


# Luton Local Plan: Initial Transport Evidence Base



Prepared by:  .....  
**Steven Ward**  
Principal Consultant

Checked by:  .....  
**Tim Price**  
Senior Consultant

Approved by:  .....  
**Ian Burrows**  
Regional Director

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AECOM House, 63-77 Victoria Street, St Albans, Hertfordshire, AL1 3ER  
Telephone: 01727 535000 Website: <http://www.aecom.com>

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# Executive Summary

# Executive Summary

## Option Tests and Planning Data

Transport modelling tests of the proposed Luton Local Plan have been undertaken, for three scenarios and two forecast years - 2016 and 2031. The Options considered were:

- Option A - Detailed trajectory, incorporating 'reasonable certainty' growth
- Option B - Baseline planned LBC growth
- Option C - Duty to Cooperate (DtC) scenario

Planning data for households, employment and infrastructure was provided by Luton Borough Council (LBC) for each of the Options and forecast years and incorporated into the modelling forecasts.

## Assignment Results

### Option A 2016

Due to the limited differences between the two planning data sets, differences between the assignment results are negligible in 2016 between Option A and Option B/C.

For Option A 2016 considered as a standalone test:

- Congestion observed on parts of the main routes into Luton on -
  - A6
  - Hatters Way
  - Dunstable Road
  - Leagrave Road and
  - A505 and Airport Way close to the airport

### Option B versus Options A 2031

Modelled traffic flow impacts of Baseline planned LBC growth (Option B) versus the 'reasonable certainty' growth (Option A) suggest:

- Vehicle flow differences along the M1 and A505 (from/to Hitchin) suggest a net increase in trips to Luton and a net drop in trips from Luton to elsewhere.
- Increases in vehicle flow can be seen at points where there are increases jobs available - Butterfield, Luton Airport and Century Park.
- A potential drop in M1 Southbound trips
- Committed housing growth has an impact on the highway network. The key areas of stress are on routes into the town centre in the morning peak and travelling outbound in the evening peak.
- There is an increase in stress on the network in areas around the key employment sites
  - A505 Vauxhall Way, related to Luton Airport, Century Park, Butterfield Green and Napier Park.
  - Junctions around the airport and Kimpton Road.
  - Butterfield Green is modelled as having less of an impact.
  - M1 Junction 10a is likely to be able to cope with the additional employment
- Between Option B and A there appears to be limited highway impact in North and West Luton, this seems sensible as the bulk of planned development is to the East and South of Luton.

### **Option C versus Option A 2031**

The additional impacts of the duty to cooperate model run - Option C, suggest the following modelled differences.

- An overall increase in trips in Central Bedfordshire, around Leighton Buzzard, Houghton Regis, North Luton and East Luton.
- The combined impact of the northern bypass and developments to the north of Luton mean that west to east routes show a drop in trips as an alternative route is available, while north-south routes show an increase in trips as there is more demand produced that distributes north and southwards.

### **Recommendations**

There are opportunities to gain further understanding of modelled traffic flow differences and potential impacts by considering additional model runs.

Enhanced modelling of demand and trip patterns are an important consideration, currently there are constraints in the way Luton Airport is modelled i.e. as part of the full model rather than an external input including passenger forecasts. Initial infrastructure proposals for the Century Park link and duelling on other approaches to the airport were modelled, but, the mitigation measures covered by the London Luton Airport Access proposals were not available for this stage of modelling. When available these should be incorporated into a further round of model runs for 2016 and 2031 as appropriate. These measures could alleviate congestion in the vicinity of the airport. As currently modelled, when additional jobs are included at the Airport and Century Park, longer journey times/severe delays make travel southbound unattractive which could have a significant wider impact. Longer journey times are a contribute to the “unattractiveness” of southbound travel on the M1. In particular there are modelled delays at the Airport Way/Gypsy Lane roundabout and this makes it unattractive to route south to Junction 10 from East Luton. As discussed, there is a possibility that future Airport mitigation measures could mean southbound journey times would be similar and re-routeing/ re-distribution will be less noticeable.

The testing undertaken has identified prospective traffic problems associated with Local plan growth. As such determining the level of mitigation required to facilitate the proposed development should be considered in the next stage. The outcome of the introduction of mitigation is likely to influence the traffic routeing and resulting congestion and delays on the network.

As further stages of the Local plan process progress, additional transport evidence at a more refined level will be required to understand likely impacts. As such, the phasing of development over the Local plan period will need to be understood along with the associated infrastructure. Furthermore, more refined representation of key development sites, (including the local access requirements, trip rates as well as the phasing will need to be understood.

The results and analysis contained within this report should only be used as an early high level strategic assessment of the transport impacts of the proposed Local Plan. These tests should only be used for this purpose.

# 1. Introduction

Capabilities on project:  
Transportation

# 1 Introduction

- 1.1 The Central Bedfordshire and Luton Transport model is a multi-modal model used in assessing the impacts of transport schemes and developments proposed for both Luton and Central Bedfordshire. The highway assignment model of the Central Bedfordshire and Luton Transport Model (CBLTM) has recently been enhanced to provide improved model performance and coverage in and around Luton to enable the assessment of impacts of transport schemes and developments proposed for both Luton and Central Bedfordshire. This latest enhanced version of the transport model has been used for the initial assessment of the Luton Local Plan as detailed within this report.
- 1.2 AECOM has been requested to undertake transport modelling tests of the proposed Luton Local Plan, for a number of scenarios and forecast years. To summarise the uses and context of the modelling:
- These tests should only be used for the assessment of the Local Plan;
  - Results will provide an indicative, high level, strategic assessment;
  - Additional transport planning evidence will be required as the Local Plan moves towards adoption; and
  - There has been no assessment of potential further mitigation required in order to alleviate congestion and delays as a result of proposed growth.
- 1.3 This report explains the inputs into the development plan model runs and the out-turn results in comparison to different levels of development. The structure of this report after this introduction is as follows:
- Section 2 - Summarises the Local Plan Scenarios considered,
  - Section 3 - Outlines the planning and infrastructure data which underpins the modelling tests,
  - Section 4 - Summarises the assignment results of the model tests,
  - Section 5 - Presents the conclusions of the testing.

## 2. Local Plan Scenarios

Capabilities on project:  
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## 2 Local Plan Scenarios

- 2.1 AECOM has undertaken a range of transport modelling tests of the proposed Luton Local Plan, for a number of scenarios and forecast years. This section sets out the assessment years considered and the options tested.
- 2.2 Three broad scenario tests have been undertaken:
- Option A - Detailed trajectory, incorporating 'reasonable certainty' growth
  - Option B - Baseline planned LBC growth
  - Option C - Duty to Cooperate (DtC) scenario

### Assessment Year

- 2.3 Two forecast years were tested, namely 2016 and 2031. 2016 was chosen as it is 5 years into the 2011-2031 planning cycle and key committed infrastructure (Luton Town centre & Junction 10a) will be complete within this time horizon. Table 1 summarises the options tested by scenario year.
- 2.4 LBC required the assessment of Option A, B & C for 2016 and 2031, which included all the infrastructure and development proposed in line with the Local Plan in the corresponding years. In terms of the number of households, employment and infrastructure Options B and C are the same in 2016 and are combined to a single scenario. The prioritisation of potential schemes was considered, alongside how they are linked with development proposals, to ensure adequate evidence is in place to identify appropriate funding which may be required, along with the likely timing of this.
- 2.5 The purpose of the Local Plan tests is to provide supporting transport evidence covering the provision of growth and linked infrastructure and identify whether this can be delivered. The tests were used to identify likely junctions and roads where congestion may occur in the future as a result of proposed developments and will be used to inform the development of potential transport solutions.
- 2.6 The Option tests and their respective modelled years are summarised in Table 1.

**Table 1: Summary of option tests and modelled years**

Option	2016	2031
A	✓	✓
B	✓	✓
C		✓

### Options Summary

- 2.7 An overview of the options considered is summarised below:

#### Option A

- 2.8 Option A reflects developments which are 'reasonably certain' to be brought forward. LBC provided the 'Emerging 2013 SHLAA' which highlighted committed developments and their geographical locations. Committed growth includes North Houghton Regis Phase 1 (5,150 dwellings) in 2031. In 2016, the early release sites at Kestrel Way & East of Bedford Road were included in addition to Core Growth.

#### Option B

- 2.9 This option is to identify locations of congestion on the modelled network as a result of proposed developments in the Borough, with the aim of highlighting any pinch points which are likely to require significant mitigation.

