

Cambridgeshire County Council

East Cambridgeshire Local Plan Transport Tests

Model Results, Assumptions and Details of Runs

October 2012



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Contents

1	Introduction	2
2	CSRM Assessment of Local Plan Assumptions	4
3	Ely Traffic Model	22
4	Comparison of CSRM and Ely Model	36
5	Summary	39
	Appendix A	41

1 Introduction

1.1 BACKGROUND

- 1.1.1 Cambridgeshire County Council (CCC) have commissioned Local Plan model tests on behalf of East Cambridgeshire District Council (ECDC). This work has been carried out jointly by Atkins and WSP. Two existing models have been applied in this work:
- 1.1.2 The Cambridge Sub Regional Model (CSRМ): A strategic model of land use and transport behaviour in four local authority districts (comprising Cambridge City, East Cambridgeshire, Huntingdonshire and South Cambridgeshire), which incorporates Cambridgeshire County Council's sub regional SATURN model of the wider area.
- 1.1.3 The Ely Traffic Model (ETM): A local SATURN model covering highway movements in and around Ely in more detail.
- 1.1.4 Atkins have taken responsibility for the ETM work, and highway aspects of the strategic CSRМ model. WSP have taken responsibility for the land use, public transport and general transport behaviour reported through CSRМ.

1.2 PURPOSE OF LOCAL PLAN MODEL TESTS

- 1.2.1 The purpose of the model testing was to ascertain the transport impacts of growth in East Cambridgeshire based on Local Plan development aspirations. Specifically, the models would be used to:
- Project forward housing, employment and population patterns for the district based on ECDC's projected growth aspirations and anticipated employment allocations;
 - Test the transport demand arising from this level of growth, to understand the changes in travel demand which will arise, and the impact on the transport network.
- 1.2.2 A secondary aim of the work, was to inform on other aspects of the Local Plan, including the extent of mitigation which may be necessary, how achievable the projected growth levels would be, and, in turn, how the transport infrastructure and changes to it may influence growth.

1.3 EXISTING CORE STRATEGY

- 1.3.1 Both the Cambridge Sub Regional Model and the ETM have been used previously to examine the Core Strategy development patterns. These have been the basis of assessments for projects such as the Ely Southern Link and for the planning application submissions for the Ely North residential development sites. The Core Strategy forms the basis of the Annual Monitoring Report and as such is considered to be comparable with the National Trip End Forecasts embedded within DfT TEMPRO program.

1.4 DRAFT REVISED LOCAL PLAN ASSUMPTIONS

- 1.4.1 These tests look at a higher level of growth with planning horizons to 2031. The Local Plan assumptions have a significantly higher level of local employment with a further increase in local residential allocations in Ely, Soham and Littleport. The proposed ECDC Local Plan development levels are outlined at the beginning of Section 2 of this report.

1.5 PURPOSE AND STRUCTURE OF THIS TECHNICAL REPORT

- 1.5.1 This report is structured in the following manner:
- Chapter 2 looks at the modelling conducted using CSRМ from the strategic perspective

including a review of the land use mixes and their performance in East Cambridgeshire, as well as overall travel patterns ensuing.

- Chapter 3 examines consequences of the revised growth forecasts on the local high network through the application of the ETM.
- Chapter 4 briefly compares the findings from the two models.
- Chapter 5 provides a summary of the key findings, a summary of key assumptions and suggestions for further work.

2 CSRМ Assessment of Local Plan Assumptions

2.1 INTRODUCTION

2.1.1 This section of the report outlines the input assumptions and high level results from the CSRМ model tests of the Local Plan. CSRМ represents East Cambridgeshire using a system of 18 transport zones and 7 land use zones, as shown in Figure 2.1 below. This is a more aggregate system than applied in other districts of the sub-region, but provides a reasonable geography to summarise changes over time in locations of housing and employment, and to show the changes in travel behaviour related to this. Some issues have arisen due to the lack of detail in representing highway costs, which are described later in this section. The use of the ETM assists in addressing this.

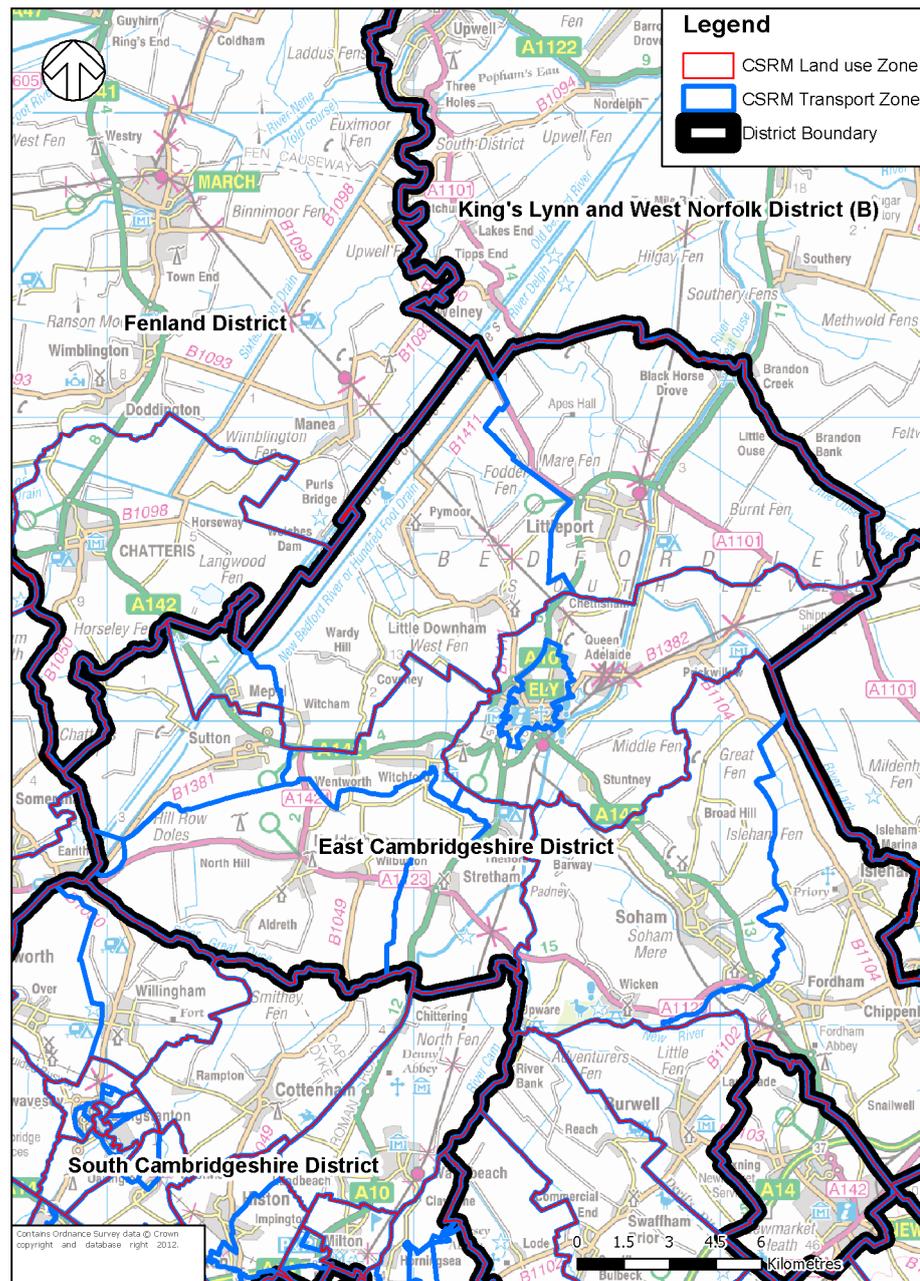


Figure 2.1 - Land Use and Transport Model Zones in CSRМ covering East Cambridgeshire

2.2 CSRM MODEL TESTS

2.2.1 The aim of the CSRM model tests has been to ascertain the broader travel demand impacts of the proposed ECDC Local Plan targets. These have been modelled by constructing a 'Local Plan Scenario' in CSRM for 2011-2031 growth in line with the proposed targets. The key elements of the Local Plan Scenario are listed below:

- **ECDC Local Plan Inputs:** The Local Plan Scenario includes development of 8,699 additional dwellings and floorspace sufficient to support growth of 10,000 jobs in the period 2011-2031. These planning inputs are applied to specific model zones as described in Section 2.3 below. Additionally, model constraints are applied to 'force' employment growth of 10,000 in this period in appropriate sectors.
- **Sub-Regional Inputs:** The total employment and households for the sub-region are assumed to rise above previous assumptions, to allow for the expansion of the residential and jobs market in East Cambridgeshire. This entails a growth for the sub-region of 1,700 dwellings and approx. 5,000 jobs above that assumed in previous model runs (the 'Base Case')
- **Other model assumptions:** The current model runs all include the Ely Southern Link Road. No upgrade to the A14 is assumed¹.

2.2.2 In analysing the transport outputs it has been helpful to compare this scenario with an existing model run (constructed for a previous project). This 'Base Case' scenario uses previous East Cambridgeshire development assumptions, in line with development location information supplied by Cambridgeshire County Council in 2008, and with overall sub-regional development based on the DfT NTEM (TEMPRO) 6.2 dataset.

2.2.3 Comparison of the Base Case and Local Plan Scenario is helpful to illustrate the differences in development and transport patterns which the ECDC Local Plan introduces.

Land Use Sensitivities

2.2.4 In carrying out this work, WSP have also conducted two separate land use sensitivities with alternative development assumptions. These were used to test the response of CSRM to development in East Cambridgeshire. They also provide some insight into the attractiveness of East Cambridgeshire for employment and housing, and extent of competition with the rest of the sub-region. The two sensitivities are as follows:

- **Sensitivity 1: No forcing of employment growth for East Cambridgeshire District Council.** This test is as for the Local Plan Scenario, but the employment growth of 10,000 is not constrained or forced in the model. The delivery of the floorspace, sufficient for 10,000 employees, is maintained. In this test, the model therefore predicts the additional employment which would be attracted to East Cambridgeshire, assuming that sub-regional employment growth is as before.
- **Sensitivity 2: Additional floorspace development in South Cambridgeshire and Cambridge (competition effect).** In this test, it is assumed that additional floorspace is made available in South Cambridgeshire and Cambridge, sufficient for an additional 10,000 jobs in these districts (combined). As for Sensitivity 1, the East Cambridgeshire floorspace growth is maintained, but employment growth is not forced to 10,000. This test therefore illustrates the effect of competition between East Cambridgeshire and other districts, and which will be most attractive to jobs – all other things being equal.

¹ Consequently, housing projects which are listed in the South Cambridgeshire Annual Monitoring Report as dependent on the A14 upgrade are excluded. This applies to development at Northstowe in excess of 1,500 dwellings, and the NIAB2 development north of Cambridge.

2.2.5 Summary of test scenarios:

- **'Base Case'** - current NTEM 6.2 based employment and household growth, with previous floorspace assumptions, roughly in line with previous 'Core Strategy' targets. This scenario was not constructed for this project but provides a useful benchmark, particularly when comparing model inputs.
- **'Local Plan Scenario'** – 10,000 extra jobs in East Cambs (constrained in model), plus floorspace and 8,699 dwellings
- **Sensitivity 1 – No District Employment Constraint** – As ECDC, but increase in total sub-regional employment is not constrained to East Cambs.
- **Sensitivity 2 – Competition from South Cambs and Cambridge** – As Sens1, but additionally with identical ABSOLUTE increase in floorspace for Cambridge+South Cambs. Tests impact of competition to attract employment.

2.3 LOCAL PLAN ASSUMPTIONS

2.3.1 This section of the report outlines the Local Plan development assumptions supplied to WSP by CCC, and describes how these were input to CSRM for testing.

Dwelling Assumptions

2.3.2 Assumptions on dwellings for the Local Plan Scenario test were supplied by Cambridgeshire County Council, showing growth in dwellings by Parish across the District. The total growth indicated was 5,340 dwellings by 2021, and 8,699 by 2031. Figure 2.2 below shows compares this development level with the NTEM 6.2 figures used in the Base Case. The DfT's NTEM 6.2 dataset uses dwelling growth derived from the East Cambridgeshire 2008/09 Annual Monitoring Report, with extrapolations for growth post-2021.

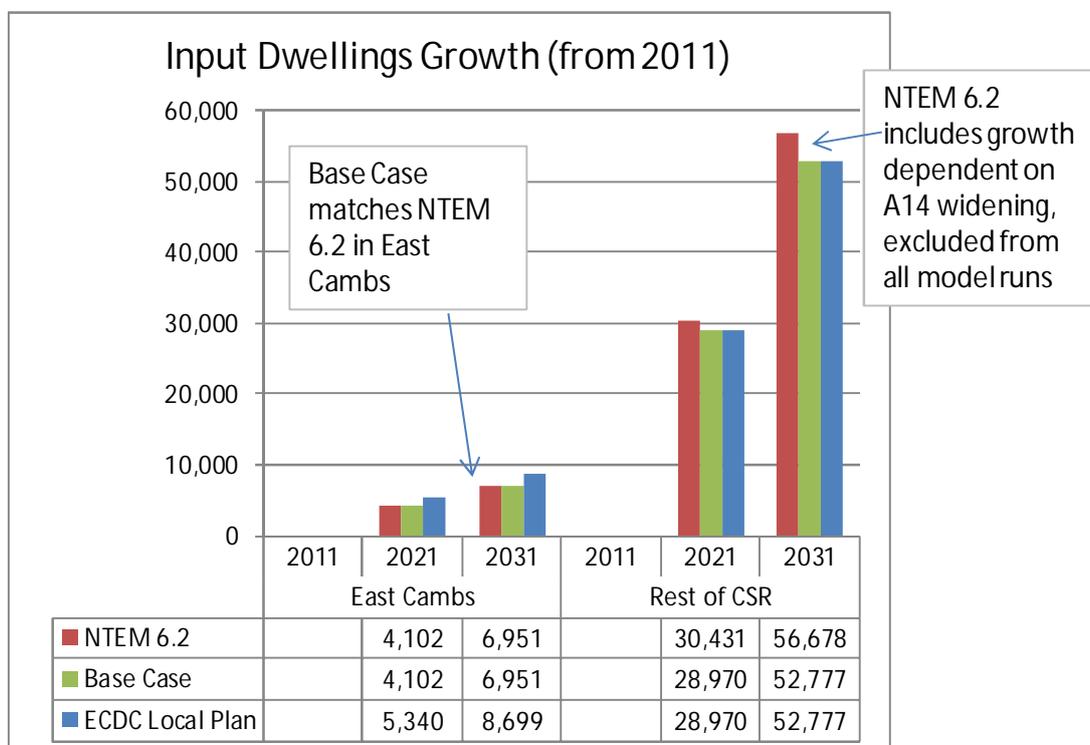


Figure 2.2 : Comparison of dwellings growth in East Cambs and rest of sub-region

2.3.3 Figure 2.3 below shows the resulting distribution of dwellings growth by Land Use zone CSRM once the parish-level data has been processed into the

model. This is compared with the Base Case, which demonstrates that the additional growth is focused mainly in Ely and the settlements to the immediate south and south-east of Ely. The total relative distribution of housing in East Cambridgeshire changes comparatively little through time: in 2011 74% of dwellings in East Cambridgeshire are outside the four wards of Ely; in 2031 in the Local Plan Scenario, this has fallen only slightly to 71%,

