Jobs	7.67	
			Carbon Emissions		
	E7-E9	-1 to 1	Carbon Emissions	2.67	
			Socio-Distributional Impacts		
	E10	-3 to 1	Social and Distributional	2.33	
	E11	-1 to 1	Regeneration	3.00	
	E12	-1 to 1	Regional imbalance	2.33	
			Local Environment		
	E13	-1 to 1	Air Quality	2.00	
	E14	-2 to 1	AQMA	0.00	
	E15	-2 to 2	Noise	1.33	
	E16	-2 to 2	Natural environment and landscape	2.33	
	E17	-2 to 2	Streetscape and urban environment	1.67	
			Well being		
	E18	-1 to 1	Physical activity	1.33	
	E19	-1 to 1	Injury or death	2.33	
	E20	-1 to 1	Crime	0.67	
	E21	-1 to 1	Terrorism	0.00	
	E22-E24	-1 to 1	Enable access to goods, services, people and places	5.67	
	E25	-1 to 1	Severance	4.00	
	E26	-2 to 0	Support environmentally sustainable travel	2.33	
			Value for Money		
	E27	-1 to 3	Expected VfM (BCR) and wider economic benefit	14.00	
Commercially Viable					
Commercial Case	C1	0 to 2	Flexibility of options	63.33	Total of 100
	C2	0 to 5	Income generation	36.67	
			Source of funding (not scored)		
Financially Affordable					
Financial Case	F1	1 to 5	Affordability	23.33	Total of 100
	F2	0 to 2	Capital Cost	33.33	
	F3	0 to 2	Revenue Costs	16.67	
	F4	0 to 4	Cost profile / quality of estimates	13.33	
	F5	0 to 5	Overall cost risk	13.33	
Achievability					
Management Case	M1	0 to 4	Implementation time table from present to start of construction	16.67	Total of 100
	M2	1 to 4	Construction period	13.33	
	M3	1 to 5	Public acceptability	20.00	
	M4	0 to 2	Practical feasibility	21.67	
	M5	0 to 5	Quality of supporting evidence	11.67	
	M6	0 to 4	Key delivery risk	16.67	

Harlow Access Study: Options Appraisal Sifting - Weighted Evaluation

		M11 J7a			
Weighted Case:		**59.6**	out of 100		
		Score	Weighted score		
Case for Change				**12.3**	out of 20.7
Strategic Case	Scale of impact / address identified problem	4.0	22.7		
	Fit with wider transport and government objectives	4.0	16.0		
	Fit with objectives of the overall project	4.0	18.7		
	Key Uncertainties	-1.0	-6.7		
	Consensus over outcomes	3.0	9.0		
Value for Money				**23.2**	out of 35.7
Economic Case	***Economic Growth***				
	Connectivity	1.0	13.0		
	Connectivity during construction	1.0	2.7		
	Reliability	1.0	10.0		
	Resilience	1.0	5.3		
	Delivery of Housing	1.0	13.3		
	Delivery of Jobs	0.6	4.6		
	Carbon Emissions	0.0	0.0		
	Carbon Emissions	0.0	0.0		
	Socio-Distributional Impacts	0.0	0.0		
	Social and Distributional	0.0	0.0		
	Regeneration	1.0	3.0		
	Regional imbalance	1.0	2.3		
	Local Environment	0.0	0.0		
	Air Quality	1.0	2.0		
	Noise	-1.0	-0.7		
	Natural environment and landscape	-1.0	-1.2		
	Streetscape and urban environment	-1.0	-0.8		
	Well being	0.0	0.0		
	Physical activity	0.0	0.0		
	Injury or death	0.0	0.0		
	Crime	0.0	0.0		
	Terrorism	0.0	0.0		
	Enable access to goods, services, people and places	0.3	1.9		
	Severance	-1.0	-2.0		
	Support environmentally sustainable travel	-1.0	-2.3		
	Value for Money	0.0	0.0		
	VfM	3.0	14.0		
Commercially Viable				**3.7**	out of 11.7
Commercial Case	Flexibility of options	1.0	31.7		
	Income generation	0.0	0.0		
Financially Affordable				**9.5**	out of 18.3
Financial Case	Affordability	3.0	14.0		
	Capital Cost	2.0	11.1		
	Revenue Costs	2.0	6.7		
	Cost profile / quality of estimates	1.0	6.7		
	Overall cost risk	2.0	13.3		
Achievability				**10.8**	out of 13.7
Management Case	Implementation time table from present to start of constructi	2.0	11.1		
	Construction period	2.0	8.9		
	Public acceptability	4.0	16.0		
	Practical feasibility	4.0	17.3		
	Quality of supporting evidence	4.0	9.3		
	Key delivery risk	2.0	16.7		