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### Option C

2.10 Option C considers proposed developments in the Borough and known proposed development sites in adjacent Local Authority areas. The following assumptions apply to both forecast years.

- Houghton Regis Development (HRD) - Phase 1 + 2 - 7,200 dwellings
- North of Luton - although no application received, 2,900 dwellings are in the housing strategy;
- North Hertfordshire - currently modelled to TEMPRO growth, more detail growth for Wandon End and Brick Kiln developments to the East of Luton has been specified to include 5,500 dwellings.
- East Leighton Buzzard - 2,500 dwellings

2.11 Table 2 and Table 3 summarise the differences between the option tests by year. The only difference between Option A and Option B/C in 2016 is an additional 26 households.

**Table 2: Options summary 2016**

2016	Option A	Option B	Option C
Network	- All Bedford Committed + Existing (C+E) - All HA C+E - All Central Bedfordshire and Luton C+E - Plus, A5/M1 Link, HRD Kestrel Way early release/ Distribution Centre access	As Option A	As Option A
Demand (Internal)	H/H - 2,438  Employment - 0	As Option A + H/H - 26 SHLAA no certainty Employment - 0	As Option A + H/H - 26 SHLAA no certainty Employment - 0
Demand (External)	H/H - 1,000 Employment - 962	As Option A	As Option A

2.12 For the 2031 scenarios, there are more significant differences between the options in terms of highway infrastructure and additional demand in-terms of new households and jobs.

**Table 3: Option summary 2031**

2031	Option A	Option B	Option C
Network	- All Bedford C+E - All HA C+E - All Central Bedfordshire and Luton C+E - Plus, Woodside Link and associated schemes, Leighton Buzzard and Luton proposed options	As Option A	As Option A + HRD, North Luton Bypass, North of Luton and A505 Airport Bypass.
Demand (Internal)	H/H - 4,110  Employment - 0	As Option A + H/H - 1,643 SHLAA no certainty Employment - 19,102	As Option A + H/H - 1,643 SHLAA no certainty Employment - 19,102
Demand (External)	H/H - 5,150  Employment - 2,648	As Option A	As Option A + H/H - 12,950 Employment - 9,767

### 3. Planning Data Input

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### 3 Planning Data

#### Households and Employment

3.1 Forecast year planning data for Luton is based on the latest 2011 Census population figures. Forecast growth from 2011 is specified in this section. Outside of Luton, growth is based on 'core' growth used in AECOM's modelling work for Central Bedfordshire's development plan (October 2012) with scenario specific additional site development specified in this section. The additional dwellings from 2011 to each forecast year and scenario are set out in Table 4 and the additional jobs from 2011 to each year and scenario are set out in Table 5. It should be noted that the Central Bedfordshire growth aspirations may have changed in the interim, since this planning data set was specified.

**Table 4: Additional Dwellings 2011-2031**

Area	Site	2016		2031		
		Option A	Option B/C	Option A	Option B	Option C
Luton	Luton SHLAA Reasonable Certainty	2,438	2,438	4,110	4,110	4,110
	Luton SHLAA No Certainty		26		1,643	1,643
Central Beds	Leighton Buzzard East					2,500
	East of Luton Extension					5,500
	North of Luton Extension					2,900
	Early release sites at Kestrel Way and East Bidwell	1,000	1,000	1,000	1,000	1,000
	Remaining Business Case HRDC development *			4,150	4,150	4,150
	Phase 2 HRD on Shanley Land & Taylor Wimpey Land					550
	Houghton Regis North Development - Site 2					1,500
<b>Totals</b>		<b>3,438</b>	<b>3,464</b>	<b>9,260</b>	<b>10,903</b>	<b>23,853</b>

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**Table 5: Additional Jobs 2011-2031**

Area	Site	2016		2031		
		Option A	Option B/C	Option A	Option B	Option C
LBC	Butterfield Green				4,013	4,013
	Jct 10a				1,728	1,728
	Century Pk				2,599	2,599
	Power Ct				2,074	2,074
	Napier Pk				3,016	3,016
	Station Quarter				623	623
	Luton Airport				5,050	5,050
CBC	Leighton Linslade					2,099
	Sundon Quarry					2,289
	North Luton Urban Extension					2,116
	North Houghton Regis	962	962	2,648	2,648	3,263
<b>Totals</b>		<b>962</b>	<b>962</b>	<b>2,648</b>	<b>21,750</b>	<b>28,870</b>

- 3.2 Planning data in-terms of housing, population and employment is established in the latest version of CBLTM. The 'Emerging 2013 SHLAA' residential site data was incorporated into the model to ensure that the quantum and spatial distribution of housing growth is representative of current plans.
- 3.3 There are 134 proposed development sites in total covering the Luton area that have been taken forward at this stage. Each development site was located spatially within the model and the developments grouped together to form a reasonable representation of developments at a zonal level.
- 3.4 Commitment of development defines the difference between Option A and Option B. Both include Houghton Regis committed developments e.g. 5,150 dwellings (all east of Bedford Road) by 2031 and Kestrel Way & East of Bedford Road early release sites in 2016.
- 3.5 Option C includes developments in neighbouring authorities. The detail of this is specified above.
- 3.6 With the exception of North Hertfordshire proposals, these will be modelled as per Central Bedfordshire's preferred option "Scenario 1" from the October 2012 development option testing undertaken.
- 3.7 Information on the land-use composition has been provided, as well as the number of jobs within the "Luton Employment Land Review"<sup>1</sup>. This was used for employment input with the exception of Napier Park (3016 jobs) which was provided by LBC and Station Quarter (623 jobs) which was calculated using the floorspace provided by LBC and a search of the B1 landuse category within the TRICS trip rate calculator. It should also be noted that Airport growth only includes growth in employment
- 3.8 For Household occupancy factors, TEMPRO figures used by AECOM in previous testing were used.
- 3.9 Trip generation and attraction were calculated and attributed to the updated zone system, in line with the projections of growth. Since the purpose of these tests is to assess development proposals in line with the proposed Local Plan, the total growth was retained and no overall constraint against TEMPRO was undertaken.
- 3.10 The assumption for future growth outside of the Luton area was in line with latest growth projections. This covers growth within the Central Bedfordshire area as well as external traffic growth (i.e. growth generated externally, but passing through the modelled area).

<sup>1</sup> Employment Land Review Final Report March 2013 – Luton Borough Council

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## Transport Infrastructure Schemes

3.11 The modelled representation of committed and proposed infrastructure schemes has been considered in detail during the preparation and running of the Local Plan testing. The infrastructure included is as shown in Table 6.

**Table 6: Transport Infrastructure Schemes**

		Scheme	2016		2031		
			Option A	Option B/C	Option A	Option B	Option C
Networks	Bedford C+E	Bedford Western Bypass Phase 1	✓	✓	✓	✓	✓
		Bedford Western Bypass Phase 2	✓	✓	✓	✓	✓
		A421 Dualling	✓	✓	✓	✓	✓
	HA C+E	M1 J10a	✓	✓	✓	✓	✓
		M1 J10-13	✓	✓	✓	✓	✓
	Central Beds and Luton C+E	Morrisons Houghton Regis	✓	✓	✓	✓	✓
		Luton & Dunstable Guided Busway	✓	✓	✓	✓	✓
		Luton Town Centre	✓	✓	✓	✓	✓
		Luton Parkway Northern Access	✓	✓	✓	✓	✓
		Luton 20mph	✓	✓	✓	✓	✓
	Central Bedfordshire Proposed	A5 - M1 link	✓	✓	✓	✓	✓
		Woodside Connection (WSC)			✓	✓	✓
		Poynters Road Scheme (20mph speed limit and HGV ban)			✓	✓	✓
		Connection to WSC from Parkside Drive			✓	✓	✓
		Access to Early Release Kestrel Way	✓	✓	✓	✓	✓
		Access Road to Distribution Centre	✓	✓	✓	✓	✓
		HRDC development access over CBC land					✓
		Houghton Regis North Development 2 - Distributor Road					✓
		East Leighton Distributor Road			✓	✓	✓
		Leighton Buzzard Town Centre Schemes			✓	✓	✓
		Luton North Bypass*					✓
		North of Luton Extension Distributor Roads					✓
		Luton Proposed	Dunstable Road Pinch Points			✓	✓
	Aiport Link to Century Park				✓	✓	✓
	Dualling of Airport Access Road				✓	✓	✓
	A505 - Airport Bypass						✓
	Airport Junction Mitigation				✓	✓	✓
Luton Airport Parkway Bus-Loop				✓	✓	✓	

\* Luton North Bypass is in addition to the distributor road for the North of Luton Development

3.12 The allocation of Central Bedfordshire schemes into Luton plan 'options' is dependent on development, e.g. with the North Luton distributor comes with the north Luton development and the Houghton Regis distributors, Woodside Link and Poynters Road scheme come with Houghton Regis North as per the Central Bedfordshire development option testing by AECOM.