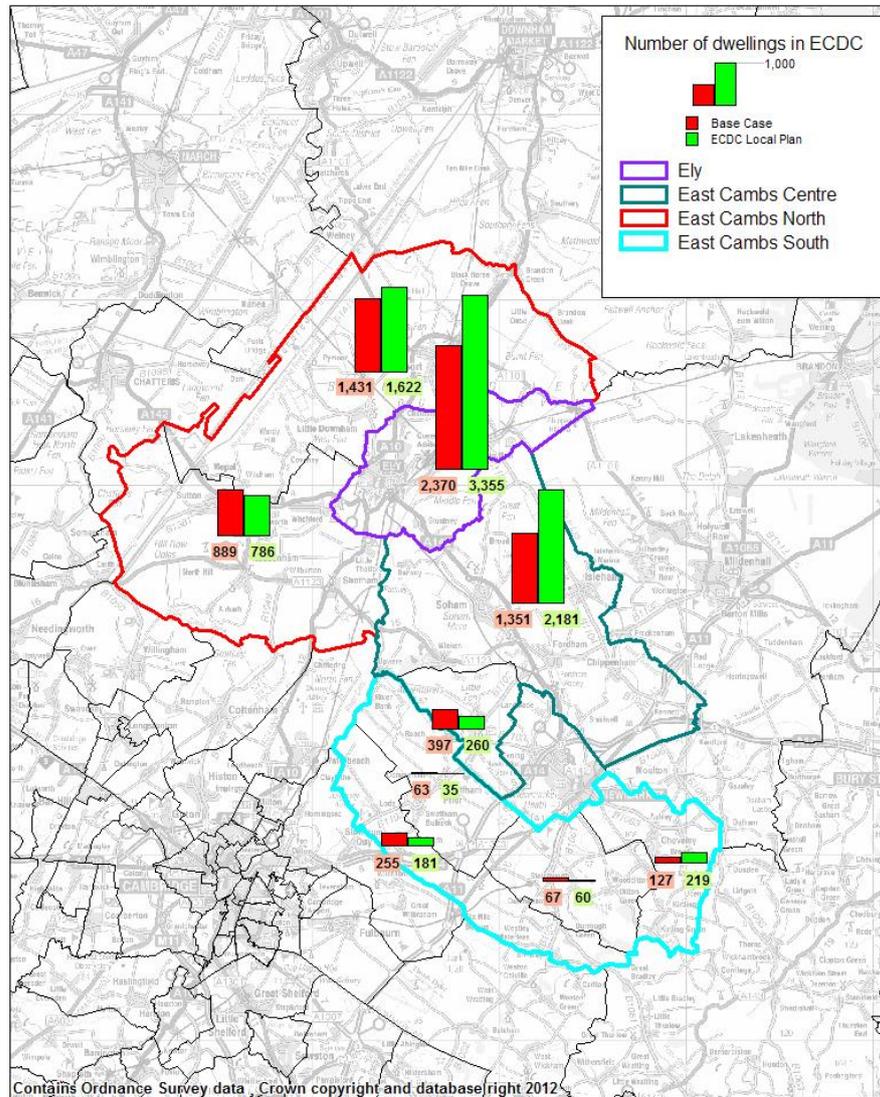


Figure 2.3 : 2011-2031 dwellings growth in East Cambridgeshire, comparing Local Plan Scenario with Base Case

COMMERCIAL FLOORSPACE ASSUMPTIONS

- 2.3.4 CSRMs represent employment using 9 separate industry classifications, 5 of which explicitly require floorspace to be available in order to locate in a specific zone – these are listed in Table 2.1 below. It is important to note that the floorspace types are specific to each industry (and vice versa). Hence ‘manufacturing’ floorspace can accommodate only that type of employment, and manufacturing jobs require appropriate floorspace to be available.
- 2.3.5 CCC provided a table listing the floorspace developments to be assumed across East Cambridgeshire, with sufficient space to accommodate 10,800 jobs. The information supplied is summarised in Table 2.2 below.

Table 2.1 CSRM Employment Industry and Floorspace categories

Industry	Floorspace	Comment
Agriculture	n/a	No floorspace required
Manufacturing	B2	Generally considered as traditional light/heavy manufacturing, with less emphasis on hi-tech.
Construction	n/a	No floorspace required
Warehouse/Transport	B8	Generally warehousing related, but can include transport firms (e.g. bus depots, garages)
Retail	A1	Both comparison and convenience retail considered together as one type
Office/Finance/Business	B1	All office based workers. High end R&D/manufacturing sometimes considered in this category due to similarity of workforce.
Education	n/a	Floorspace assumed to be provided with no 'market' mechanism, therefore not modelled.
Government	n/a	
Other (health, leisure)	D1, Sui Generis, Other	All uses not covered above.

Table 2.2 Commercial Developments to be assumed, supplied by CCC

Location	Use	Size	Recommended Jobs target (reduced)
West Neighbourhood Panel Area			
Elean Business Park	Datacentre	17ha	554
Haddenham Business Park Extension	B2	0.5ha	49
Additional small village sites	B1/B2	1ha (50% B1, 50% B2)	191
Ely Neighbourhood Panel Area			
Octagon Business Park	A1/B2	9ha	264
Station Gateway	B1	2.8ha	791
Potters Distribution site, Queen Adelaide	B2/B8	12ha (90% B8, 10% B1)	469
North Ely	B1/D1/Sui Generis	7.5ha (50% B1, 25% B2, 25% D1)	1330
Lancaster Way	B2,B8	40.4 ha (75% B8, 25% B2)	1973
Littleport Neighbourhood Panel Area			
Wisbech Road – land to north	B2, B8	7.4ha (75% B8, 25% B2)	361
Land to rear of Wisbech Rd petrol station	B1/B2	1.6ha (60% B1, 40% B2)	132
Land west of Woodfen Road	B2/B8	7ha (25% B2, 75% B8)	341
Mushroom Farm	Sui Generis	11ha	88
Soham and East Neighbourhood Panel Area			
East of bypass allocation	B2/B8	11ha (90% B8, 10% B2)	429
Eastern Gateway	B1/A1	0.58 hectares (90% B1, 10% A1)	132
Land opposite Turners	B2/B8	6.4ha (90% B8, 10% B2)	250
Land North of Snailwell Road	B2/B8	5.5ha (90% B8, 10% B2)	215
Isleham - site off Hall Barn Road	B2	0.5ha	49
Soham Station Hub	B1	1ha	282
North Soham	B2/B8/A1	2.5ha (proportions unclear)	220
Consideration of additional site allocations	B8/B2/B1	8.0 ha (50% B8, 40% B2, 10% B1)	669
South Neighbourhood Panel			
Land adjacent to Tunbridge Court, Bottisham	B1	0.5ha	142
Former D S Smith site , Burwell	B2	3ha	293
Reach Road, Burwell	B1,B2	2.5ha (80% B2, 20% B1)	337
Heath Road, Swaffham Prior	B2	0.8ha	78
Overall total		159.48 ha specific sites	10801

2.3.6 The future floorspace provision in CSRM for East Cambridgeshire was then constructed as follows:

- All existing floorspace growth assumptions for East Cambridgeshire were removed;
- The locations of the developments in Table 2.2 were identified, and the appropriate transport and land use zones recorded. Where no specific location was provided (e.g. 'additional small village sites') the space was distributed across relevant zones within the panel area.
- The total employment space to be provided in the district was converted into an appropriate amount of floorspace, using the existing ratio of sqm/job for the industry type within CSRM for East Cambridgeshire²;
- Within the Land Use model, the total employment floorspace was assumed to be delivered by 2031, assuming growth at a fixed rate from 2011 to 2031;
- For transport modelling purposes, the employment locations are 'zone-matched' down to transport zone level. For example, though the relevant Land Use Zone for Ely covers both Ely city centre AND some surrounding areas, the employment trip ends which are relevant to the city centre are correctly assigned there in the transport model.

2.3.7 Figure 2.4 to Figure 2.8 below summarise the resulting employment space made available in CSRM by industry type. Note that this is additional floorspace created between 2011 and 2031. The model allows for variations in density of floorspace occupation by zone, based on competition effects. Therefore zones with low demand for employment may ultimately have a lower number of jobs per sqm, whereas high demand areas would have a higher density.

2.3.8 Most notable in the comparison with the Base Case is that very little development was previously assumed outside Ely and its immediate area. The ECDC Local Plan data assumes that large commercial developments occur in most parts of the district. Notably there is considerable manufacturing developed to the north and south of Ely (Littleport, Soham, Fordham and Burwell). The western part of the district receives one major development: this is the Elean Business Park data centre development. There remains little or no development in the far south of the district (Bottisham, and areas around Newmarket).

² Note that the floorspace estimates provided by CCC were not directly used. This was because the estimates were frequently based on site area, not expected internal area to be provided. Using the existing CSRM ratios for the district allowed the precise amount of employment space to be input to the model.

ECDC Local Plan

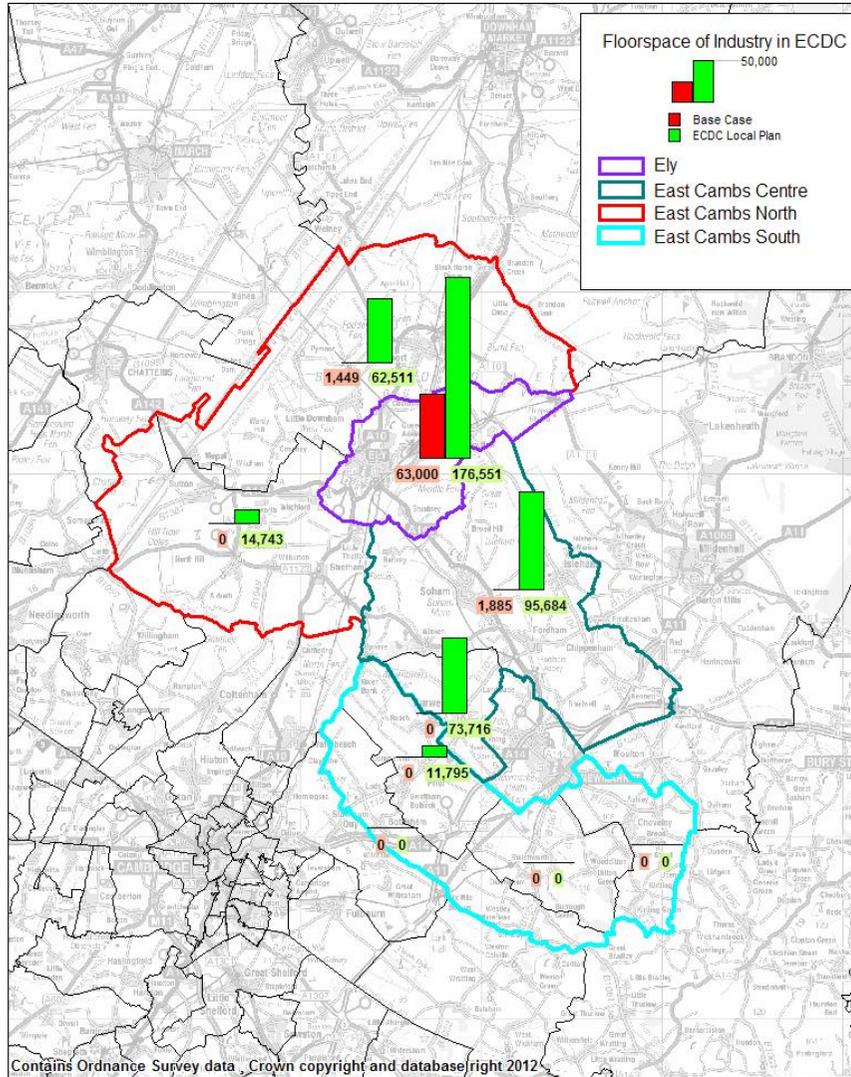


Figure 2.4: Manufacturing / Industrial Floorspace (sqm) in Base Case vs ECDC Local Plan Scenario (2011-2031 growth)

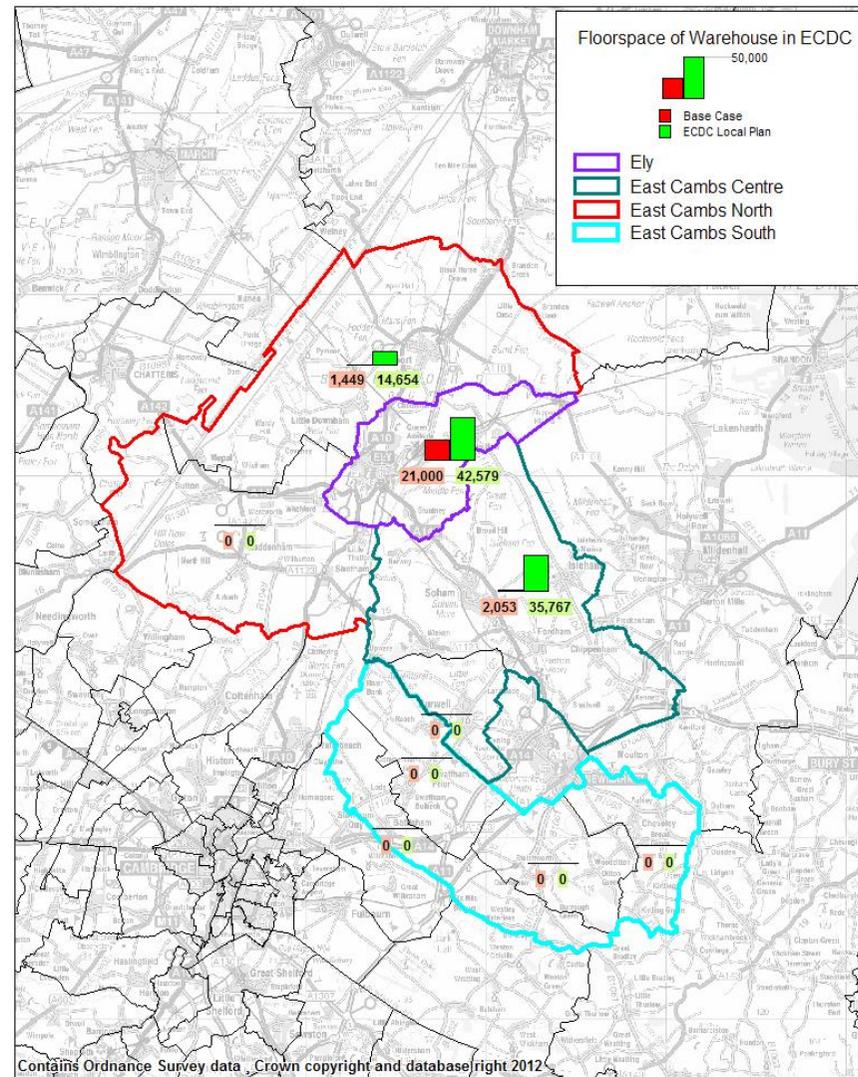


Figure 2.5: Warehouse/Transport Floorspace (sqm) in Base Case vs ECDC Local Plan Scenario (2011-2031 growth)

ECDC Local Plan

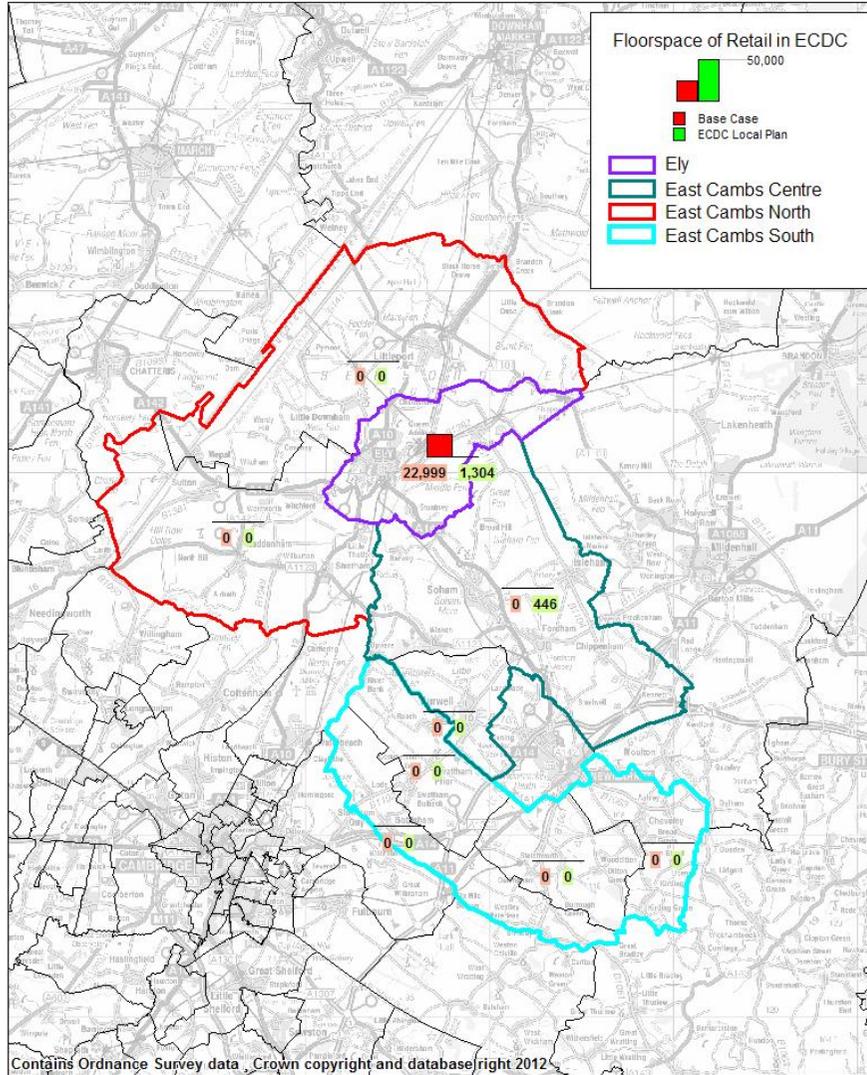


Figure 2.6: Retail Floorspace (sqm) in Base Case vs ECDC Local Plan Scenario (2011-2031 growth)