		M11 J7 Major			
Weighted Case:		**25.1**	out of 100		
		Score	Weighted score		
Case for Change				**1.7**	out of 20.7
Strategic Case	Scale of impact / address identified problem	2.0	11.3		
	Fit with wider transport and government objectives	1.0	4.0		
	Fit with objectives of the overall project	0.0	0.0		
	Key Uncertainties	-2.0	-13.3		
	Consensus over outcomes	2.0	6.0		
Value for Money				**5.4**	out of 35.7
Economic Case	***Economic Growth***				
	Connectivity	0.0	0.0		
	Connectivity during construction	-2.0	-2.7		
	Reliability	0.0	0.0		
	Resilience	0.0	0.0		
	Delivery of Housing	1.0	13.3		
	Delivery of Jobs	0.4	3.2		
	Carbon Emissions	0.0	0.0		
	Carbon Emissions	0.0	0.0		
	Socio-Distributional Impacts	0.0	0.0		
	Social and Distributional	0.0	0.0		
	Regeneration	0.0	0.0		
	Regional imbalance	0.0	0.0		
	Local Environment	0.0	0.0		
	Air Quality	0.0	-2.0		
	Noise	0.0	0.0		
	Natural environment and landscape	-1.0	-1.2		
	Streetscape and urban environment	0.0	0.0		
	Well being	0.0	0.0		
	Physical activity	0.0	0.0		
	Injury or death	0.0	0.0		
	Crime	0.0	0.0		
	Terrorism	0.0	0.0		
	Enable access to goods, services, people and places	0.0	0.0		
	Severance	0.0	0.0		
	Support environmentally sustainable travel	-1.0	-2.3		
	Value for Money	0.0	0.0		
	VfM	2.0	9.3		
Commercially Viable				**3.7**	out of 11.7
Commercial Case	Flexibility of options	1.0	31.7		
	Income generation	0.0	0.0		
Financially Affordable				**6.7**	out of 18.3
Financial Case	Affordability	4.0	18.7		
	Capital Cost	2.0	11.1		
	Revenue Costs	2.0	6.7		
	Cost profile / quality of estimates	0.0	0.0		
	Overall cost risk	0.0	0.0		
Achievability				**7.7**	out of 13.7
Management Case	Implementation time table from present to start of constructi	2.0	11.1		
	Construction period	2.0	8.9		
	Public acceptability	2.0	8.0		
	Practical feasibility	3.0	13.0		
	Quality of supporting evidence	3.0	7.0		
	Key delivery risk	1.0	8.3		

		M11J7a with J7 Major			
Weighted Case:		**44.5**	out of 100		
		Score	Weighted score		
Case for Change				**11.9**	out of 20.7
Strategic Case	Scale of impact / address identified problem	4.0	22.7		
	Fit with wider transport and government objectives	4.0	16.0		
	Fit with objectives of the overall project	5.0	23.3		
	Key Uncertainties	-2.0	-13.3		
	Consensus over outcomes	3.0	9.0		
Value for Money				**18.2**	out of 35.7
Economic Case	***Economic Growth***				
	Connectivity	1.0	13.0		
	Connectivity during construction	-2.0	-2.7		
	Reliability	1.0	10.0		
	Resilience	1.0	5.3		
	Delivery of Housing	1.0	13.3		
	Delivery of Jobs	0.6	4.5		
	Carbon Emissions	0.0	0.0		
	Carbon Emissions	0.0	0.0		
	Socio-Distributional Impacts	0.0	0.0		
	Social and Distributional	0.0	0.0		
	Regeneration	1.0	3.0		
	Regional imbalance	1.0	2.3		
	Local Environment	0.0	0.0		
	Air Quality	0.0	-2.0		
	Noise	-1.0	-0.7		
	Natural environment and landscape	-2.0	-2.3		
	Streetscape and urban environment	-1.0	-0.8		
	Well being	0.0	0.0		
	Physical activity	0.0	0.0		
	Injury or death	0.0	0.0		
	Crime	0.0	0.0		
	Terrorism	0.0	0.0		
	Enable access to goods, services, people and places	0.7	3.8		
	Severance	0.0	0.0		
	Support environmentally sustainable travel	-1.0	-2.3		
	Value for Money	0.0	0.0		
	VfM	2.0	9.3		
Commercially Viable				**3.7**	out of 11.7
Commercial Case	Flexibility of options	1.0	31.7		
	Income generation	0.0	0.0		
Financially Affordable				**4.2**	out of 18.3
Financial Case	Affordability	3.0	14.0		
	Capital Cost	1.0	5.6		
	Revenue Costs	1.0	3.3		
	Cost profile / quality of estimates	0.0	0.0		
	Overall cost risk	0.0	0.0		
Achievability				**6.5**	out of 13.7
Management Case	Implementation time table from present to start of constructi	2.0	11.1		
	Construction period	1.0	4.4		
	Public acceptability	3.0	12.0		
	Practical feasibility	3.0	13.0		
	Quality of supporting evidence	3.0	7.0		
	Key delivery risk	0.0	0.0		