3.13 A review and update of the representation and linkage of the above schemes was undertaken; in particular within the Luton area and to represent some of the new schemes from previous CBLTM models.

3.14 The majority of network schemes were provided by LBC or revised from those previously in the model.

## 4. Assignment Results

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## 4 Assignment Results

4.1 This section presents the results of the model assignments by year, comparing Option B and C against Option A.

### 2016 Option B/C versus Option A

4.2 The assignment results from Option B/C versus Options A for 2016 are presented below.

4.3 Due to the limited difference between the two planning data sets, differences between the assignment results are negligible as highlighted in Table 7 which shows the overall comparison of network statistics between the two options for links within Luton.

**Table 7: 2016 Option B versus Option A Highway Network Statistics for Luton**

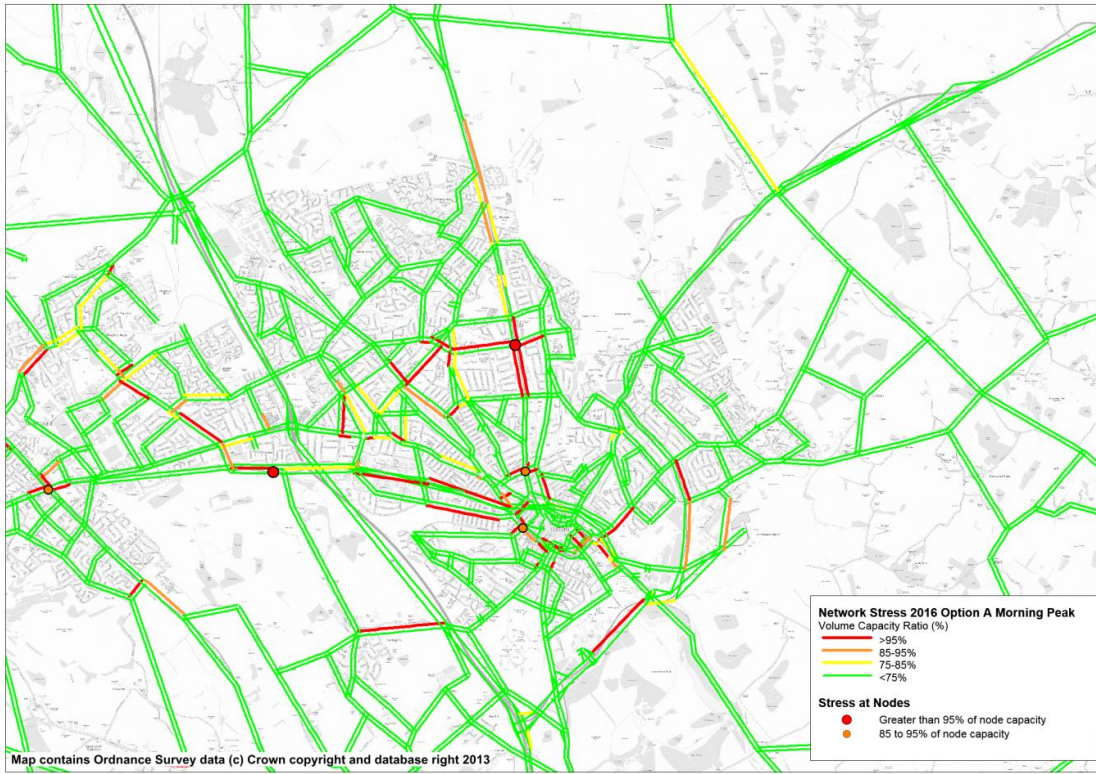
		2016 Option A	2016 Option B/C	Difference
<b>Morning Peak</b>	Vehicle Distance (veh-km)	132,171	132,377	206
	Road Distance (km)	309	309	0
	Free Flow Vehicle Time (veh-hours)	3,009	3,016	6
	Assigned Vehicle Time (veh-hours)	3,994	4,001	7
	Vehicle Delay Time (veh-hours)	985	985	0
	Vehicle Queued End of Hour (PCUs)	759	758	-0
	Speed (kph)	33	33	-0
<b>Evening Peak</b>	Vehicle Distance (veh-km)	138,387	138,597	210
	Road Distance (km)	309	309	0
	Free Flow Vehicle Time (veh-hours)	3,087	3,093	6
	Assigned Vehicle Time (veh-hours)	4,252	4,263	11
	Vehicle Delay Time (veh-hours)	1,164	1,170	5
	Vehicle Queued End of Hour (PCUs)	885	889	5
	Speed (kph)	33	33	-0

4.4 In the 2016 Option A congestion is observed on parts of the main routes into Luton (Figure 1 & Figure 2) including the A6, Hatters Way, Dunstable Road and Leagrave Road. Additionally the A505 and Airport Way close to the airport show a high level of congestion. The majority of this congestion prevails from the 2009 Base Year model particularly on the A6 and Hatters Way/Dunstable Road and is likely to be exacerbated by development as part of the Local Plan in 2016. Proposed development to 2016 is likely to result in increased stress at the junction of Hatters Way/Chaul End Road and along Vauxhall Way which is not present in the 2009 Base Year model.

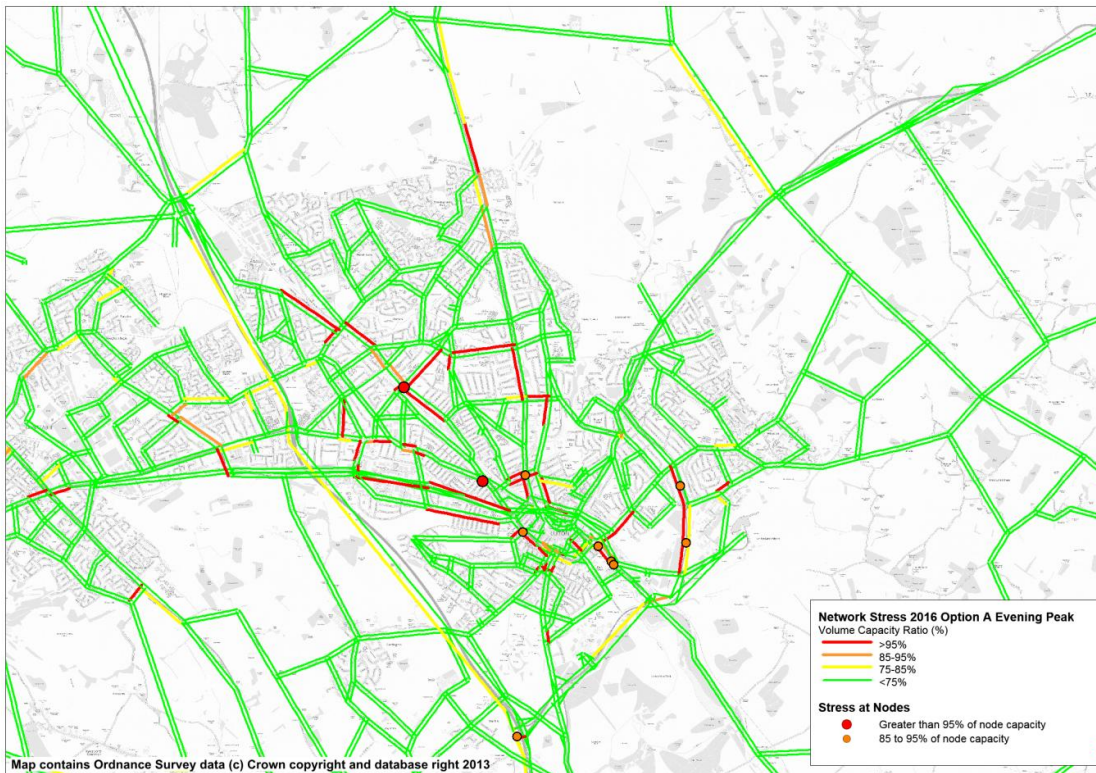
4.5 Only the most severely congested junctions are shown to be 'stressed' on the plots, existing congestion at junctions may be overlooked, stress on individual links should be considered in parallel to that at individual junctions. Two different junctions in both the morning and evening peak are severely congested operating at over 95% capacity with the evening peak additionally affecting a higher number of junctions to a lesser extent. In the morning peak, the junctions operating at over 95% capacity are the junction of Hatters Way and Chaul End Road and a second at the traffic signals at New Bedford Road/Barnfield Avenue. The delay at Barnfield Avenue in the morning but not in the evening peak could be related to the proximity of Barnfield College. At Chaul End Road/Hatters Way the congestion is likely to be related to the right turn from Hatter Way (Eastbound) which experiences more congestion in the morning peak. In the evening peak, the worst performing junctions are Dunstable Road (within Bury Park) and Marsh Road/Waller Avenue. As suggested, 2016 is only three years away and these junctions are known pinch points in the current 2013 network.