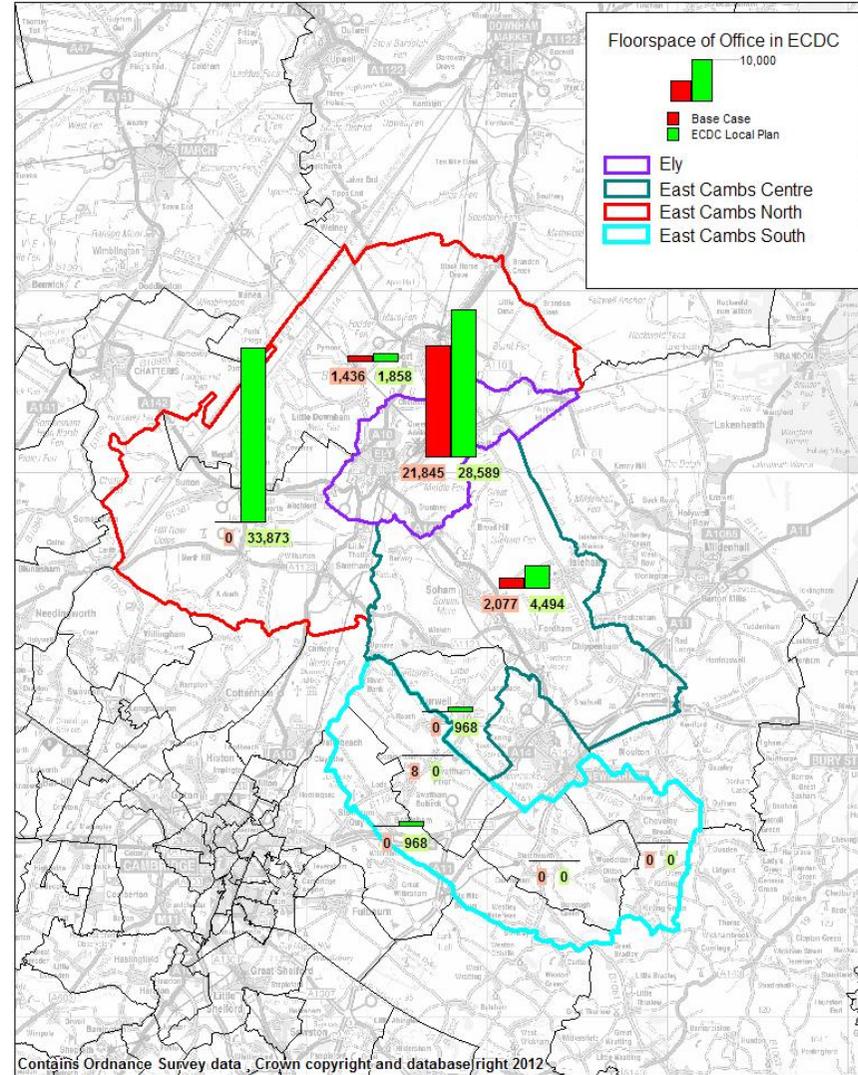


Figure 2.7: Office Floorspace (sqm) in Base Case vs ECDC Local Plan Scenario (2011-2031 growth)

ECDC Local Plan

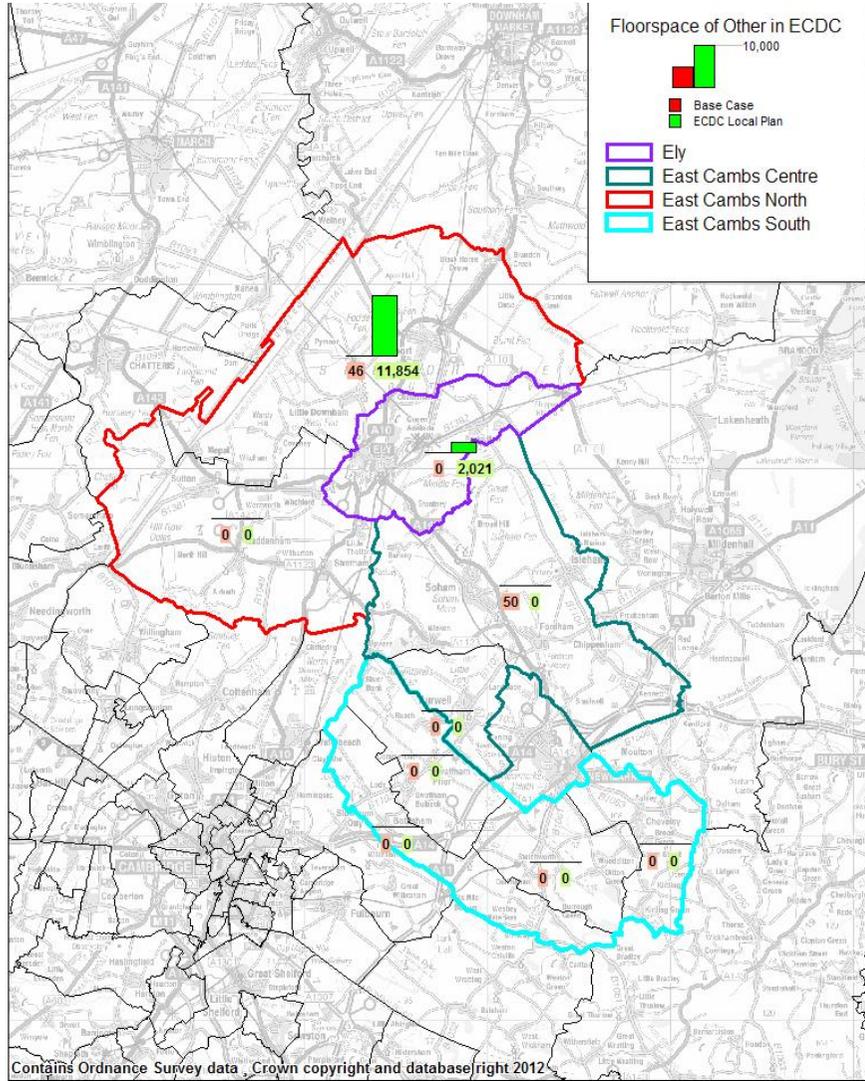


Figure 2.8: Other Floorspace (incl Health and Leisure) (sqm) in Base Case vs ECDC Local Plan Scenario (2011-2031 growth)

2.4 LAND USE RESULTS

Dwellings and Households

- 2.4.1 Table 2.3 below summarises the CSRМ projections of household growth. In this case, the figures provided are the number of **households** which occupy the **dwellings**. The total additional dwellings in East Cambridgeshire is 8,699 in each case, so that it can be seen that not all dwellings are occupied. This is not entirely unexpected: in the 2001 Census the ratio of households:dwellings in East Cambridgeshire was 0.97, equivalent to 3% of dwellings being unoccupied at any time.
- 2.4.2 The results of the Local Plan Scenario test show 8,128 additional households formed, or 93% of the dwellings delivered are occupied during this period. The over-supply is greater in the 'East Cambs Centre' area (see marked in maps above) where the figure is 88%. In the south of the district, where the additional supply is smallest in both absolute and proportional terms, there are slightly more households formed than dwellings delivered. This indicates a small undersupply of housing, leading to more shared households. Overall these figures lead to a small fall in the ratio of households:dwellings in East Cambridgeshire, with just over 4% vacant in 2031.
- 2.4.3 The proportion of the new households which are employed in the Local Plan Scenario is 68%: this is roughly in line with the balance in the model for 2011.
- 2.4.4 Comparison with the sensitivity tests is helpful in illustrating the importance of employment in attracting households. The sensitivities (which we will see in Table 2.5 below have lower employment growth), subsequently predict much lower levels of household growth, and within these households a lower rate of employment.

Table 2.3 : Growth in Households in 2011-2031 (CSRМ Outputs)

Growth in Households 2011-2031	ECDC	Sens1	Sens2
	ECDC Local Plan	w/o Empl Constraint	Increased Competition
East Cambs	+8,380	+7,816	+7,167
Ely	+3,527	+3,336	+3,129
East Cambs North	+2,337	+2,071	+1,889
East Cambs Centre	+1,977	+1,870	+1,611
East Cambs South	+539	+539	+538
Rest of CSR	+51,453	+52,019	+52,667
For East Cambs only:			
Hhlds per Dwelling	0.96	0.90	0.82
%age Employed Households	69%	66%	63%
Workers per Household	0.99	0.94	0.88

(All ratios based on CHANGE from 2011-2031)

Changes in Employment

- 2.4.5 The tables below analyse the changes in employment projected by the model. Note that in the Local Plan Scenario the growth in employment for certain sectors has been forced to the required level. These are the five sectors which require floorspace, and for which floorspace totals were supplied by CCC (see paragraph 2.3.4 above). The remaining sectors were allowed to change according to existing trends. As can be seen in Table 2.4 below, the growth in the sectors where floorspace was specified is ~10,600, primarily consisting of manufacturing and office-based jobs. This matches the levels specified for the test. However, because of the background trend of decreasing agricultural employment, the net change in ALL sectors is only 9,536.
- 2.4.6 Table 2.5 then illustrates how the growth varies in different parts of the district, and how the sensitivity runs compare. As would be expected, employment growth is greatest in Ely and to the north of the district. The sensitivities demonstrate that the 'forcing' of employment growth in the model is necessary to achieve the required growth levels: the total growth is below 8,000 jobs when no constraint is applied (Sensitivity 1). This leads to a lowering of density of occupation of the floorspace, and a fall in rents. In Sensitivity 2, where other districts contain additional floorspace, the employment growth in East Cambs falls still further. It should be noted that each of these tests assumes that sufficient floorspace to accommodate 10,000 jobs is delivered, which leads to oversupply of floorspace and lowering rents which will distort the true levels of competition with other districts.

Table 2.4 : Growth in all East Cambs Employment by Industry Sector (CSRM Outputs)

Change in East Cambs employment by sector	ECDC
	ECDC Local Plan
Floorspace required:	
Manufacturing	+5,015
Warehouse	+772
Retail	+750
Office	+3,670
Other: leisure&health	+436
Subtotal:	+10,643
Floorspace not required:	
Construction	-24
Education	-207
Government	+359
Agriculture	-1,235
Total all sectors	+9,536

Table 2.5 : Growth in Employment 2011-2031 (CSRM Outputs)

Growth in Employment (2011-2031, all sectors)	ECDC	Sens1	Sens2
	ECDC Local Plan	w/o Empl Constraint	Increased Competition
East Cambs	+9,536	+7,916	+5,957
Ely	+4,200	+3,840	+3,233
East Cambs North	+3,081	+2,230	+1,713
East Cambs Centre	+2,438	+2,191	+1,443
East Cambs South	-183	-345	-431
Rest of CSR	+43,974	+45,112	+47,071
For East Cambs only:			
Employed Residents per Job	0.87	0.93	1.06

(All ratios based on CHANGE from 2011-2031)

**Table 2.6 : Comparison of growth in workers
(=employed residents) and jobs in each area**

Growth in Workers and Jobs 2011-2031	2031 ECDC Local Plan vs 2011		
	Workers	Jobs	Balance
East Cambs	8,258	9,536	+1,278
Ely	4,240	4,200	-40
East Cambs North	2,199	3,081	+881
East Cambs Centre	1,574	2,438	+864
East Cambs South	244	-183	-427
Rest of CSR	21,696	18,897	-2,799

2.4.7 Finally, Table 2.6 shows the difference between growth of workers (residents of the district who are employed) and the number of jobs. It is important to note that East Cambridgeshire is currently a net exporter of workers – i.e. there are more workers living in the District than jobs available. The table illustrates that in the Local Plan Scenario this situation improves: over 1,200 more jobs are created than workers coming to live in the District. This improves the balance, though the situation remains one of net out-commuting.

2.4.8 It is important to note however that this improved balance between jobs and workers occurs only in the central and northern areas of the district. This reflects the patterns of employment and housing proposed for the Local Plan, with a much greater emphasis than previously on employment growth in outside Ely.

2.5 TRANSPORT DEMAND AND MODE CHOICE

2.5.1 The land use outputs from CSRM are used by the model to determine numbers of trips, by origin, destination and mode. CSRM includes a representation of the transport network including the sub region wide SATURN Highway Model, public transport, walk and cycle links. It should be noted that the East Cambridgeshire transport infrastructure is represented with less detail than for other parts of the sub-region, reflecting the less detailed zoning already noted. This leads to some important caveats, particularly concerning highway congestion impacts, which are mentioned below.

2.5.2 The results presented here therefore represent CSRM's best estimates of travel volumes, mode choice and some indication of impacts on car travel speed. This is having made the assumption that employment and household growth in the district are achieved as set out in section 2.4 above.

- 2.5.3 Table 2.7 shows the overall growth in trips by car, public transport and active modes (walk & cycle), breaking down (a) the trips to/from East Cambridgeshire, and (b) the broad pattern of trips within East Cambridgeshire. **NOTE: In CSRM, the AM peak represents the period 7am-10am, hence absolute figures given are for a 3 hour period. Also, these are person trips.**
- 2.5.4 This shows that the growth in trips to/from destinations outside East Cambridgeshire, whilst not insignificant, is very much smaller than the growth in trips WITHIN East Cambridgeshire. Note that the rise in trips to Cambridge and South Cambridgeshire is not insignificant, with a ~10% rise in each case. However, in absolute and percentage terms the rise in internal trips is much more significant. As might be expected, this increase is dominated by car trips (a total rise of 4,281 AM peak trips, or 24%), and active modes (walk and cycle, rising by 3,290 trips or 19%). The combination of a rise in both car and amodes suggests a high number of very short trips, the significance of which is discussed below.
- 2.5.5 It is also worth noting that there are large increases in trips attracted TO the district, with a net rise of 2,200 AM car trips into the district. This reflects the fact that the increased employment in the district will attract in-commuting trips from other areas, though the extent of this may depend on corresponding Local Plan development in those other districts.

Table 2.7 a+b: Growth in AM (7am-10am) peak trips for ECDC Local Plan Scenario (2011-2031)

Growth by Mode in AM Trips to/from East Cambs		Additional Growth (ECDC Local Plan vs 2011)					
		Percentage (growth from 2011)			Absolute		
		Car	PT	Active	Car	PT	Active
From EC To	Cambridge City	11%	7%	22%	573	106	34
	South Cambs	10%	29%	-1%	442	96	-1
	Huntingdonshire	1%	20%	-2%	17	3	-0
	East Cambs	24%	15%	19%	4,281	238	3,290
	Fenland	18%	31%	-25%	124	19	-1
	Other External	5%	12%	2%	325	97	9
To EC From	Cambridge City	41%	19%	31%	476	50	13
	South Cambs	18%	2%	11%	425	4	10
	Huntingdonshire	4%	-1%	-6%	59	-0	-1
	East Cambs	24%	15%	19%	4,281	238	3,290
	Fenland	17%	-6%	-22%	234	-8	-6
	Other External	25%	-3%	-6%	1,038	-9	-10

Trips within East Cambs		Additional Growth (ECDC Local Plan vs 2011)					
		Percentage (of 2011)			Absolute		
		Car	PT	Active	Car	PT	Active
Ely to	Ely	46%	n/a	41%	574	0	924
	Other East Cambs	49%	62%	62%	826	104	927
Other to	Ely	9%	4%	15%	180	23	219
	Other East Cambs	21%	13%	10%	2,701	111	1,221

Note: PT includes all public transport modes; Active modes comprise walking and cycling. All sub-modes are separately modelled.