		Northern Bypass with J7a			
Weighted Case:		**38.4**	out of 100		
		Score	Weighted score		
Case for Change				**9.5**	out of 20.7
Strategic Case	Scale of impact / address identified problem	4.0	22.7		
	Fit with wider transport and government objectives	3.0	12.0		
	Fit with objectives of the overall project	4.0	18.7		
	Key Uncertainties	-2.0	-13.3		
	Consensus over outcomes	2.0	6.0		
Value for Money				**17.0**	out of 35.7
Economic Case	***Economic Growth***				
	Connectivity	1.0	13.0		
	Connectivity during construction	-1.0	-1.3		
	Reliability	1.0	10.0		
	Resilience	1.0	5.3		
	Delivery of Housing	1.0	13.3		
	Delivery of Jobs	0.6	4.6		
	Carbon Emissions	0.0	0.0		
	Carbon Emissions	0.0	0.0		
	Socio-Distributional Impacts	0.0	0.0		
	Social and Distributional	0.0	0.0		
	Regeneration	1.0	3.0		
	Regional imbalance	1.0	2.3		
	Local Environment	0.0	0.0		
	Air Quality	1.0	2.0		
	Noise	-1.0	-0.7		
	Natural environment and landscape	-2.0	-2.3		
	Streetscape and urban environment	-1.0	-0.8		
	Well being	0.0	0.0		
	Physical activity	0.0	0.0		
	Injury or death	-1.0	-2.3		
	Crime	0.0	0.0		
	Terrorism	0.0	0.0		
	Enable access to goods, services, people and places	0.3	1.9		
	Severance	0.0	0.0		
	Support environmentally sustainable travel	-1.0	-2.3		
	Value for Money	0.0	0.0		
	VfM	1.0	4.7		
Commercially Viable				**3.7**	out of 11.7
Commercial Case	Flexibility of options	1.0	31.7		
	Income generation	0.0	0.0		
Financially Affordable				**2.5**	out of 18.3
Financial Case	Affordability	1.0	4.7		
	Capital Cost	1.0	5.6		
	Revenue Costs	1.0	3.3		
	Cost profile / quality of estimates	0.0	0.0		
	Overall cost risk	0.0	0.0		
Achievability				**5.7**	out of 13.7
Management Case	Implementation time table from present to start of constructi	2.0	11.1		
	Construction period	1.0	4.4		
	Public acceptability	1.0	4.0		
	Practical feasibility	3.0	13.0		
	Quality of supporting evidence	4.0	9.3		
	Key delivery risk	0.0	0.0		