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**Figure 1: Volume over capacity in Luton in 2016 Option A in the Morning Peak.**



**Figure 2: Volume over capacity in Luton in 2016 Option A in the Evening Peak.**



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## 2031 Option B versus Options A

- 4.6 Table 8 shows the change in key highway statistics between Option B and Option A for 2031 for links within Luton. Each of these high level performance indicators increases under Option B, except for average speed which decreases as network wide delay increases. Some of this increase is in part due to more demand and therefore more delay. As such this is not necessarily a measure of “impact” but of increasing volume of traffic on the network. However, the increase in delayed hours & vehicles queued is much greater proportionally, around 40% compared to 10-15% increase for vehicle kilometres and total vehicle hours, which does suggest more congestion.

**Table 8: 2031 Option B and Option C versus Option A Highway Network Statistics for Luton**

		2031 Option A	2031 Option B	Difference (B-A)	2031 Option C	Difference (C-A)
Morning Peak	Vehicle Distance (veh-km)	149,081	153,903	4,822	165,936	16,855
	Road Distance (km)	315	305	-10	315	1
	Free Flow Vehicle Time (veh-hours)	3,360	3,507	148	3,789	429
	Assigned Vehicle Time (veh-hours)	4,728	5,401	674	6,072	1,344
	Vehicle Delay Time (veh-hours)	1,368	1,894	526	2,283	915
	Vehicle Queued End of Hour (PCUs)	1,092	1,593	501	1,977	885
	Speed (kph)	32	28	-3	27	-4
Evening Peak	Vehicle Distance (veh-km)	154,182	158,120	3,938	170,000	15,818
	Road Distance (km)	315	305	-10	315	1
	Free Flow Vehicle Time (veh-hours)	3,419	3,528	109	3,818	399
	Assigned Vehicle Time (veh-hours)	5,018	6,040	1,022	6,095	1,077
	Vehicle Delay Time (veh-hours)	1,599	2,512	913	2,277	678
	Vehicle Queued End of Hour (PCUs)	1,207	2,016	809	1,990	784
	Speed (kph)	31	26	-5	28	-3

- 4.7 In the 2031 scenario, vehicle flow differences along the M1 and A505 (from/to Hitchin) suggest a net increase in trips to Luton and a net drop in trips from Luton to elsewhere. This is intuitive as the number of jobs provided in this scenario exceeds the working population added from committed development in the Luton Local Plan. It should be noted that “Option B”, the Luton plan scenario, is actually more balanced and subsequently more sustainable as the jobs provided are in line with population projections. Conversely, in “Option A” there is commitment to build 4,100 houses without any increase in jobs.
- 4.8 As would be expected, increases in vehicle flow can be seen at points where there are increases in jobs available - such as Butterfield, Luton Airport and Century Park. The directionality of flow is sensible, i.e. the larger increases in flow are to the key employment sites in the morning peak and from the key employment sites in the evening peak.
- 4.9 Figure 3 shows a drop in M1 Southbound trips. Under Option B in 2031, a relatively high number of jobs are provided in Luton and hence there is the opportunity over time for the number of commuters to London and Hertfordshire (travelling southbound on the M1) to decrease, since there are suitable jobs for them in Luton they are less likely to commute southbound on the M1 as jobs are available in Luton. In Option B there are

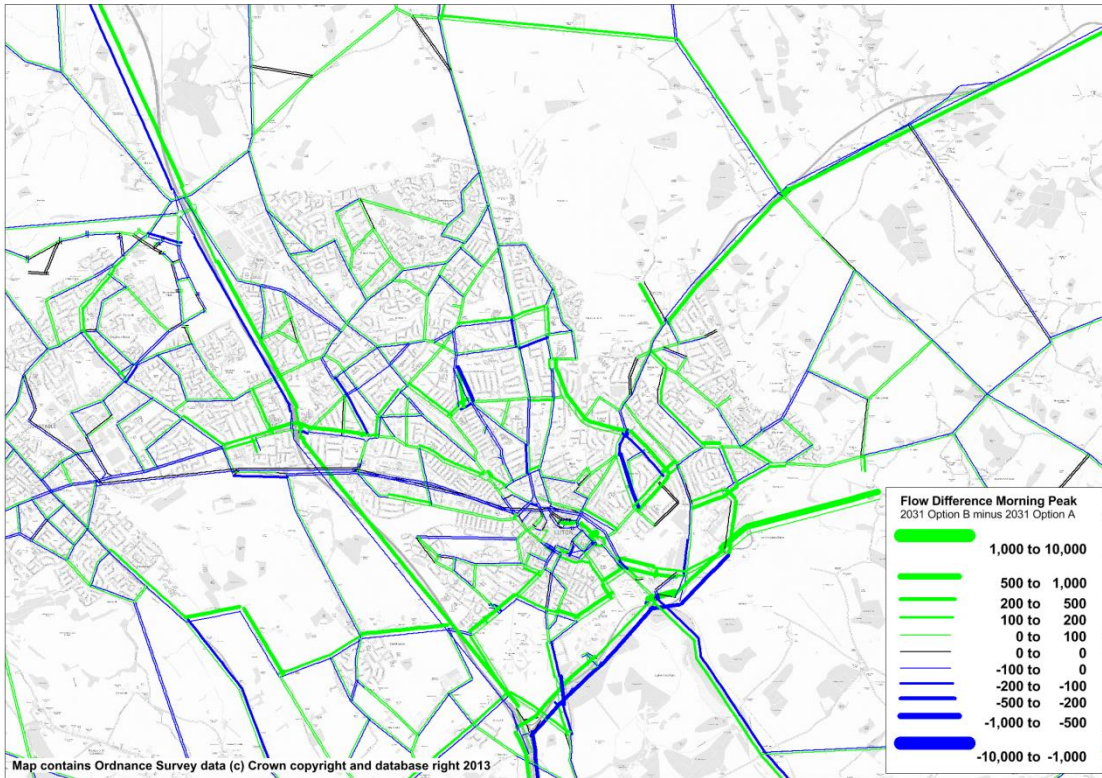
Capabilities on project:  
Transportation

more jobs provided within Luton than population increase. Therefore, these jobs are taken by people who see Luton as a more “attractive” option. Luton to Luton trips are more “attractive” which leads to more “internalised” commuter trips. In addition, there are constraints in the way Luton Airport is modelled (as part of the full model rather than an external input including passenger forecasts) and further, the mitigation measures around the airport were not available for this stage of modelling. As a consequence, when additional jobs are included at the Airport and Century Park, severe delays make travel southbound unattractive. There is a possibility that Airport mitigation measures would mean southbound journey times would be similar and re-routeing/ re-distribution will be less noticeable. Further modelling work and refined modelling of the airport may indicate the scale of this change.