2.5.6 Table 2.8 shows how the changes in trip volumes by mode will affect mode share and car journey speed over time. There is not any great change predicted in mode shares: some increase in general car mode share appears to occur for trips to East Cambridgeshire, and trips within the district. This may be caused partly by trends increasing car ownership. However, comparison with the Base Case run has shown that at least part of the shift is unique to the ECDC Local Plan Scenario run. The change in distribution of housing and employment is clearly a contributing factor: as locations of housing and employment become more dispersed car modes are more frequently chosen.

2.5.7 The projected fall in car speeds illustrates the extent of the increase in congestion anticipated. The impact is much greater than in the previously modelled Base Case scenario. Note that no speed change is shown for Ely-Ely trips simply because CSRM does not represent congestion on trips within individual transport zones. This is important when considering other internal movements: it is very likely that there will in reality be increases in road congestion arising from this plan which are not reflected in the model. The implications of this are discussed in more detail in section 2.6 below.

Table 2.8 a+b: Change in mode share from 2011-2031, and car speed (congestion)

Total Mode Share and Change from 2011		2031 ECDC Local Plan			Change from 2011			Change in car speed (%age fall)
		Car	PT	Active	Car	PT	Active	
From EC To	Cambridge City	76%	22%	3%	0%	-1%	0%	-17%
	South Cambs	90%	8%	2%	-1%	1%	0%	-17%
	Huntingdonshire	98%	1%	1%	0%	0%	0%	-17%
	East Cambs	50%	4%	46%	1%	0%	-1%	-14%
	Fenland	91%	9%	0%	-1%	1%	0%	-10%
	Other External	83%	11%	5%	0%	1%	0%	-6%
To EC From	Cambridge City	82%	16%	3%	2%	-2%	0%	-6%
	South Cambs	89%	7%	3%	1%	-1%	0%	-9%
	Huntingdonshire	98%	1%	1%	0%	0%	0%	-12%
	East Cambs	50%	4%	46%	1%	0%	-1%	-14%
	Fenland	92%	7%	1%	2%	-2%	-1%	-7%
	Other External	92%	6%	3%	2%	-1%	-1%	-6%

Total Mode Share and Change from 2011		2031 ECDC Local Plan			Change from 2011			Change in Speed
		Car	PT	Active	Car	PT	Active	
Ely to	Ely	36%	0%	64%	1%	+0%	-1%	0%
	Other East Cambs	48%	5%	47%	-2%	0%	2%	-22%
Other to	Ely	49%	14%	37%	-1%	-0%	2%	-15%
	Other East Cambs	52%	3%	45%	2%	0%	-2%	-12%

Note: PT includes all public transport modes; Active modes comprise walking and cycling. All sub-modes are separately modelled.

2.6 IMPACT OF INTRA-ZONAL MOVEMENTS

2.6.1 As noted above, there is an important caveat on the CSRM transport demand results, arising from the fact that local congestion may not be fully represented. The CSRM SATURN model contains only a relatively simplified highway network for East Cambridgeshire, and represents demand based on reasonably large zones (see figures in section 2.7 below and Figure 2.1 in section 2.1 above). This is a necessary limitation within a county-wide model, but restricts the ability of CSRM to account for congestion caused

by the build up of traffic on roads within zones.

2.6.2 The ECDC Local Plan scenario leads to very high growth in local trips in the rural areas of the District. In reality this is very likely to lead to congestion which is not represented in the model. Hence the congestion itself - and the restraining effect it can have on behaviour and growth - are likely to be under-estimated. This may mean that in reality traffic would grow less and other behaviours would arise – this is described in more detail below.

2.6.3 The impact will be that road trips entirely within zones (e.g. within settlements such as Ely or Littleport, or between settlements such as Wilburton and Haddenham which lie in a single zone) will not be impacted by congestion. For most future scenarios, the demand for 'local' trips would not be expected to grow to such an extent that such short trips would impact on highway congestion. However, within the current model results there is clear risk that this is occurring.

2.6.4 For this reason, the estimates of the speed decrease in Table 2.8 should be considered a conservative estimate, given the volume and patterns of future transport demand predicted.

2.6.5 The lack of a congestion-response for intra-zonal trips may also have influenced the transport demand and land use elements of the model. This may arise because the true costs of making local highway trips are not represented, and therefore living and working locally, and driving to work, are seen as too attractive.

2.6.6 If local congestion costs were fully represented, then overall congestion would increase further (and hence speeds would decrease more than in Table 2.8). This would lead to one or more of the following effects:

- Increased congestion levels would lead to a shift in journey modes for short trips, likely to walking or cycling;
- Trips would lengthen, if individuals ceased to find working locally comparatively attractive;
- Public transport patronage would tend to increase, including rail trips to Cambridge;
- Housing and employment growth may be constrained by the accessibility issues caused by local congestion.

2.6.7 These are 'real world' effects which should also be exhibited within the model should congestion increases be represented, see further work in section 5.3.

2.7 HIGHWAY NETWORK ANALYSIS

2.7.1 This section presents SATURN County Highway model outputs, using the CSRM Local Plan Scenario tests, and comparing against the 2011 Base model run.

2.7.2 Figure 2.9 and Figure 2.10 shows the change in highway flows between 2031 Local Plan Scenario and 2011 Base during morning peak and evening peak respectively.

2.7.3 Within this analysis, the absolute changes in highway flows are shown. Given the very high base flows on roads to the south (e.g. A14 and A428), the changes in flows in East Cambridgeshire stand out less.

2.7.4 The green bars represent increase in flow and the blue bars decreases. Whilst there are considerable increase on links close to Cambridge, the increases in flows close to Ely are smaller. Increase in flows can be seen along A10 and A142, the major feeder roads for Ely. The A10 route is already near to capacity at current day traffic volumes, hence the change in actual flows recorded is not unsurprising. There is a larger increase in the flow heading towards Cambridge than away from it. There is growth in movements through the A142

corridor generally.

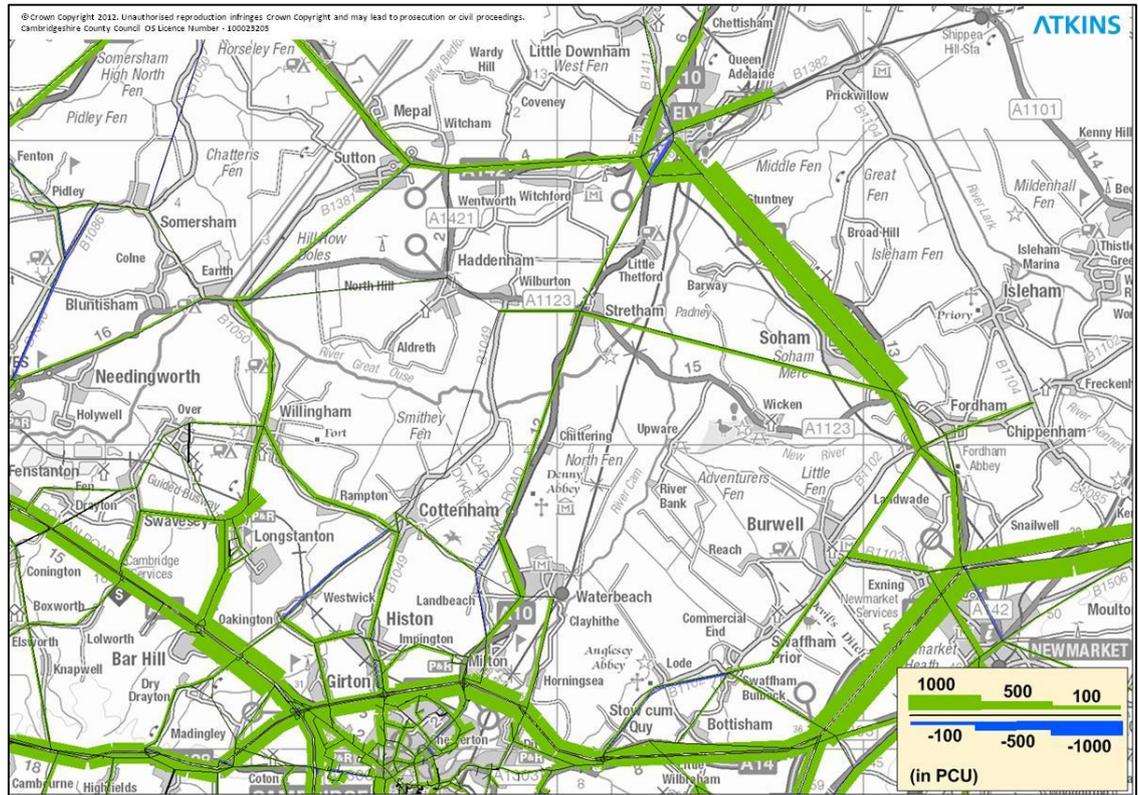


Figure 2.9 CSRM - Changes in highway link flow in the Morning Peak

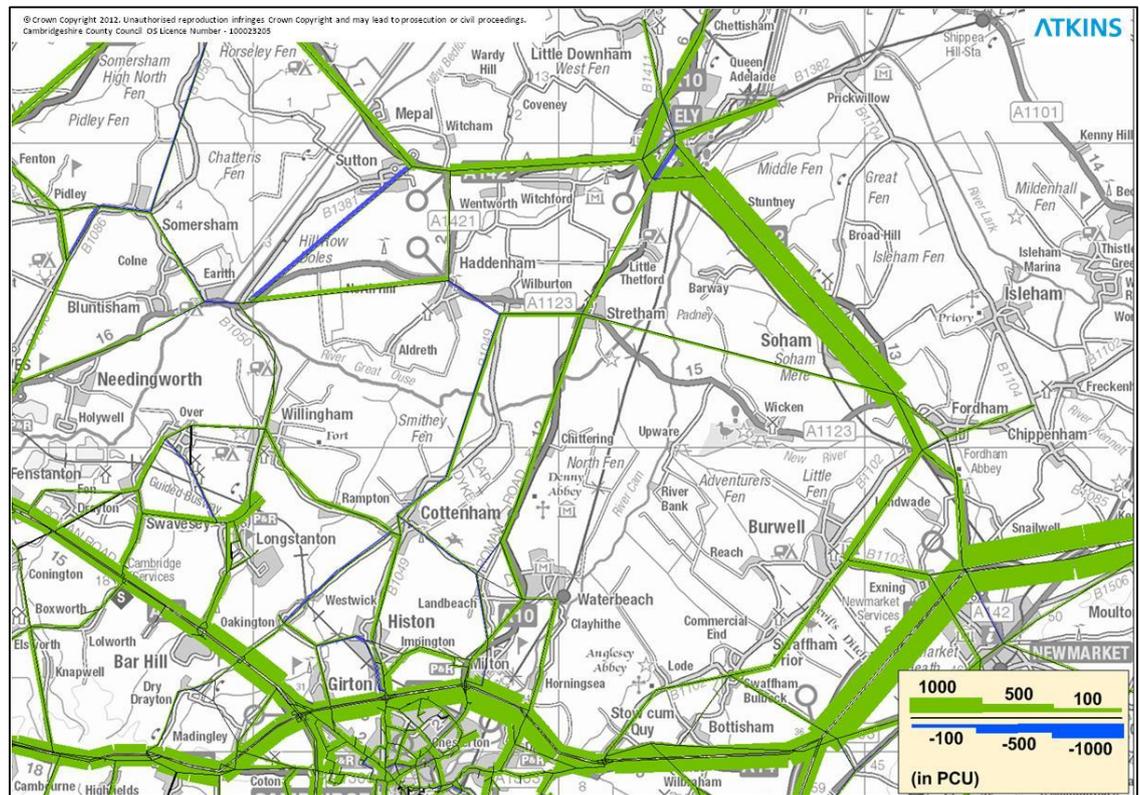


Figure 2.10 CSRM - Changes in highway link flow in the Evening Peak

2.8 JOURNEY TIMES

2.8.1 Modelled journey times between Ely to Cambridge and Ely to Huntingdon have been used to analyse the impact of the developments considered in 2031 Local Plan Scenario. A comparison of the journey time for the 2011 Base Year and 2031 Local Plan scenarios are provided in Table 2.9.

Table 2.9 CSRM - Journey Time Summary

Routes	Morning Peak (0800-0900)			Evening Peak (1700-1800)		
	2011 Base (mm:ss)	2031 Local Plan Scenario	Change from 2011	2011 Base	2031 Local Plan Scenario	Change from 2011
Route 1: A10 Ely to Cambridge	39:51	50:20	26%	25:07	29:58	19%
Route 1: A10 Cambridge to Ely	24:13	25:50	7%	33:33	42:23	26%
Route 2: A142 Ely to Huntingdon	50:34	62:17	23%	42:13	54:08	28%
Route 2: A142 Huntingdon to Ely	36:29	43:14	19%	47:51	54:32	14%
Route 3: A142 Ely to Newmarket	21:35	28:31	34%	20:05	23:17	16%
Route 3: A142 Newmarket to Ely	20:57	21:24	7%	21:38	29:47	39%

2.8.2 Table 2.9 shows the increases in journey times between Ely to Cambridge in the AM peak are considerable given the minor changes in flow recorded, indicating a route that is very congested. Likewise in the PM peak, in the reverse direction there are comparable percentage increases in journey times. The reverse direction from Cambridge to Ely in the AM peak shows reasonable stability indicating there may be capacity available for movements in the northbound direction. Congestion generally will increase, as shown by the increases in journey times predicted on the routes from Ely to Huntingdon, although the increases are not as pronounced as the A10 journey times.

2.9 SUMMARY

- CSRM has been used to test the strategic development impacts and transport movements related to the ECDC Local Plan growth levels.
- CSRM includes only a high level representation of East Cambridgeshire, which should be considered alongside the more detailed Ely Transport Model results.
- The ECDC Local Plan scenario will lead to much more growth in employment outside Ely than previously projected.
- This change in development patterns will lead to a very significant growth in car trips within the district: 24% more AM peak trips between 2011 and 2031, with the majority of these taking place outside Ely.
- Traffic speeds would be expected to fall significantly, by as much as 17% for trips between East Cambridgeshire and other parts of the sub-region, and 14% within East Cambridgeshire. For specific routes tested in SATURN, there

- may be more extreme changes: AM journey times from Ely to Cambridge increase by 26%.
- However, CSRM does not represent congestion on local roads, which may mean this is an under-estimation of congestion effects.
 - The absence of local congestion in the model may have led to an over-emphasis on the growth of short car trips. In reality, this local congestion may lead to longer car trips, mode shift from car to walking/cycling, or lower levels of development if residents and employers are discouraged from locating in the District.
 - Sensitivity tests show that if employment growth is lower than targeted, then this will lower demand for housing, particularly in areas outside Ely.
 - Furthermore, competition with Cambridge and South Cambridgeshire employment sites has potential to lower jobs growth in East Cambridgeshire.

3 Ely Traffic Model

3.1 INTRODUCTION

3.1.1 The ETM provides a more detailed simulation of the highway network in the built up area of Ely and a corresponding finer detailed transport zoning system.

3.1.2 The ETM is essentially independent of the more strategic Cambridge Sub Regional Model and their forecasting methods follow differing procedures. Because the level of zoning and network detail of the two models is different it is difficult to integrate the two approaches, however CSR, has been used to supply the ETM with strategic trip distributions for the Local Plan allocations in Soham, Littleport and Witchford.

3.1.3 The derivation of the ETM trip generation for the development allocations is covered in Appendix A to this report and follows the same procedure as adopted for the earlier Local Development Framework tests.