Harlow Access Study: Options Appraisal Sifting - Weighted Evaluation

		Northern Northern			
Weighted Case:		**12.5**	out of 100		
		Score	Weighted score		
Case for Change				**-1.0**	out of 20.7
Strategic Case	Scale of impact / address identified problem	1.0	5.7		
	Fit with wider transport and government objectives	0.0	0.0		
	Fit with objectives of the overall project	0.0	0.0		
	Key Uncertainties	-2.0	-13.3		
	Consensus over outcomes	1.0	3.0		
Value for Money				**3.2**	out of 35.7
Economic Case	***Economic Growth***				
	Connectivity	0.0	0.0		
	Connectivity during construction	-1.0	-1.3		
	Reliability	0.0	0.0		
	Resilience	0.0	0.0		
	Delivery of Housing	1.0	13.3		
	Delivery of Jobs	0.0	0.0		
	Carbon Emissions	0.0	0.0		
	Carbon Emissions	0.0	0.0		
	Socio-Distributional Impacts	0.0	0.0		
	Social and Distributional	0.0	0.0		
	Regeneration	0.0	0.0		
	Regional imbalance	0.0	0.0		
	Local Environment	0.0	0.0		
	Air Quality	0.0	-2.0		
	Noise	-1.0	-0.7		
	Natural environment and landscape	-2.0	-2.3		
	Streetscape and urban environment	-1.0	-0.8		
	Well being	0.0	0.0		
	Physical activity	0.0	0.0		
	Injury or death	-1.0	-2.3		
	Crime	0.0	0.0		
	Terrorism	0.0	0.0		
	Enable access to goods, services, people and places	0.0	0.0		
	Severance	0.0	0.0		
	Support environmentally sustainable travel	-1.0	-2.3		
	Value for Money	0.0	0.0		
	VfM	2.0	9.3		
Commercially Viable				**3.7**	out of 11.7
Commercial Case	Flexibility of options	1.0	31.7		
	Income generation	0.0	0.0		
Financially Affordable				**2.5**	out of 18.3
Financial Case	Affordability	1.0	4.7		
	Capital Cost	1.0	5.6		
	Revenue Costs	1.0	3.3		
	Cost profile / quality of estimates	0.0	0.0		
	Overall cost risk	0.0	0.0		
Achievability				**4.1**	out of 13.7
Management Case	Implementation time table from present to start of constructi	1.0	5.6		
	Construction period	1.0	4.4		
	Public acceptability	0.0	0.0		
	Practical feasibility	3.0	13.0		
	Quality of supporting evidence	3.0	7.0		
	Key delivery risk	0.0	0.0		

		Southern RR			
Weighted Case:		**11.7**	out of 100		
		Score	Weighted score		
Case for Change				**0.2**	out of 20.7
Strategic Case	Scale of impact / address identified problem	2.0	11.3		
	Fit with wider transport and government objectives	0.0	0.0		
	Fit with objectives of the overall project	0.0	0.0		
	Key Uncertainties	-2.0	-13.3		
	Consensus over outcomes	1.0	3.0		
Value for Money				**1.2**	out of 35.7
Economic Case	***Economic Growth***				
	Connectivity	1.0	13.0		
	Connectivity during construction	-1.0	-1.3		
	Reliability	-1.0	-10.0		
	Resilience	0.0	0.0		
	Delivery of Housing	1.0	13.3		
	Delivery of Jobs	0.0	0.0		
	Carbon Emissions	0.0	0.0		
	Carbon Emissions	0.0	0.0		
	Socio-Distributional Impacts	0.0	0.0		
	Social and Distributional	0.0	0.0		
	Regeneration	0.0	0.0		
	Regional imbalance	0.0	0.0		
	Local Environment	0.0	0.0		
	Air Quality	0.0	-2.0		
	Noise	-2.0	-1.3		
	Natural environment and landscape	-2.0	-2.3		
	Streetscape and urban environment	-1.0	-0.8		
	Well being	0.0	0.0		
	Physical activity	0.0	0.0		
	Injury or death	-1.0	-2.3		
	Crime	0.0	0.0		
	Terrorism	0.0	0.0		
	Enable access to goods, services, people and places	0.0	0.0		
	Severance	0.0	0.0		
	Support environmentally sustainable travel	0.0	0.0		
	Value for Money	0.0	0.0		
	VfM	0.0	0.0		
Commercially Viable				**3.7**	out of 11.7
Commercial Case	Flexibility of options	1.0	31.7		
	Income generation	0.0	0.0		
Financially Affordable				**2.5**	out of 18.3
Financial Case	Affordability	1.0	4.7		
	Capital Cost	1.0	5.6		
	Revenue Costs	1.0	3.3		
	Cost profile / quality of estimates	0.0	0.0		
	Overall cost risk	0.0	0.0		
Achievability				**4.1**	out of 13.7
Management Case	Implementation time table from present to start of constructi	1.0	5.6		
	Construction period	1.0	4.4		
	Public acceptability	0.0	0.0		
	Practical feasibility	3.0	13.0		
	Quality of supporting evidence	3.0	7.0		
	Key delivery risk	0.0	0.0		