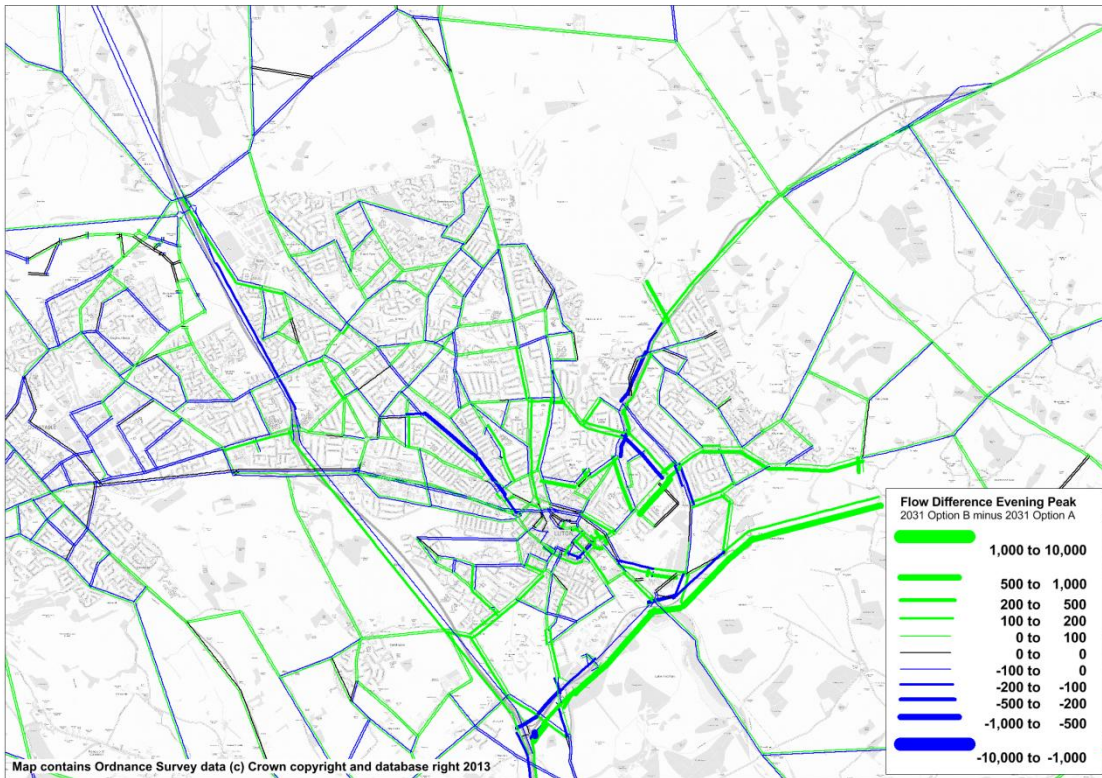
- 4.10 Figure 5, Figure 6, Figure 7 and Figure 8 show the changes in congestion or stress on the network from 2031 Option B and 2031 Option A.
- 4.11 There are several areas of stress on the network in 2031 Option A as committed housing growth has an impact on the highway network. The key areas of stress are on routes into the town centre in the morning peak and travelling outbound in the evening peak. There is also some congestion in the Leagrave area of Luton as well as on New Bedford Road & Stockingstone Road. Further, the A505 Vauxhall Way becomes more congested when comparing to the 2016 Luton Plan. Furthermore, some roads on the approach to the airport experience delays including Airport Way from Capability Green to Luton Airport Parkway.
- 4.12 Each of these routes are existing congestion points in 2013, so without mitigation it is perhaps to be expected that there is likely to be congestion as the population of Luton increases. The areas where mitigation has been included show less stress than is experienced currently, specifically around the M1 Junction 10a and to the north east of the town centre, the schemes seem to be effective in reducing congestion and there are other areas of the town requiring congestion relief.
- 4.13 Between Option B and Option A in 2031 there is an increase in stress on the network in areas around the key employment sites as this is a significant increase in jobs between Option B and Option A. Key increases in stress are on the A505 Vauxhall Way, as a result of growth at Luton Airport, Century Park, Butterfield Green and Napier Park which are all close proximity. The same is relevant to the junctions around the airport and Kimpton Road. Butterfield Green is modelled as having less of an impact. Butterfield Green has more of an impact on Stockingstone Road in 2031 Option B, particularly in the morning peak. The model suggest that M1 Junction 10a is likely to be able to cope with the additional employment at Luton Town FC’s proposed new stadium at Junction 10a in option B but the junction to the North, with Cutenhoe Road is modelled as experiencing increased congestion under this scenario.
- 4.14 Between Option B and A there appears to be limited highway impact in North and West Luton, this seems sensible as the bulk of planned development is to the East and South of Luton.

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**Figure 3: The Difference in PCU flows in 2031 Option B vs 2031 Option A in the Morning Peak (Luton)**