3.1.4 This chapter reviews the overall trip generation predicted by the forecasting model and reports the results in terms of travel demand, journey time and junction impacts of the forecast growth

3.2 SUMMARY OF DEMAND FORECASTING

3.2.1 The forecast year matrices for Core Strategy Scenario and Local Plan Scenario has been built by adding the corresponding development demands assumed and background growth distributed, as described in Appendix A, to that of the base matrix by purpose and by time period.

3.2.2 Table 3.1 and Table 3.2 summarises morning and evening peak matrix totals by purpose for 2011 Base year, 2031 Core Strategy Scenario and 2031 Local Plan Scenario respectively.

Purpose	2011 Base Year	2031 Core Strategy Scenario	2031 Local Plan Scenario
Commute	3,702	4,942	5,762
Education	1,055	1,135	1,190
Employers Business	1,042	1,353	1,797
Others	1,069	2,331	2,371
Heavy Vehicles	712	1039	1,123
All Purpose	8,180	10,800	12,274

Table 3.1 – ETM Morning Peak Matrix Totals

Purpose	2011 Base Year	2031 Core Strategy Scenario	2031 Local Plan Scenario
Commute	3,397	4,304	5,088
Education	290	306	323
Employers Business	1,249	1,569	1,912
Others	2,865	4,149	4,497
Heavy Vehicles	418	667	620
All Purpose	8,220	10,996	12,440

Table 3.2 – ETM Evening Peak Matrix Totals

3.3 RESULTS

Highway Demand

3.3.1 A two-sector system as shown in Figure 3.1 has been developed to analyse the change in demand. Ely City centre is defined as one sector and rest of the modelled area is defined as the second sector. Table 3.3 summarises the highway demand in the Ely sectors. The highway demand between base year (2011) and forecast year (2031) has increased by 32% in Core Strategy Scenario and by 51% in Local Plan Scenario during morning peak. In the evening peak the corresponding growth is 35% for the Core Strategy and 53% for the Local Plan allocations.

2x2 Sector Matrix		2011 Base			2031 Core Strategy Scenario			2031 Local Plan Scenario		
		Destination			Destination			Destination		
		Ely	Rest of Model	Total	Ely	Rest of Model	Total	Ely	Rest of Model	Total
Morning Peak Hour										
Origin	Ely	467	1,571	2,038	664 (42%)	2140 (36%)	2804 (38%)	709 (52%)	2205 (40%)	2914 (43%)
	Rest of Model	1,852	4,189	6,041	2207 (19%)	5692 (36%)	7899 (31%)	2448 (32%)	6826 (63%)	9274 (54%)
	Total	2,319	5,760	8,079	2871 (24%)	7832 (36%)	10704 (32%)	3157 (36%)	9031 (57%)	12188 (51%)
Evening Peak Hour										
Origin	Ely	625	1,520	2,145	944 (51%)	1975 (30%)	2919 (36%)	1107 (77%)	2087 (37%)	3194 (49%)
	Rest of Model	2,018	3,899	5,917	2691 (33%)	5233 (34%)	7924 (34%)	2725 (35%)	6382 (64%)	9107 (54%)
	Total	2,643	5,419	8,062	3635 (38%)	7208 (33%)	10844 (35%)	3832 (45%)	8469 (56%)	12301 (53%)

*The figure in bracket indicates the percentage difference between the 2031 forecast scenario and Base

Table 3.3: Highway demand sector matrices in pcu

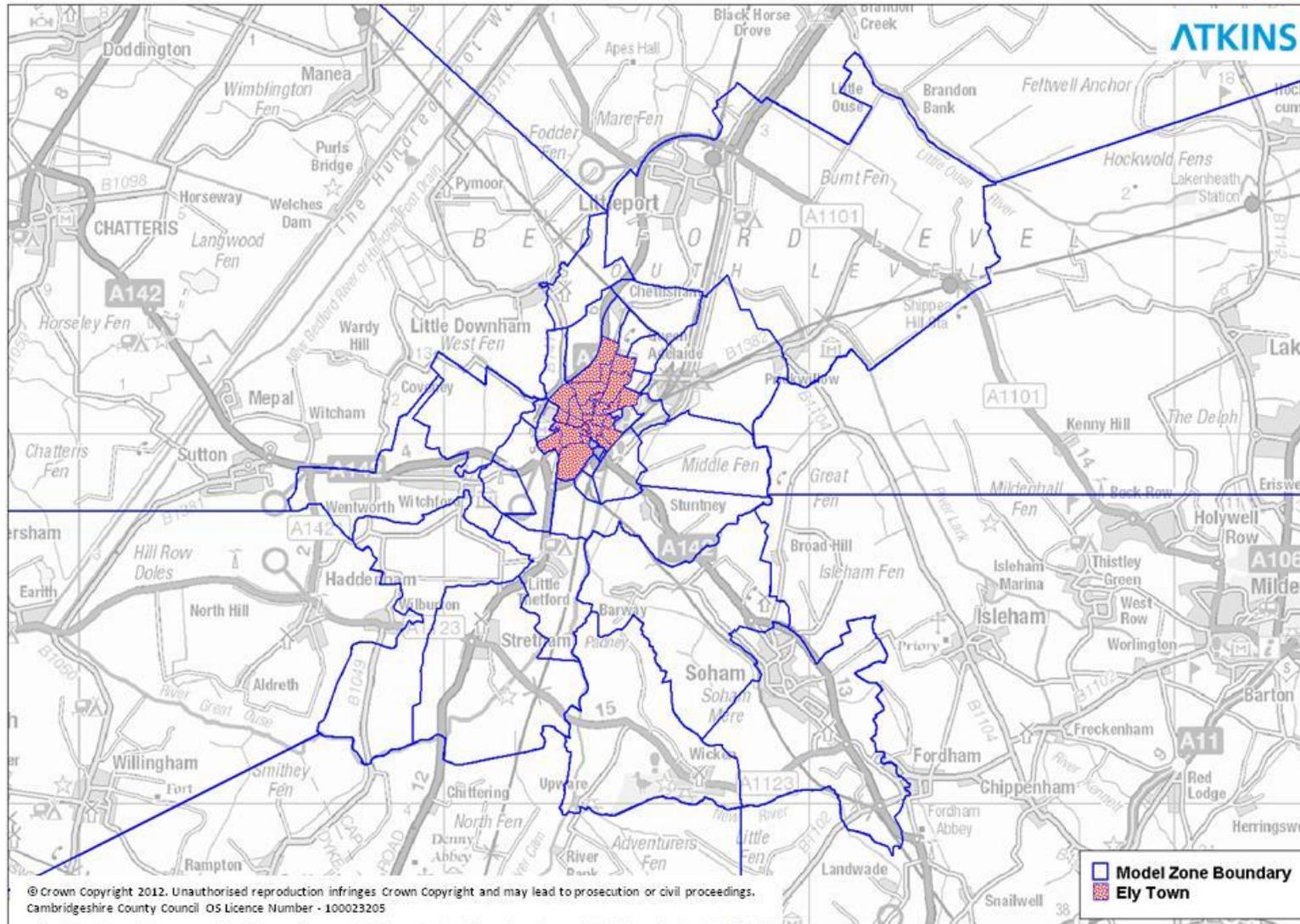


Figure 3.1: ETM Zone Plan

3.3.2 Average speed, Trip Distance and time

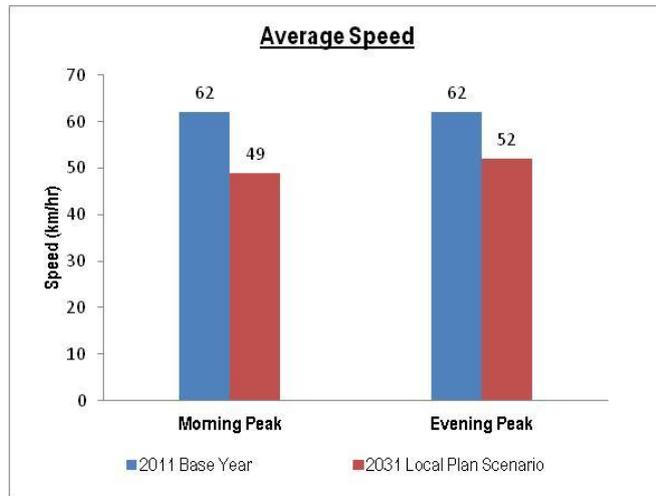


Figure 3.2: Comparison in average speed (km/h) 2011 against 2031 Local Plan scenario

3.3.3 Figure 3.2 shows the impact of developments upon the average speed of vehicles on highway network between 2011 and 2031. There will be a fall of around 10 km/hr in each time period. This reduction in average speed reflects rises in congestion due to the increase in the highway demand.

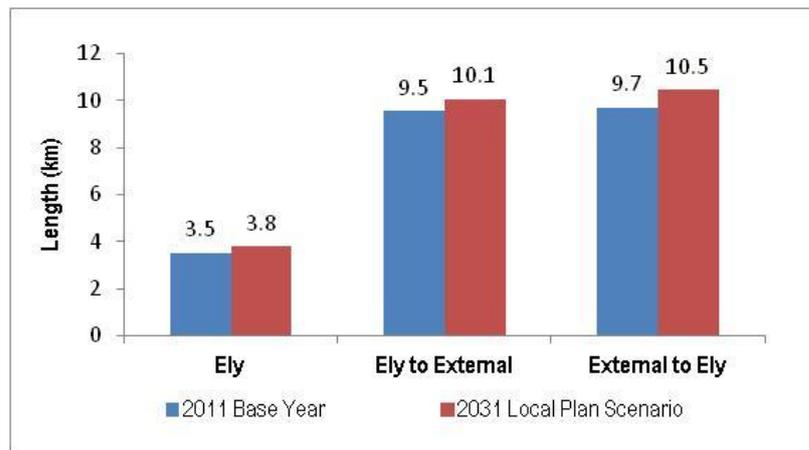


Figure 3.3: Average Trip length (km) distribution – Morning Peak

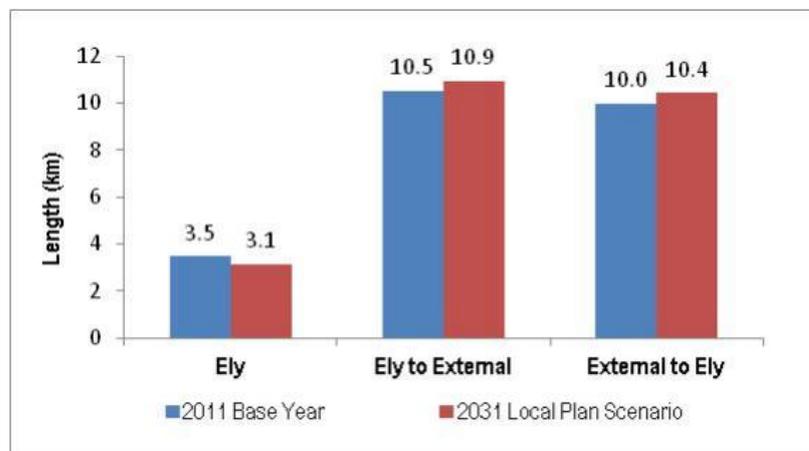


Figure 3.4: Average Trip length (km) distribution – Evening Peak

3.3.4 Figure 3.3 and Figure 3.4 shows the average length of trips within and to/from Ely town. These trip lengths are broadly stable up to 2031. There is a slight reduction in trip lengths for trips within Ely in the PM peak which may be reflecting the greater number of shorter distance (particularly retail) trips within the afternoon assignment.

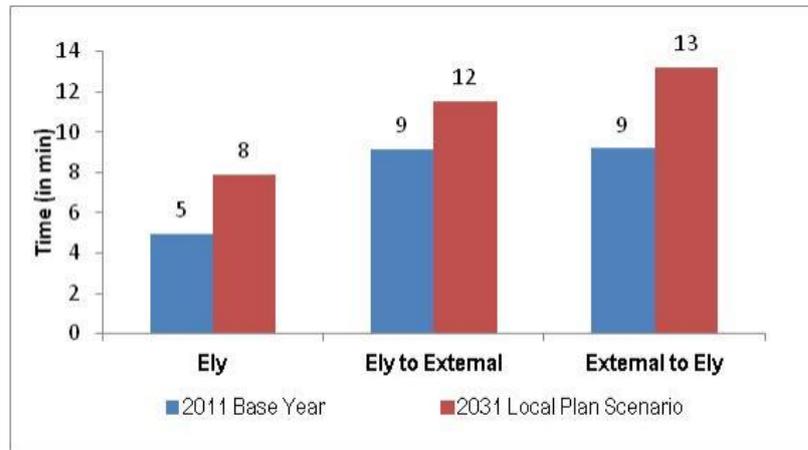


Figure 3.5: Average Trip Time (minutes) – Morning Peak

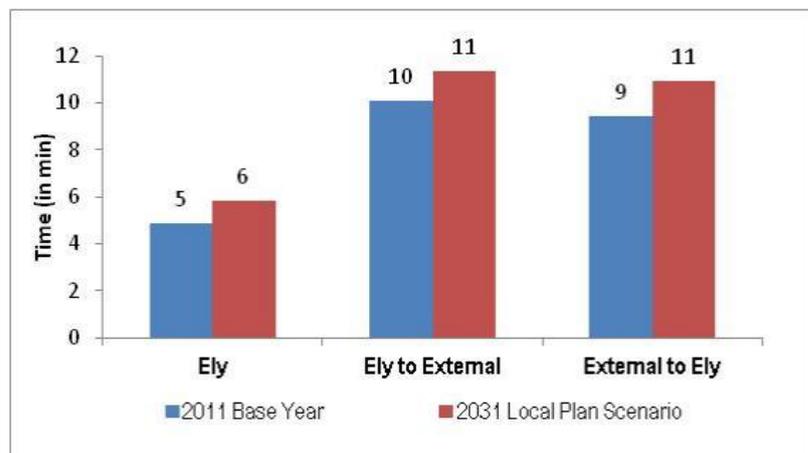


Figure 3.6: Average Trip Time (minutes) – Evening Peak

3.3.5 Figure 3.5 and Figure 3.6 shows the average time taken for a trip. The average travel time will go up by 3 minutes during morning peak and by 1 min during evening peak. The increase in average travel time is a consequence of increased congestion on the highway network.

3.3.6 Highway Network Analysis

3.3.7 Table 3.4 summarises the highway network statistics of 2011 Base and 2031 Local Plan Scenario. The forecast model shows that the total travel distance, total travel time and total delay for Ely will increase in both Morning and Evening peaks. The increase in demand, as discussed in previous sections, means more car trips in Ely, therefore increase in the total travel distance and total travel time. The increase in total delay time shows the scale of congestion in local network because of increased demand.

Highway Network Statistics	Morning Peak Hour		Evening Peak Hour	
	2011 Base	2031 Local Plan Scenario	2011 Base	2031 Local Plan Scenario
Total Travel Distance (pcu km)	72921	103843 (42%)	72562	97967 (35%)
Total Travel Time (pcu hr)	1170	2124 (81%)	1161	1876 (61%)
Total Delay (pcu hr)	92	544 (490%)	87	376 (332%)

*The figure in bracket indicates the percentage difference between the 2031 Local Plan Scenario and 2011 Base

Table 3.4: Highway network statistics

3.3.8 Highway Trip assignments

3.3.9 The increase in highway demand due to new developments results in increased flow along all the major roads in Ely. Figure 3.7a and Figure 3.8a shows the change in highway flow between 2031 Local Plan Scenario and 2011 Base as variable bandwidths for the morning peak and evening peak respectively. Figures 3.7b and 3.8b give the absolute values for a selection of links centred around Ely.

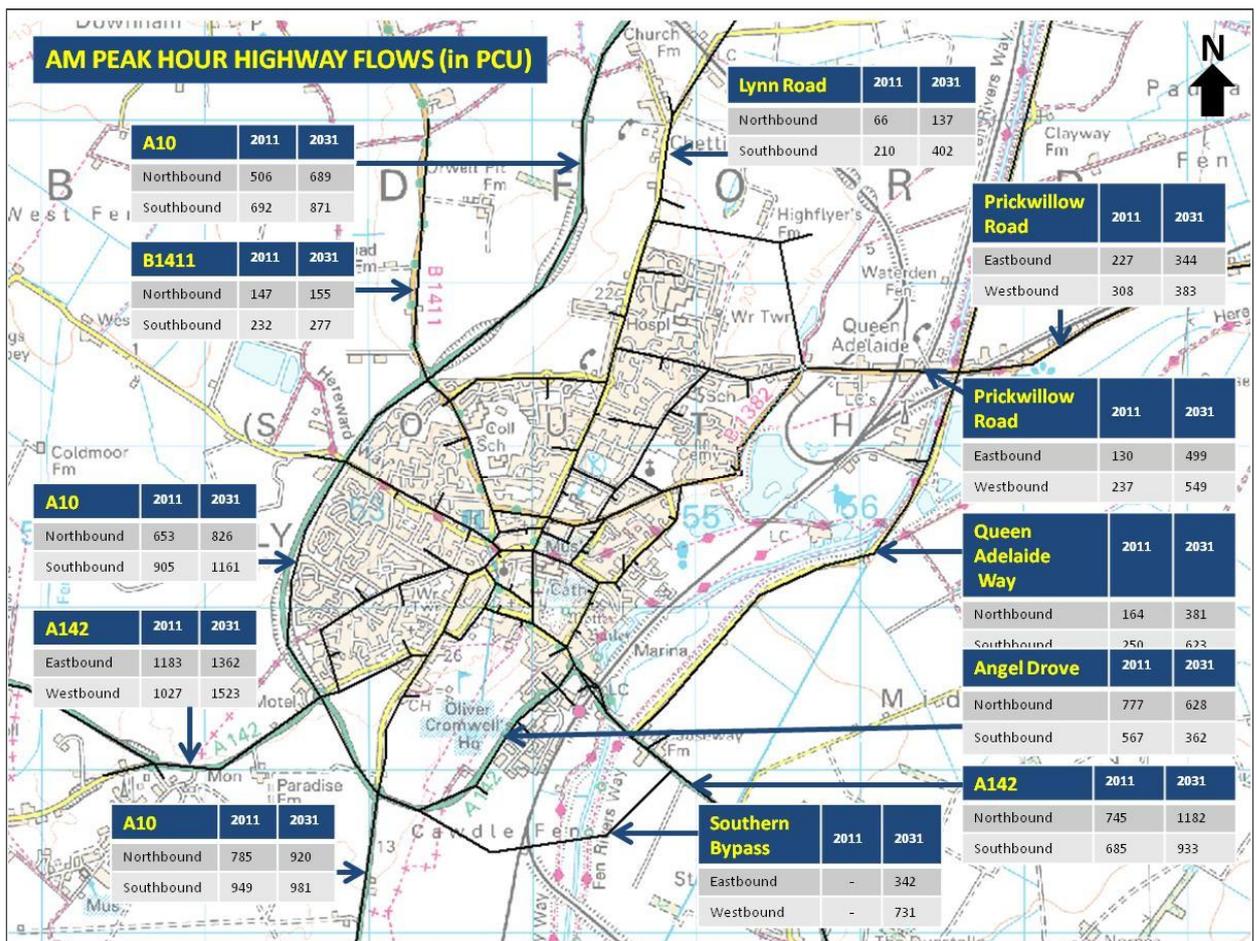
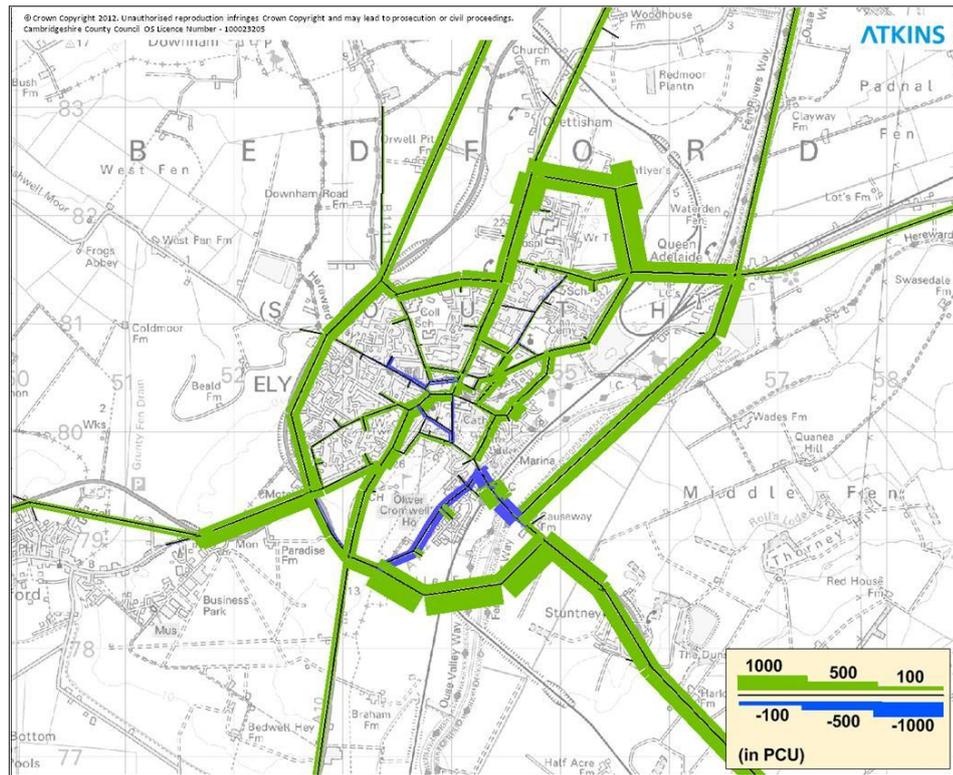


Figure 3.7a and 3.7b: Changes in highway link flow (in pcu) in the Morning Peak between 2031 and 2011

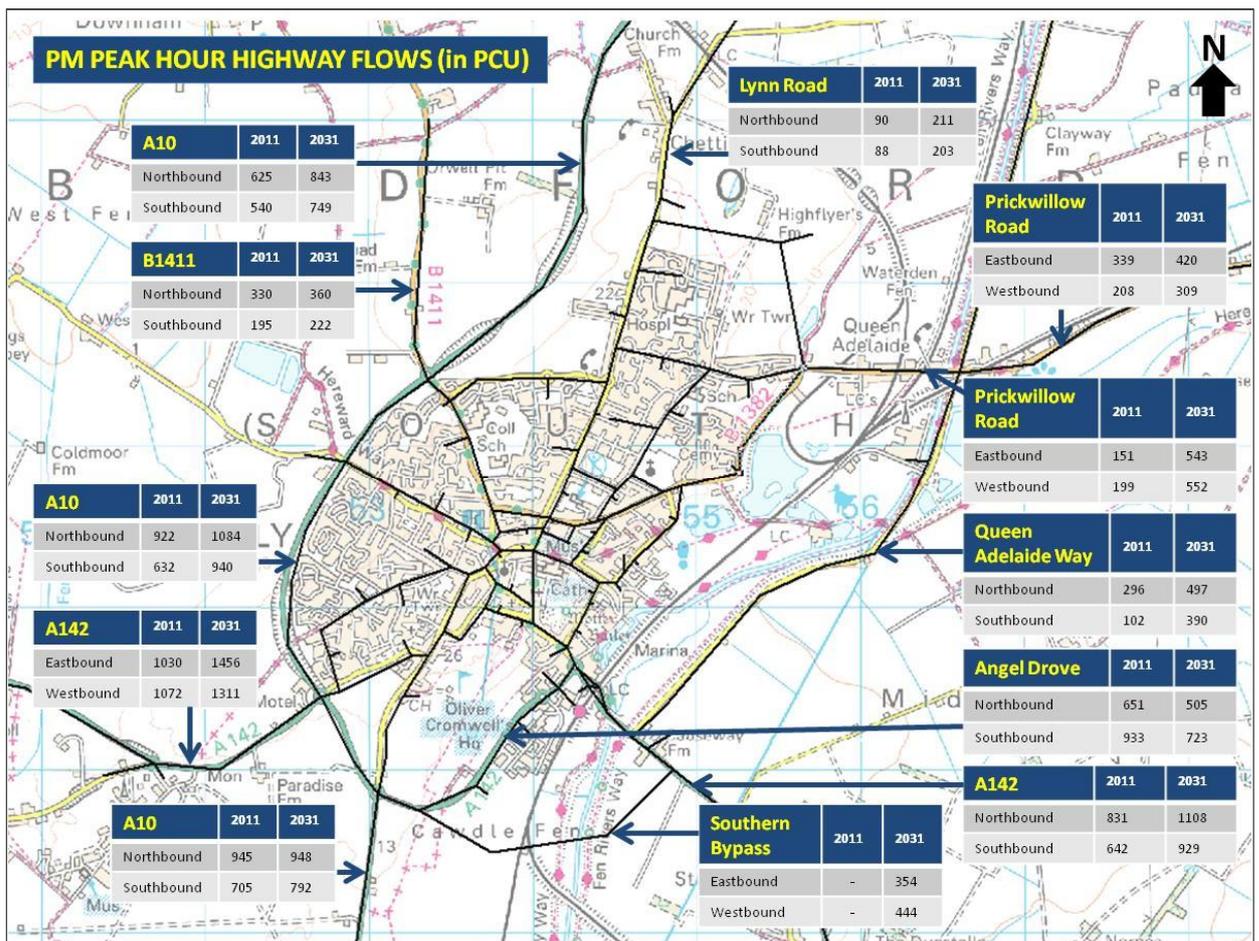
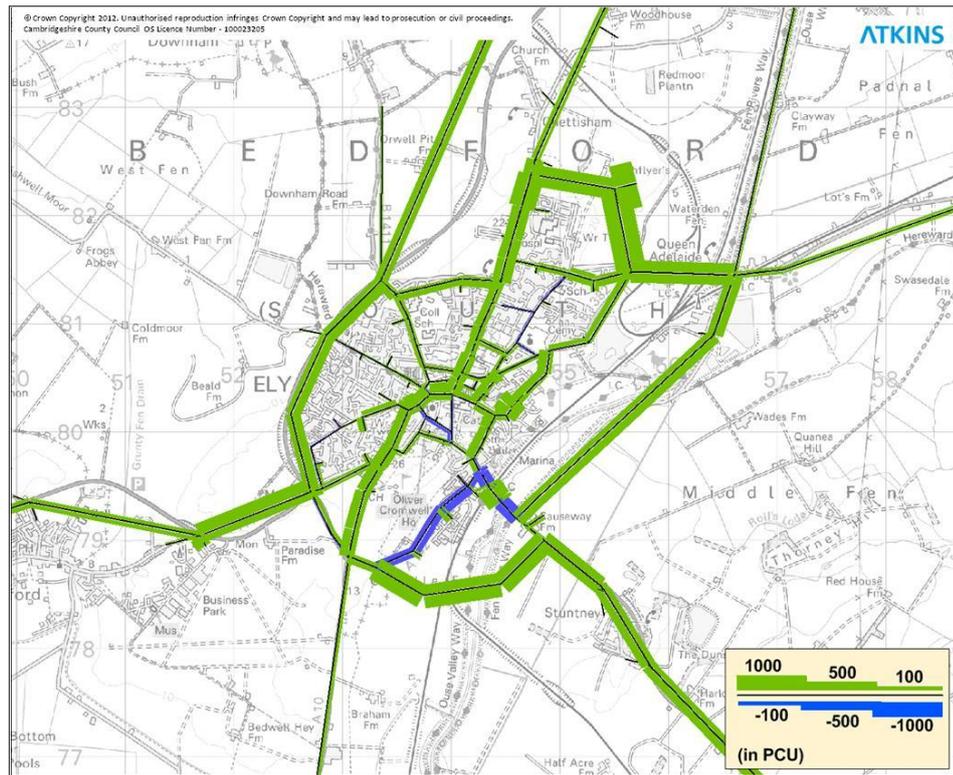


Figure 3.8a and 3.8b : Changes in highway link flow (pcu) in the Evening Peak between 2031 and 2011

3.3.10 The reduction in flow compared to base can be seen along Angel Drive and Station Road, which is because of the introduction of Southern Bypass along A142 diverts traffic along A142 and A10 from using Angel Drive. However, the developments along Angel Drive including Octagon Business Park attract significant flow along Angel Drive.