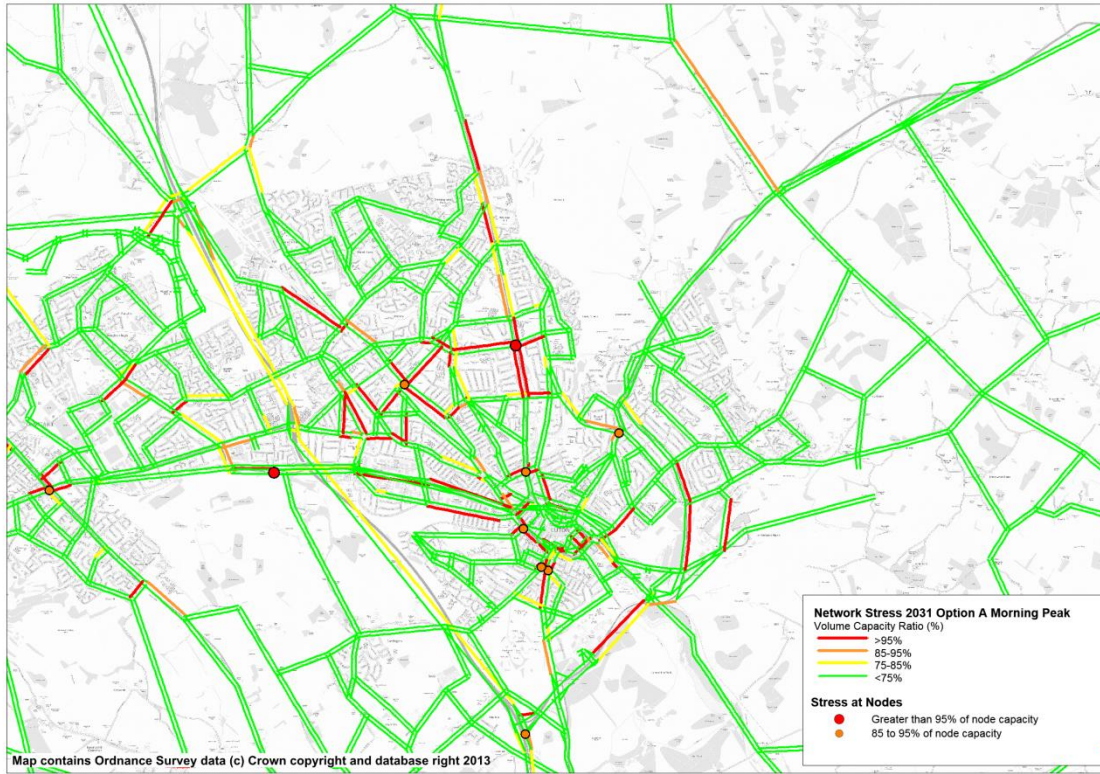


**Figure 4: The Difference in PCU flows in 2031 Option B vs 2031 Option A in the Evening Peak (Luton)**

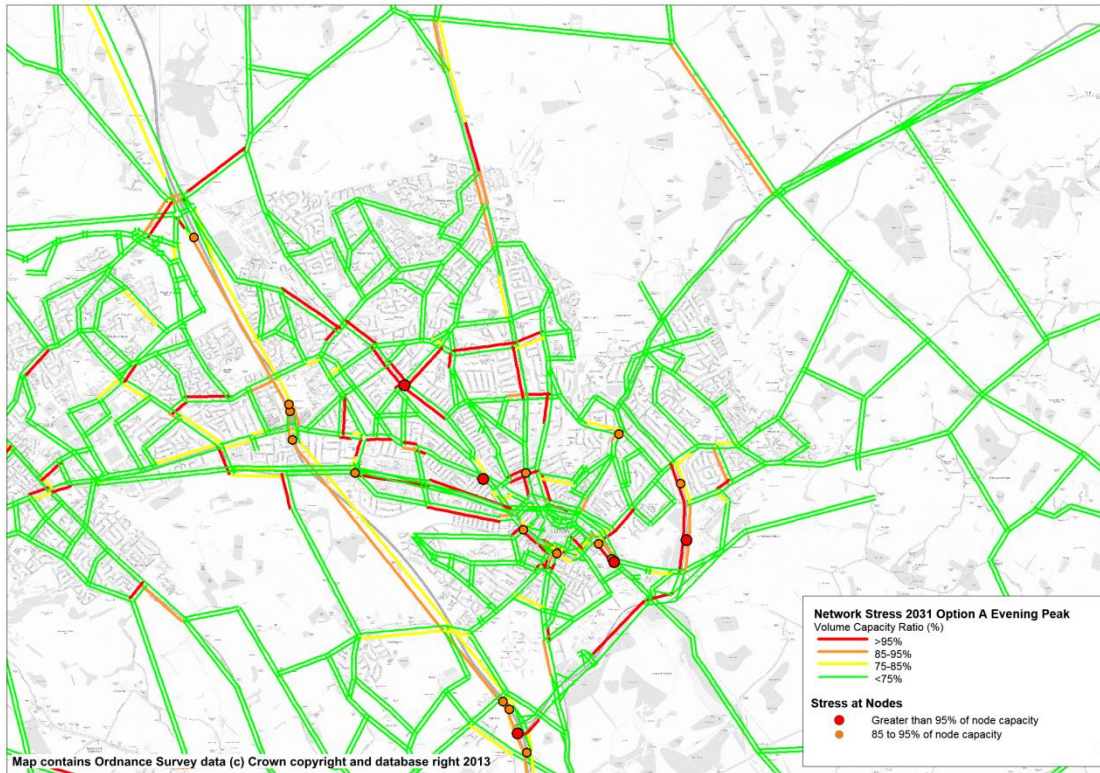


Capabilities on project:  
Transportation

**Figure 5: Volume over capacity in Luton in 2031 Option A Morning Peak.**

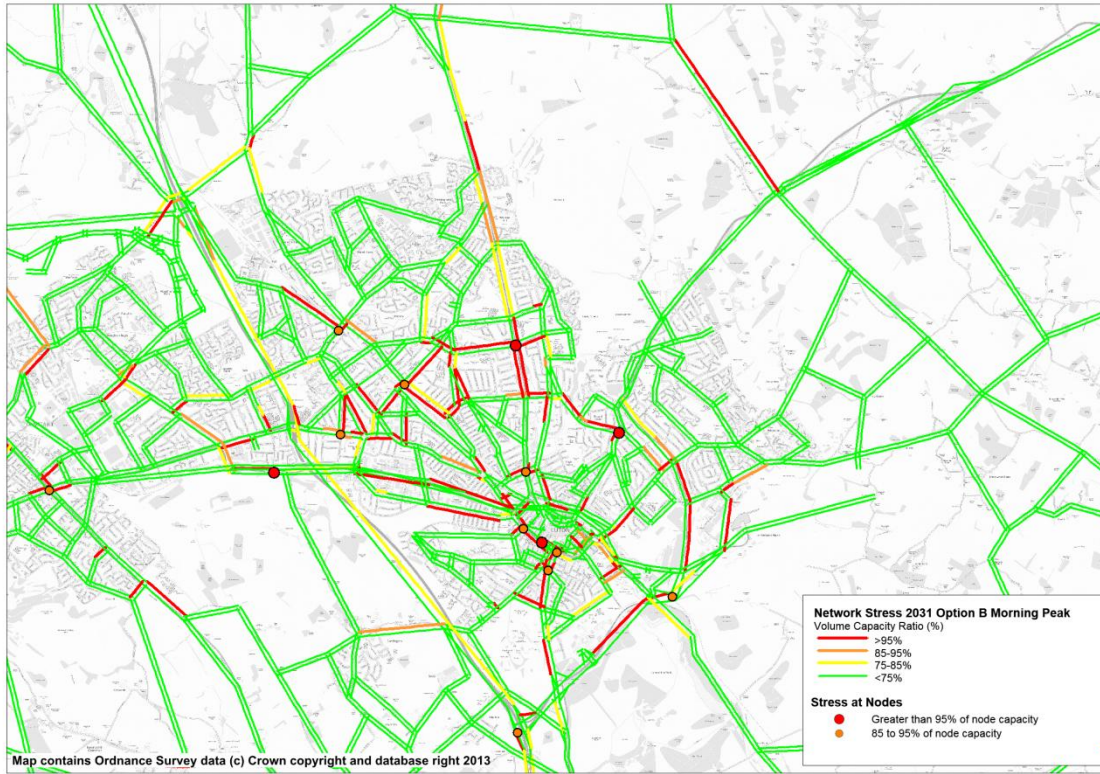


**Figure 6: Volume over capacity in Luton in 2031 Option A Evening Peak.**

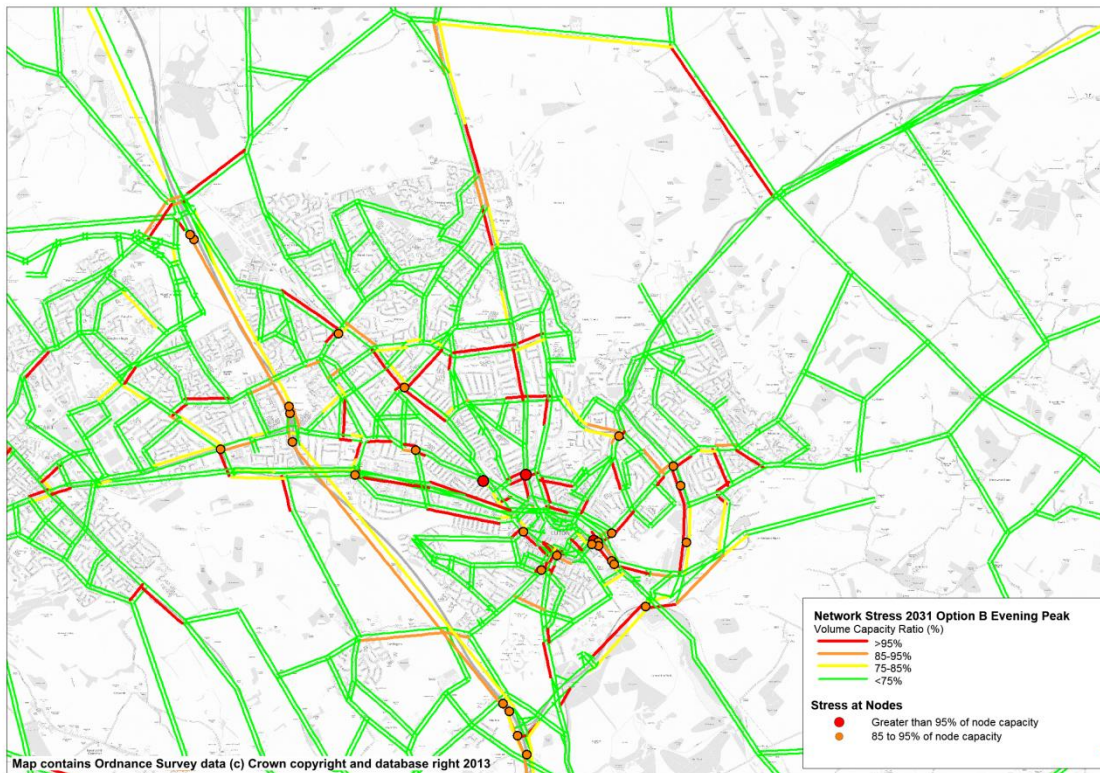


Capabilities on project:  
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**Figure 7: Volume over capacity in Luton in 2031 Option B Morning Peak.**



**Figure 8: Volume over capacity in Luton in 2031 Option B Evening Peak.**



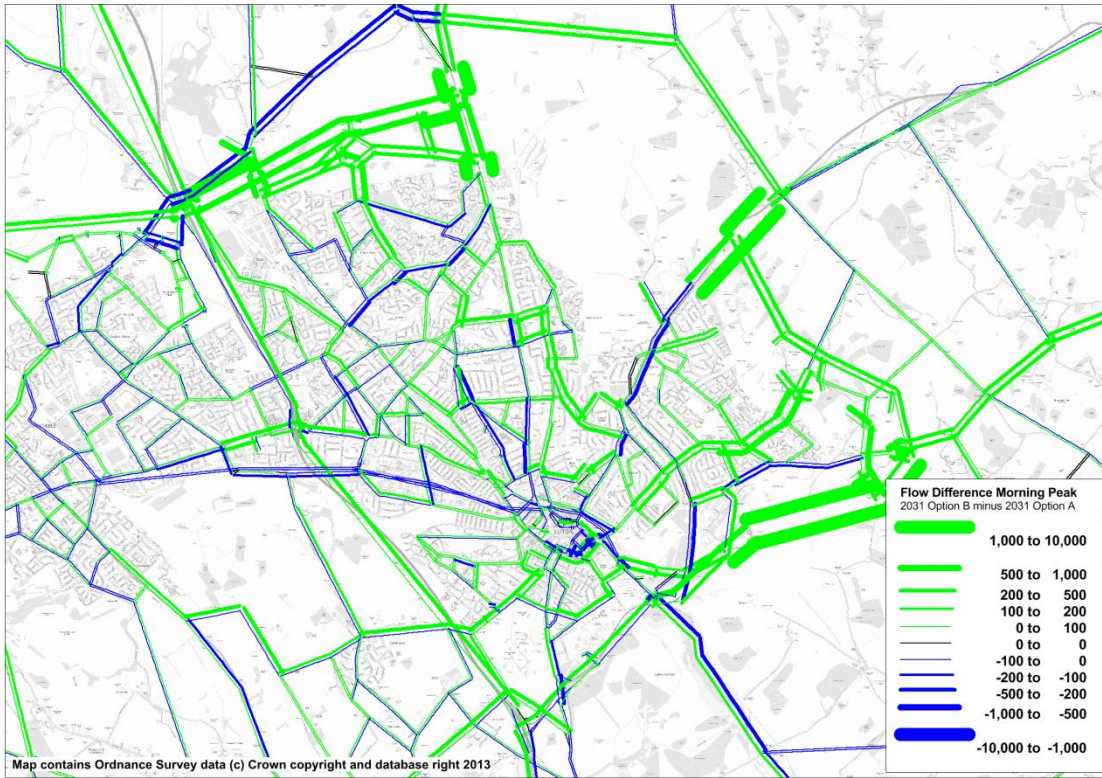
Capabilities on project:  
Transportation