3.3.11 Junction Analysis

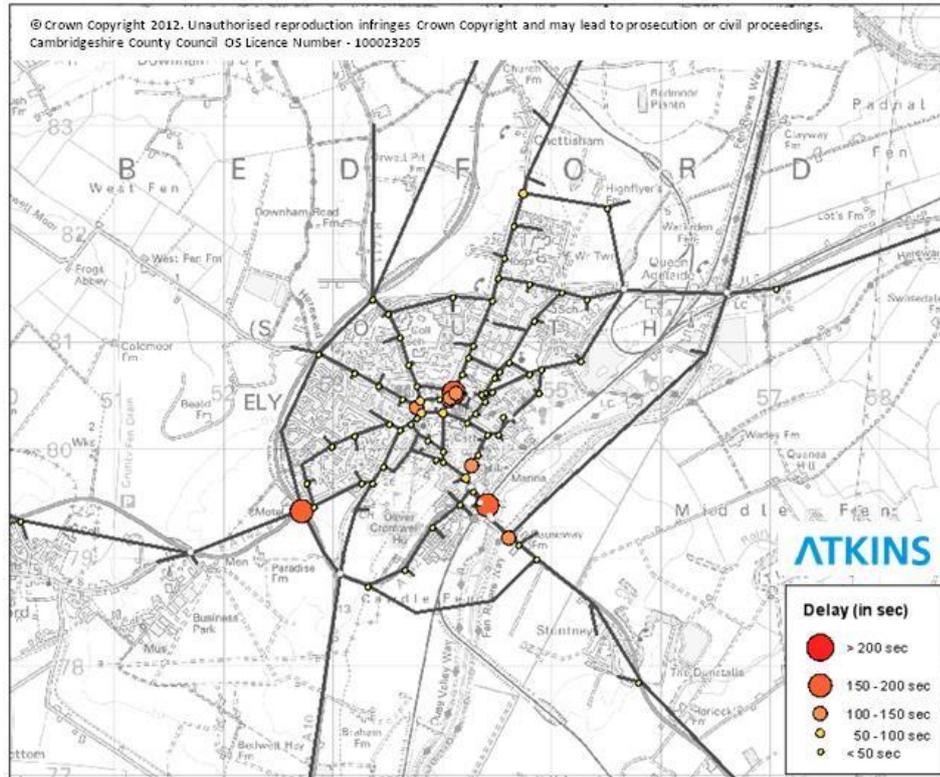


Figure 3.9: Junction delay in the Morning Peak – 2031 Local Plan Scenario

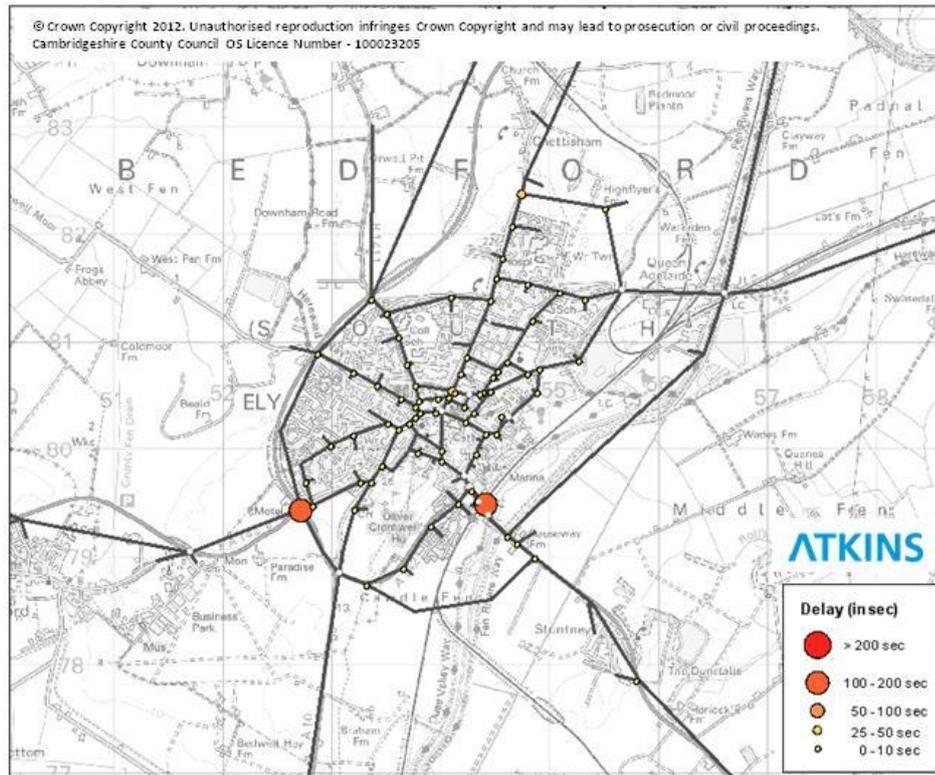


Figure 3.10: Junction delay in the Evening Peak – 2031 Local Plan Scenario

- 3.3.12 Figure 3.9 and Figure 3.10 shows the delays at junctions in 2031 Local Plan Scenario. The significant delay can be visualised at A10 / Witchford Road roundabout, Station Road level crossing and at the Egremont Street / Nutholt Lane junction.
- 3.3.13 The delay at A10/Witchford Road roundabout is because of the increase in external-to-external traffic using A142 and A10 South and partly associated with the Lancaster Way Business Park expansion.
- 3.3.14 The delay at the rail line crossing on Station Road is because of the increase in level crossing closure times and from transient traffic signal delay assuming the underpass will remain open but have traffic signal controlled single lane operation.
- 3.3.15 The development expansion on Northern Ely produces significant amount of trips to/from Cambridge or southern region resulting in increase in traffic flow along Lynn Road, causing delay at Egremont Street / Nutholt Lane / Lynn Road Junction.
- 3.3.16 Journey Times**
- 3.3.17 Figure 3.11 provides an illustration of the journey time routes for which comparisons have been made between base and forecast year scenarios.
- 3.3.18 A comparison of the local model journey time for the 2011 Base Year; 2031 Local Plan Scenario is provided in Table 3.5.
- 3.3.19 It is noted the percentage increases in journey times in the local area are considerably higher than those recorded by the CSRM. The routes chosen in the ETM are internal to Ely which is not an aspect covered in any great detail by CSRM, hence these results are neither unexpected nor contradictory.

Morning Peak

- 3.3.20 The journey time along Route 1 (southbound) is increased significantly (98%) due to the increased junction delay at the A10/Witchford Road roundabout as well as the increased level crossing closure time on Station Road.
- 3.3.21 The severe delays at Egremont Street / Nutholt Lane cause a significant increase in the journey times of Route 3 (42% in EB and 57% in WB direction) and southbound of Route 2 (103%).
- 3.3.22 The journey time along Route 5 is increased by 52%, partly due to the vehicle trips accessing from/to the retail developments (Aldi and additional convenience retail).
- 3.3.23 The journey time along Route 6 is increased by 100%, mainly due to the increase in the level crossing closure time on Station Road.

Evening Peak

- 3.3.24 The journey time along Route 4 eastbound is increased significantly (164%) due to the increased junction delay at the A142 Witchford Road/A10 roundabout. This is a result of the increased number of trips associated with the Lancaster Way Business Park expansion.
- 3.3.25 The journey time along Route 1 in the northbound direction is increased by 32% also due to the increased delay at the A142 Witchford/A10 roundabout.

3.4 SUMMARY

A wide range of local outputs have been extracted for the 2031 Local Plan Forecasts from the ETM.

- In the local area around Ely AM and PM peak trip activity may increase by 50% in 2031 compared to current day;
- Internal highway trips to Ely are one sector likely to have the largest percentage growth which is also the type of movements that are easiest to target with smarter choices;
- Movements between other parts of East Cambs are also showing large increases in traffic which may be more difficult to mitigate with sustainable modes;
- Average speeds across the network are forecast to fall by about 10km/h to about 50km/h in both AM and PM peaks;
- Whilst the number of trips will rise by 50%, the overall time spent on the local road network will rise by 80% in the AM peak and 60% in the PM peak, illustrating the greater strain on network in the AM peak;
- Traffic growth across the wider area of East Cambridgeshire is spread across the network quite evenly. Ely North Development and its impact on the local network close to the site is forcing traffic to both the east (via Queen Adelaide Way) and west (to ultimately impact on the Ely western Bypass since a large proportion of traffic seeks routes to the south of Ely);
- Specific routes could have very considerable increase in journey times depending on specific junction operation but the most severe impact is predicted to be in the AM peak.

Routes	Morning Peak				Evening Peak			
	Observed time	2011 Base	2031 Local Plan Scenario		Observed time	2011 Base	2031 Local Plan Scenario	
Route 1: A10 Downham Road to A142 Stuntney Causeway (SB)	00:07:27	00:06:40	00:13:10	98%	00:07:54	00:06:34	00:07:38	16%
Route 1: A142 Stuntney Causeway to A10 Dunham Road (NB)	00:07:38	00:06:36	00:08:49	34%	00:07:38	00:06:37	00:08:43	32%
Route 2: Lynn Road to Angel Drove (SB)	00:07:03	00:06:21	00:12:54	103%	00:06:58	00:06:15	00:06:23	2%
Route 2: Angel Drove to Lynn Road (NB)	00:06:04	00:05:47	00:05:49	1%	00:06:12	00:05:47	00:05:53	2%
Route 3: Downham Road to Prickwillow Road (EB)	00:07:26	00:07:39	00:10:50	42%	00:07:16	00:07:34	00:07:49	3%
Route 3: Prickwillow Road to Downham Road (WB)	00:09:01	00:07:49	00:12:16	57%	00:07:02	00:07:47	00:08:09	5%
Route 4: A142 Sutton Road to Cambridge Road (EB)	00:05:09	00:04:13	00:04:49	14%	00:05:06	00:04:15	00:11:14	164%
Route 4: Cambridge Road to A142 Sutton Road (WB)	00:05:14	00:04:16	00:04:53	14%	00:04:51	00:04:12	00:04:19	3%
Route 5: Station Road to A142 Angel Drove (Loop)	00:11:39	00:10:21	00:15:44	52%	00:11:14	00:10:28	00:12:13	17%
Route 6: A142 Stuntney Causeway to Queen Adelaide Way (Loop)	00:10:14	00:08:42	00:17:25	100%	00:09:56	00:08:34	00:10:16	20%

Table 3.5: Journey Time Route Summary

4 Comparison of CSRM and Ely Model

4.1 INTRODUCTION

4.1.1 This chapter provides a comparison between the CSRM strategic forecasts and the ETM. In comparing the base situation, we can gain confidence that the basis of the forecasting is sound and robust and hence have more confidence on the impact of the forecast growth scenario.

4.2 HIGHWAY DEMAND

4.2.1 It is important to appreciate that the CSRM and ETM create a representation of travel movements. No representation is perfect and comparison to observed data where it is available is useful to understand how well the scale and distribution of trip compare.

4.2.2 The 2001 National Census provides ward summaries of commuter patterns by mode with the available data for the Ely area for car drivers summarised in Table 4.1.

2x2 Sector Matrix		2001 Journey To work Census		
		Destination		
		Ely	Rest of Model	Total
Origin	Ely	662	2,650	3,312
	Rest of Model	2,369	-	2,369
	Total	3,031	2,650	5,681

Table 4.1: 24hr Journey to work movements for car drivers

4.2.3 Table 4.2 has extracted the all purpose highway matrices from both models for the AM and PM peak hours, which is the time at which commuting trips are most dominant. The other purposes (such as shopping or leisure) may have a different distribution pattern compared to commuter trips, hence the comparison here is more related to the broad scale of activity rather than matching precise numbers.

4.2.4 The two models show a consistent scale of overall highway activity (the ETM having 16% fewer trips overall than the CSRM for the same area). Both models show a lower level of activity compared to the all day commuter patterns recorded in the 2001 Census, which is to be expected as many commuter trips are made outside the 0800-0900 peak hour.

4.2.5 The ETM forecasts are more trend based than CSRM. The ETM will tend to propagate the exiting patterns whilst CSRM has scope to change inherent patterns dependent on the scale of change in dwelling and employment provision. Tables 4.3 to 4.4 help identify whether any major change in highway travel patterns will be experienced by the growth allocations for the Ely area.

2011 Base 2x2 Sector Matrix		CSR			ETM		
		Destination			Destination		
		Ely	Rest of Model	Total	Ely	Rest of Model	Total
Morning Peak Hour							
Origin	Ely	289	963	1,252	467	1,571	2,038
	Rest of Model	774	7,601	8,375	1,852	4,189	6,041
	Total	1,063	8,564	9,627	2,319	5,760	8,079
Evening Peak Hour							
Origin	Ely	304	704	1,008	625	1,520	2,145
	Rest of Model	977	7,260	8,237	2,018	3,899	5,917
	Total	1,281	7,964	9,245	2,643	5,419	8,062

Table 4.2: AM and PM Peak hour all purpose sectored highway matrix summaries from base year CSR and ETM

4.2.6 Table 4.3 compares the corresponding 2031 core strategy sector analysis, which shows a rise in activity for all sectors compared to the 2011 base. Car based movements within Ely have risen but from a comparatively low base. The growth into and out from Ely itself appears to broadly follow existing highway patterns across both models.

2031 Core Strategy Scenario 2x2 Sector Matrix		CSR			ETM		
		Destination			Destination		
		Ely	Rest of Model	Total	Ely	Rest of Model	Total
Morning Peak Hour							
Origin	Ely	450	1,317	1,767	664	2,140	2,804
	Rest of Model	988	8,747	9,735	2,207	5,692	7,899
	Total	1,438	10,064	11,502	2,871	7,832	10,703
Evening Peak Hour							
Origin	Ely	449	911	1,360	944	1,975	2,919
	Rest of Model	1,298	8,682	9,980	2,691	5,233	7,924
	Total	1,747	9,593	11,340	3,635	7,208	10,843

Table 4.3 AM and PM Peak hour all purpose sectored highway matrix summaries from 2031 Core Strategy CSR and ETM

- 4.2.7 Table 4.4 shows the corresponding sector analysis for the 2031 local plan allocations. CSRM suggests activity in Ely remains largely unchanged except for a rise in outbound movements from Ely in the morning and a corresponding rise in the reverse direction in the PM peak. CSRM also identifies a large car growth in movements between non Ely ECDC settlements.
- 4.2.8 This increase in activity in the other areas of ECDC settlement is also supported by the growth patterns predicted by the ETM.

2031 Local Plan Scenario 2x2 Sector Matrix		CSRM			ETM		
		Destination			Destination		
		Ely	Rest of Model	Total	Ely	Rest of Model	Total
Morning Peak Hour							
Origin	Ely	481	1,503	1,984	709	2,205	2,914
	Rest of Model	991	9,352	10,343	2,448	6,826	9,274
	Total	1,472	10,855	12,327	3,157	9,031	12,188
Evening Peak Hour							
Origin	Ely	448	902	1,350	1107	2,087	3,194
	Rest of Model	1,462	9,356	10,818	2,725	6,382	9,107
	Total	1,910	10,258	12,168	3,832	8,469	12,301

Table 4.4: AM and PM peak hour all purpose sectored highway matrix summaries from 2031 Local Plan forecast year CSRM and ETM

4.3 SUMMARY

- 4.3.1 Overall there is a reasonable degree of consistency in the scale and shape of the forecast demand growth. This is understandable as the underlying assumptions for the growth are the same but the forecasting procedures employed are different.
- 4.3.2 CSRM predicts higher levels of non-Ely trips than ETM, whereas ETM predicts higher levels of Ely trips than CSRM. Both models are giving forecasts of approximately 12,000 trips for 2031.
- 4.3.3 Comparing and contrasting the two procedures suggests there could be a wide range in the forecast outcomes with a worst case scenario combining the volume of local trips of the Ely transport Model and the longer distance trips of CSRM giving a potential maximum figure of 14,700 vehicle movements. It is unlikely, however, that both extremes of growth can co-exist: the ultimate outcome will be constrained by housing, jobs and the people/workers in the district meaning an overall figure of 12,000 trips in 2031 is reasonable.
- 4.3.4 Thus we can have confidence that the two modelling platforms are giving a similar view of forecast growth and that we can take a reasonable degree of confidence in the forecast transport network impacts. The ETM gives a much finer view of the level of impacts at a localised level and therefore from the basis of mitigation requirements on the East Cambridgeshire area.

5 Summary

5.1.1 This Chapter summarises the key findings and modelling results for the East Cambridgeshire Local Plan analyses.

5.2 KEY MODELLING RESULTS

The proposed development targets for East Cambridgeshire District Council have been tested in both the county strategic model (CSRМ) and the ETM (ETM). These models provide complementary analysis of the potential transport impacts of the proposed growth levels. Analysis of the model results has shown that similar messages arise regarding the growth in trips, changes in travel patterns and impact on highway congestion, though the ETM projects higher percentage traffic growth for the core area around Ely.

Strategic Modelling: District wide travel patterns

5.2.1 CSRМ results demonstrate that the linking of employment and housing growth hand-in-hand is essential to achieve the district-wide growth plans. The delivery of large employment sites outside Ely has potential to reduce the levels of out-commuting from rural areas of East Cambridgeshire. However, this is at the cost of a very large increase in local trips, and it is not clear whether the local highway network in rural East Cambridgeshire would in fact support this. The CSRМ estimates of a fall in road speed of 11-20% (see Table 2.8) should be seen as conservative, given that congestion on local roads is not represented.

5.2.2 Though the number of trips within East Cambridgeshire grows very steeply relative to 2011 (by 24% or 4,281 additional AM peak trips), there is still around a 10% growth in trips to Cambridge and South Cambridgeshire (see Table 2.7). Sensitivity tests show that if employment growth is lower than targeted, then this will lower demand for housing, particularly in areas outside Ely.

5.2.3 It would appear likely that the level of growth is partly constrained by congestion on the A10, which will further encourage take-up of local jobs. It is notable that the rise in employment in East Cambridgeshire also leads to a rise in in-commuting, with absolute growth similar to that seen for out-commuting.

5.2.4 There is no major change in mode share due to the development plans. Public Transport mode share does decline slightly. Due to the local nature of much of the transport demand growth, there are rises in both car and walk/cycle trips. It might be that increases in congestion on local roads will mean that ultimately mode shift occurs away from car to walk/cycle.

Local Highway Modelling

5.2.5 ETM projects that compared to the current day situation highway demand to 2031 may grow by 50% in the AM peak and PM peak hour (broadly from 8,000 trips to 12,000 trips see Table 3.3). This is a considerable increase compared to the 30% forecast growth for the existing Core Strategy.

5.2.6 As in the strategic modelling results, there is a consequent increase in both local congestion and journey times for longer distance movements to and from East Cambridgeshire. These increases in journey times are commensurate with the strategic road network already being close to capacity at today's traffic usage.

5.2.7 The Ely North development is one of the largest single sites. In the Local Plan land use assumptions, the mix of housing and employment uses lead to a fairly balanced generation and attraction pattern. The scale of generation is predicted to have an adverse effect on the local network and without mitigation this is likely to lead not only to large increases in delays at local junctions but also the diversion of traffic onto less suitable routes.

5.2.8 Careful consideration of each site needs to be made to ensure the access to the network matches the demand expectations and that the loading of the strategic network can provide sufficient capacity. This modelling exercise has not set out to pinpoint precise pressure points but it is clear when examined at a strategic level that the scale of development is likely to present challenges without a clear mitigation strategy.

5.3 ASSUMPTIONS AND FURTHER ANALYSIS

5.3.1 For both models, the Local Plan runs have assumed that the projected levels of employment and housing growth in the ECDC Local Plan are achieved, at the locations specified. The modelling has not therefore accounted for any restriction in growth due to lack of transport connectivity and congestion. Sensitivity tests carried out using CSRМ (see Table 2.3 and Table 2.5) suggest that feedback effects exist, and may reduce the level of housing and employment growth achieved if no mitigation of transport costs is delivered.