#### 4.15 **2031 Option C versus Option A**

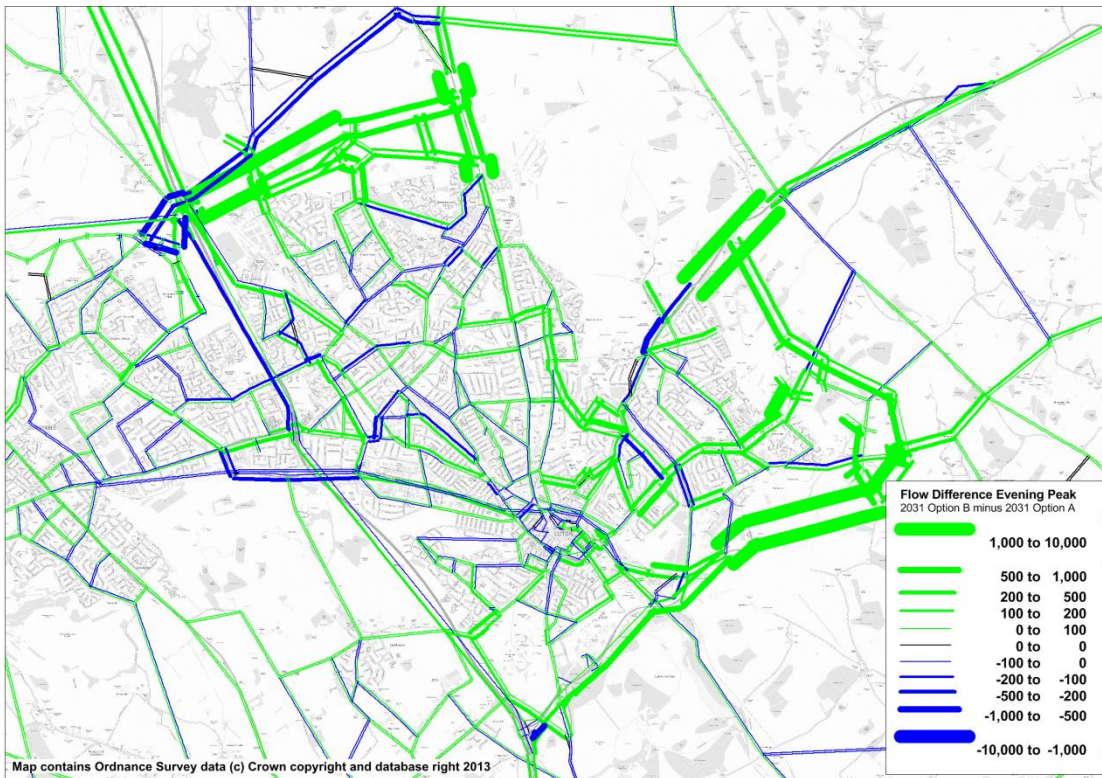
- 4.16 Table 8 presents the difference in the highway network statistics between Options C and A for 2031 for links within Luton, with every performance indicator increasing apart from average speed which decreases as delays across the network increases. The incremental changes to Option C from Option B are much smaller but in comparison to option A there are substantial increases in all indicators with a similar pattern as observed from Option A to Option B.
- 4.17 As may have been expected, the traffic flow difference plots comparing Option C with Option A show an overall increase in trips in Central Bedfordshire, particularly around Leighton Buzzard, Houghton Regis, North Luton and East Luton.
- 4.18 The combined impact of the northern bypass and developments to the north of Luton means that west to east routes show a drop in trips as an alternative route is available, while north-south routes show an increase in trips as there is more demand produced that distributes north and southwards. There are no mitigation measures proposed north-south so the volume/delay increases experienced in the model on these roads are perhaps to be expected.
- 4.19 A similar pattern is observed in east Luton with some drops on A505 and its feeder roads due to the alternative East Luton bypass being provided but there is a large increase in demand in all directions out of the new development to the east of Luton particularly via the Airport. This puts many junctions around Luton Airport under further strain when added on top of Century Park and Airport job growth.
- 4.20 As a result, increasing delays and congestion are modelled on links around the airport - Figure 11 & Figure 12 leading to delays increasing around the airport but decreasing on the A505 which is consistent with the volume changes observed.
- 4.21 Increased delays to the North of Luton are modelled, particularly on the A6 (Barton Road) which shows an increase in congestion to both the North and South of the North Luton Bypass as demand has increased around this area with no additional capacity provided, excepting new junctions to allow the development to access the existing network. Additionally the Northern bypass is congested at the western end in both the morning and evening peaks.
- 4.22 The demand from the Houghton Regis Stage 2 development increases A5-M1 bypass modelled trips in both the morning and evening peaks. There does not seem to be significant additional stress as a consequence of Houghton Regis Stage 2.
- 4.23 Modelled M1 volumes and volume over capacity is similar to that observed in 2031 Option B with a slight increase in congestion Southbound towards junction 11.

Capabilities on project:  
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**Figure 9: The Difference in PCU flows in 2031 Option C vs 2031 Option A in the Morning Peak (Luton)**



**Figure 10: The Difference in PCU flows in 2031 Option C vs 2031 Option A in the Evening Peak (Luton)**



Capabilities on project:  
Transportation

Figure 11: Volume over capacity in Luton in 2031 Option C in the Morning Peak.

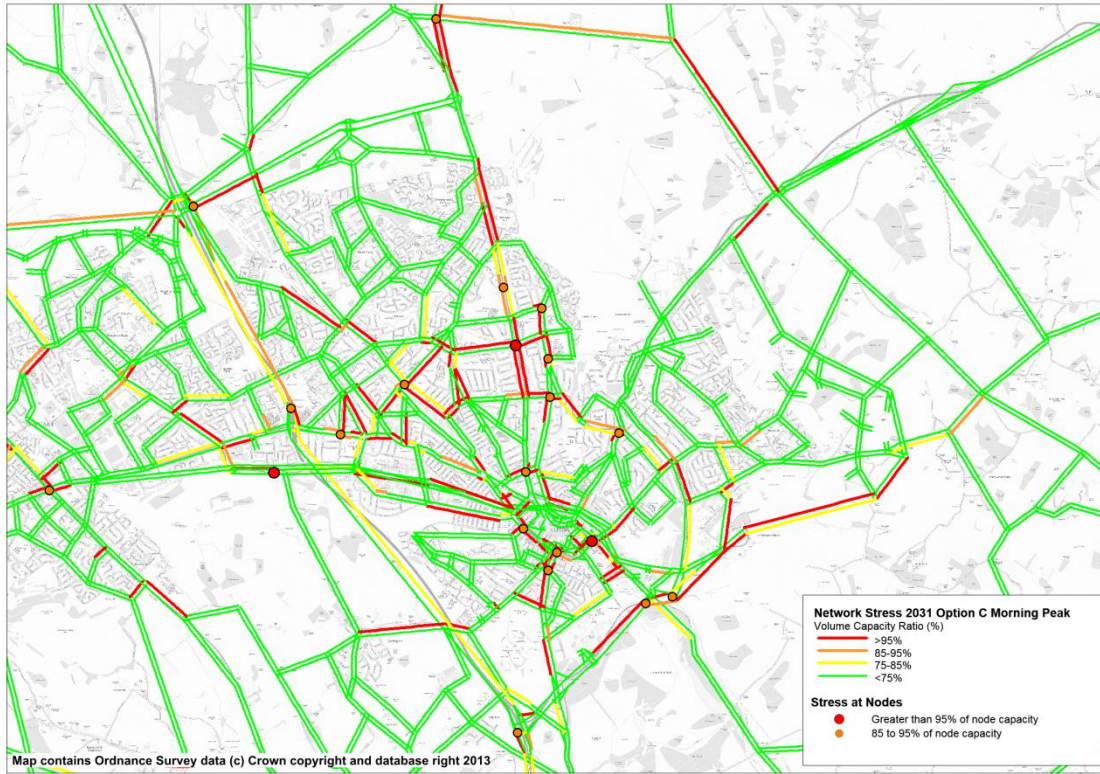
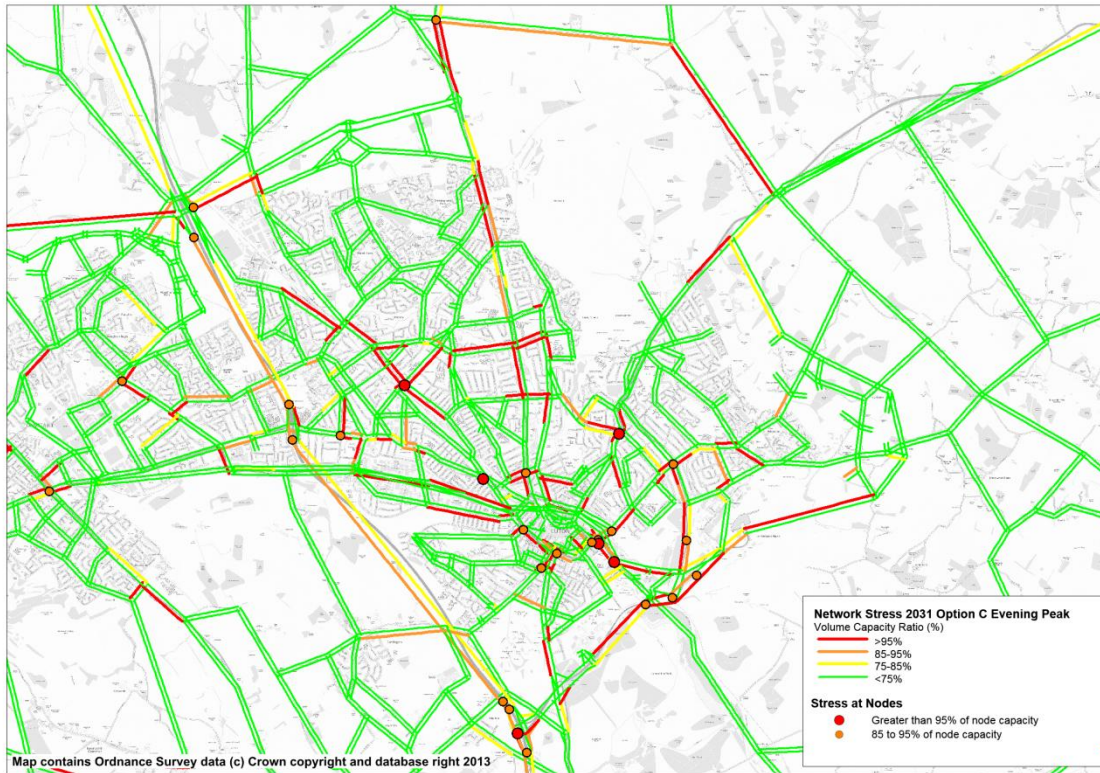


Figure 12: Volume over capacity in Luton in 2031 Option C in the Evening Peak.



## 5. Summary and Conclusions

## 5 Summary and Conclusions

### Overview

- 5.1 The transport modelling evidence undertaken and reported within the report should only be used for the assessment of the Local Plan. The results provide an indicative, high level strategic assessment and this should be borne in mind.
- 5.2 The model results considered seem intuitive with increases in demand and associated network stress associated with the introduction of elements of the Luton Local Plan and sites in adjacent authorities between the two assessment years.
- 5.3 The comparison of 2016 Option A and Option B/C show very similar results as the difference between the sets of planning data are negligible.

### 2016 Option A:

- 5.4 Traffic flow conditions were considered for Option A 2016 standalone.
  - Congestion is observed on parts of the main routes into Luton including the A6, Hatters Way, Dunstable Road and Leagrave Road. Additionally the A505 and Airport Way close to the airport show a high level of congestion.
  - Congestion is observed at junctions operating at over 95% capacity, as suggested these may be pinch points in the existing 2009 Base model.
    - In the morning peak, the junctions identified by the model are one between Chaul End Road and Hatters Way and a second between New Bedford Road and Barnfield Avenue.
    - In the evening peak, the worst performing junctions are Dunstable Road (within Bury Park) and Marsh Road/Waller Avenue. As suggested, 2016 is only three years away and these junctions are known pinch points in the current 2013 network.

### 2031 Option B versus Option A:

- 5.5 The modelled traffic flow impacts of the Baseline planned LBC growth (Option B) versus the 'reasonable certainty' growth (Option A) suggest the following differences.
  - In the 2031 scenario, vehicle flow differences along the M1 and A505 (from/to Hitchin) suggest a net increase in trips to Luton and a net drop in trips from Luton to elsewhere.
  - As would be expected, increases in vehicle flow can be seen at points where there are increases jobs available - such as Butterfield, Luton Airport and Century Park.
  - A drop in M1 Southbound trips, primarily this is due to the number of jobs provided exceeding the working population
  - There are several areas of stress on the network in 2031 Option A as committed housing growth has an impact on the highway network. The key areas of stress are on routes into the town centre in the morning peak and travelling outbound in the evening peak.

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Transportation

- Between Option B and Option A in 2031 there is an increase in stress on the network in areas around the key employment sites as this is a significant increase in jobs between Option B and Option A. Key increases in stress are on
  - A505 Vauxhall Way, as a result of growth at Luton Airport, Century Park, Butterfield Green and Napier Park which are all close proximity.
  - Junctions around the airport and Kimpton Road.
  - Butterfield Green is modelled as having less of an impact.
  - The model suggests that M1 Junction 10a is likely to be able to cope with the additional employment at Luton Town FC's proposed new stadium at Junction 10a
- Between Option B and A there appears to be limited highway impact in North and West Luton, this seems sensible as the bulk of planned development is to the East and South of Luton.

### 2031 Option C versus Option A

5.6 The additional impacts of the duty to cooperate model run - Option C, suggest the following modelled differences.

- Traffic flow difference plots comparing Option C with Option A show an overall increase in trips in Central Bedfordshire, around Leighton Buzzard, Houghton Regis, North Luton and East Luton.
- The combined impact of the northern bypass and developments to the north of Luton mean that west to east routes show a drop in trips as an alternative route is available, while north-south routes show an increase in trips as there is more demand produced that distributes north and southwards.

### Recommendations

- 5.7 There are opportunities to gain further understanding of modelled traffic flow differences and potential impacts by considering additional model runs.
- 5.8 Enhanced modelling of demand and trip patterns are an important consideration, currently there are constraints in the way Luton Airport is modelled i.e. as part of the full model rather than an external input including passenger forecasts. Initial infrastructure proposals for the Century Park link and dualling on other approaches to the airport were modelled, but, the mitigation measures covered by the London Luton Airport Access proposals were not available for this stage of modelling. When available these should be incorporated into a further round of model runs for 2016 and 2031 as appropriate. These measures could alleviate congestion in the vicinity of the airport. As currently modelled, when additional jobs are included at the Airport and Century Park, longer journey times/severe delays make travel southbound unattractive which could have a significant wider impact. Longer journey times are a contribute to the "unattractiveness" of southbound travel on the M1. In particular there are modelled delays at the Airport Way/Gypsey Lane roundabout and this makes it unattractive to route south to Junction 10 from East Luton. As discussed, there is a possibility that future Airport mitigation measures could mean southbound journey times would be similar and re-routing/ re-distribution will be less noticeable.
- 5.9 The testing undertaken has identified prospective traffic problems associated with Local plan growth. As such determining the level of mitigation required to facilitate the proposed development should be considered in the next stage. The outcome of the introduction of mitigation is likely to influence the traffic routing and resulting congestion and delays on the network.
- 5.10 As further stages of the Local plan process progress, additional transport evidence at a more refined level will be required to understand likely impacts. As such, the phasing of development over the Local plan period will need to be understood along with the associated infrastructure. Furthermore, more refined representation of key development sites, (including the local access requirements, trip rates as well as the phasing will need to be understood.