5.3.2 CSRМ has retained previous Core Strategy-based assumptions for growth in the other districts of the sub-region. However, the assumptions for growth in these districts is currently being reviewed as part of their Local Plan exercises, which may have a bearing on levels of development attracted to East Cambridgeshire, and the patterns of commuting between Districts.

5.3.3 Committed infrastructure such as the Ely Southern link have been assumed to be in place from 2021 onwards for both CSRМ and ETМ modelling. This helps accommodate growth and in particular relieves the southern part of the Ely road network. No upgrade has been assumed to the A14 corridor.

5.3.4 The supply network assumptions for the modelling made no additional effort to encourage sustainable travel patterns over and above the existing position. Any targeted measures such as travel planning could lower the assumed highway based trip rates.

5.3.5 Within CSRМ the inherent capacity restraint within the network for the medium and longer distance trips in forecast years may be driving a pattern towards more sustainable, shorter distance travel patterns. Due to the limitations of the network representation these patterns may not necessarily be deliverable without enhancement to the sustainable mode provision, particularly relating to the sustainable mode accessibility at new sites.

5.3.6 The work to date provides a reasonable indication of the transport implications of the proposed ECDC Local Plan growth. Further work could be carried out in the following areas:

- **Reducing uncertainty about local congestion:** It has been highlighted that congestion on local roads is not fully represented in CSRМ, and this may have affected both the trip distribution and car mode share in rural areas. Inclusion of these effects may lead to a reduction in local trips, or a mode shift from car to walk and cycle. Further tests with CSRМ and comparisons with ETМ would address this (see section 2.6).
- **Development targets / cross-county links:** Sensitivity tests using CSRМ have highlighted that alternative growth levels may arise should mitigation of transport impacts not be possible, or if competition for employment is more intense. Further testing of these feedback effects and linking to Local Plan work in other districts would be possible to inform on the extent of these impacts.
- **Mitigation measures / site-specific measures:** The work to date has not considered the potential for mitigation measures to address local congestion or encourage mode shift away from car (e.g. through travel planning). Only limited work has been carried out to consider the transport connectivity of specific sites. Further work will be helpful going forward to refine both these aspects.

Appendix A

Background to ETM Forecasting Methodology

A1.1 DERIVATION OF TRIP GENERATION

AM and PM peak hour trip generation has been estimated, by mode, for the residential, retail and employment developments proposed for Ely up to the year 2031.

The methodology has been applied to the Local Plan Allocations proposed by ECDC (2011) in addition to the development allocations specified in the East Cambridgeshire District Council (ECDC) Core Strategy Submission, Development Plan Document (2008).

Residential Developments

The residential developments allocated in Core Strategy Submission and further residential developments in Ely provided by ECDC were assumed for Core Strategy Scenario.

In the Local Plan Scenario the additional allocations proposed in Local Plan provided by ECDC and the residential developments in Soham and Littleport were considered on top of the assumptions considered in Core Strategy Scenario.

Error! Reference source not found. shows all proposed future residential developments within Ely along with estimates of the number of dwellings. in the other settlements included in the model, namely Littleport and Soham. This accounts for the shortfall compared to the anticipated 8699 dwelling estimate to 2031.

Development	TEMPRO 2031 Forecast	Core Strategy Scenario 2031	Local Plan Scenario 2031
Outstanding - Ely	-	609	609
Windfall - Ely	-	259	259
Large sites within boundary- Ely	-	247	247
Lisle Lane - Ely	-	300	300
Northern Expansion - Ely	-	1,055	2,740
Soham	-	-	1,535
Littleport	-	-	1,271
Total	2,393	2,470	6,961

Table A1.1 – Forecast Distribution of Residential Developments by scenario

Figure A1.1 shows the geographical spread of residential developments lying in Ely.

TEMPRO projects growth of 2,393 households in Ely by 2031 from 2011. The developments allocated exceed TEMPRO household growth projections, so it has been assumed no further background residential growth was required.

Table A1.2 shows the residential person trip rates taken from the Cambridgeshire County Council report, 'Housing Trip Rates – Comparison of Surveys', (2001). The trip rate data in this report is derived from Cambridgeshire local survey data and is therefore considered to be the most suitable for use in the estimation of trip generation for the residential developments in Ely.

Time Period	Arrivals	Departures	Total
AM Peak Hour	0.12	0.71	0.83
PM Peak Hour	0.60	0.30	0.90

Table A1.2: Housing Person Trip Rates

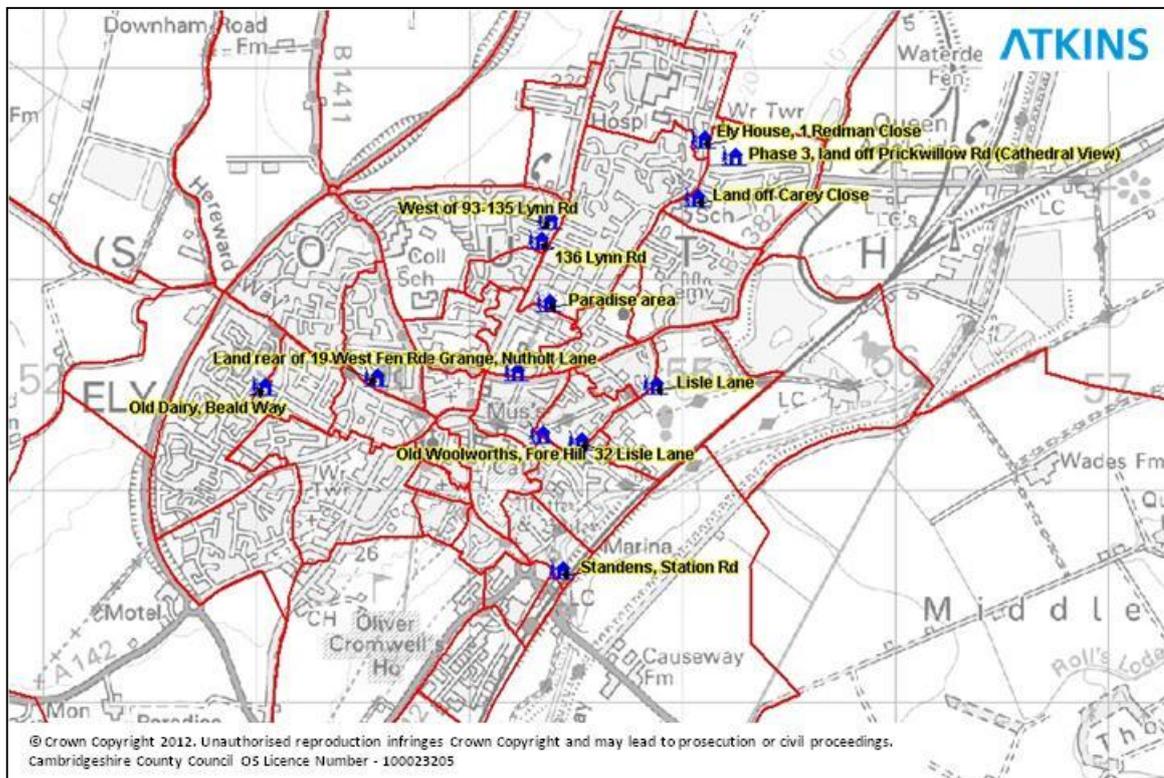


Figure A1.1: Housing Developments in Ely

A1.2: JOURNEY PURPOSE AND TIME OF DAY

For each of the proposed residential developments, the associated trips have been distributed across the following three trip purposes:

- Home-Based to Work (commuting);
- Home-Based to Education; and
- Home-Based Other (shopping, leisure etc).

Table A1.3 shows how the residential trips have been distributed by purpose for the two modelled time periods. It is noted that a large proportion of return school trips in the afternoon take place before 17:00, hence there is a lower 5% share of education trips in the PM peak.

The number of Home-Based Other trips is expected to be low in the AM peak hour. It has been assumed that 5% of all residential person trips are other purpose trips. In the PM peak it has been assumed that 30% of all trips are other purpose. The remaining trips are Home-Based Work trips and account for 80% of all trips in the AM Peak, and 65% in the PM peak.

Trip Purpose	AM	PM
Home-Based to Work	80%	65%
Home-Based to Education	15%	5%
Home-Based to Other	5%	30%

Table A1.3 – Residential Trip Distribution by Purpose

A1.3: MODE SPLIT ASSUMPTIONS

The mode splits for each of the three trip purposes described above have been taken from different sources and can be seen in Table A1.4. The Home-Based Work mode split has been taken from the 2001 National Census journey to work data and is an average of all trips with an origin in Ely. The Home-Based Education mode split is taken from the Cambridgeshire County Council School Census (2008), and is the current mode split for all education trips with an origin in Ely. It should be noted that the school census data does not include private school trips. The Home-Based Other mode split is taken from the Ely New Estates Survey (2002) and is an average of food shopping and non-food shopping trips.

Mode	Home-Based to Work	Home-Based to Education	Home-Based to Other
Walk	12%	54%	11%
Cycle	6%	6%	2%
Motorcycle	1%	-	0%
Car Driver	58%	21%	81%
Car Passenger	6%	2%	-
Taxi	0%	3%	-
Bus	2%	15%	0%
Train	7%	-	4%
Work From Home	8%	-	-
Other	0%	0%	1%

Table A1.4 – Residential Mode Split by Purpose

Retail Developments

There are no significant additional Retail Developments proposed in the Local Plan schedule of land uses. Hence, in both Core Strategy and Local Plan Scenarios the same retail assumptions have been considered as supplied for the Local Development Framework Model test in 2009/10.

Table A1.5 shows the additional Retail Development provisions considered.

Development	Core Strategy Scenario	Local Plan Scenario
Convenience Retail - Aldi	1,000 m ²	1,000 m ²
Convenience Retail – Lisle Lane	7,074 m ²	7,074 m ²
Comparison Retail – Edge of Town	12,000m ²	12,000m ²

Table A1.5 – Distribution of new retail developments

For Convenience retail developments the Transport Assessment (TA) produced by Connect Consultants (for Aldi) and Savell Bird & Axon (for Lisle Lane) provides PM peak trip rates and flows. Trip rates for PM peak hour have been taken directly from the TA and the AM peak hour trip rates are assumed based on trip rates taken from TRICS as % of the PM peak. Table A1.6 shows the trip rates assumed for convenience retail.

Retail Type	AM Peak Hour		PM Peak Hour	
	Arrivals	Departures	Arrivals	Departures
Aldi – Food	5.91	4.42	9.85	11.04
Aldi - Non-Food	0.92	0.55	1.54	1.82
Lisle Lane	4.44	3.05	7.34	7.63

Table A1.6 - Retail Vehicle Trip Rates per 100sqm GFA

The 12,000m2 of comparison retail allocated in the Core Strategy is to be located on the current Paradise Leisure Centre site. The Leisure Centre is to be relocated and combined with the existing facilities at the rugby club site off Downham Road. The trips associated with the existing site have been reassigned, and adjustments made to the mode split to reflect the sites new location.

Table A1.7 shows the TRICS sites that have been used to generate the vehicle trip rates for comparison retail shown in Table A1.8.

Reference	Description
TRIP RATE for Land Use 01 - EMPLOYMENT/K – RETAIL PARK	
ES-01-K-04	RETAIL PARK, NEWHAVEN
KC-01-K-01	RETAIL PARK, CHATHAM

Table A1.7 - Selected TRICS Comparison Retail Development Sites

TRICS Land-Use Definition	AM Peak Hour		PM Peak Hour	
	Arrivals	Departures	Arrivals	Departures
K – RETAIL PARK	0.78	0.42	1.27	1.22

Table A1.8 - TRICS Comparison Retail Vehicle Trip Rates per 100sqm GFA

Employment Developments

Table A1.9 shows the list of employment development proposals, their potential Land Use type, Size and Jobs considered in Core Strategy Scenario.

Region	Development	Core Strategy Scenario		
		Land Use	Size (Ha)	Potential Jobs
Ely Neighbourhood Panel Area	Lancaster Way	20% B1 60% B2 20% B8	30.0	1,340
	Angel Drove	48% B1 40% B2 12% B8	30.0	830

Table A1.9 - Distribution of Employment Developments in Core Strategy Scenario

Table A1.10 shows the list of Employment development proposals, their potential Land Use type, Size and Jobs considered in Local Plan Scenario. It can be noted there is a change in Land Use type and Size in case of Lancaster Way when compared with assumptions in Core Strategy Scenario.

Region	Development	Local Plan Scenario		
		Land Use	Size (Ha)	Potential Jobs
Ely Neighbourhood Panel Area	Lancaster Way	75% B8 25% B2	40.4	1,973
	Angel Drove	48% B1 40% B2 12% B8	20.0	566
	Octagon Business Park	A1/B2	9.0	264
	Station Gateway	B1	2.8	791
	Potters Distribution site, Queen Adelaide redevelopment opportunity	90% B8 10% B2	12.0	469
	North Ely	50% B1 25% B2 25% D1	7.5	1,330
West Neighbourhood Panel Area	Elean Business Park	B8	17.0	554
	Haddenham Business Park Extension	B2	0.5	49
	Additional small village sites	50% B2 50% B8	1.0	191

Region	Development	Local Plan Scenario		
		Land Use	Size (Ha)	Potential Jobs
Littleport Neighbourhood Panel Area	Wisbech Road – land to north	75% B8 25% B2	7.4	361
	Land rear of Wisbech Rd petrol station	B1/B2	1.6	132
	Land west of Woodfen Road	25% B2 75% B8	7.0	341
	Mushroom Farm		11.0	88
Soham and East Neighbourhood Panel Area	East of bypass allocation	90%B8 10% B2	11.0	429
	Eastern Gateway	B1/A1	0.58	132
	Land opposite Turners	90% B8 10% B2	6.4	250
	Land North of Snailwell Road	90%B8 10% B2	5.5	215
	Isleham - site off Hall Barn Road	B2	0.5	49
	Soham Station Hub	B1	1.0	282
	North Soham	B2/B8/A1	2.5	220
	Consideration of additional site allocations (Isleham plus new site in Fordham area)	50% B8 40% B2 10% B1	8.0	669
South Neighbourhood Panel Area	Land adjacent to Tunbridge Court, Bottisham	B1	0.5	142
	Heath Road, Swaffham Prior	B2	0.5	78
	Former D S Smith site, Burwell	B2	17.0	293
	Reach Road, Burwell	80% B2 20% B1	0.5	337

Table A1.10 - Distribution of Employment Developments in Local Plan Scenario

Table A1.11 shows the TRICS sites that have been used to generate the person trip rates for the different employment land uses. The resulting trip rates can be seen in Table A1.12

Reference	Description
TRIP RATE for Land Use 02 - EMPLOYMENT/A – OFFICE	
CA-02-A-01	OFFICE, CAMBRIDGE
CA-02-A-03	OFFICE, PETERBOROUGH
HF-02-A-02	COUNCIL OFFICES, WELWYN GC
LE-02-A-01	COUNCIL OFFICES, M. MOWBRAY
TRIP RATE for Land Use 02 - EMPLOYMENT/B - BUSINESS PARK	
LN-02-B-01	BUSINESS PARK, LINCOLN
NF-02-B-02	BUSINESS PARK, NORWICH
SF-02-B-01	BUSINESS PK, BURY ST EDMUNDS
TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE	
NF-02-D-02	INDUSTRIAL ESTATE, DEREHAM
NT-02-D-01	IND. ESTATE, SUTTON-IN-ASHFLD
TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING	
HF-02-F-02	SUPERSTORE DIST., WELWYN GC

Table A1.11 – Selected TRICS Sites, Lancaster Way Business Park Employment

TRICS Land-Use Definition	AM Peak Hour		PM Peak Hour	
	Arrivals	Departures	Arrivals	Departures
A – OFFICE	2.44	0.42	0.43	2.29
B – BUSINESS PARK	2.41	0.44	0.29	1.97
D – INDUSTRIAL ESTATE	0.58	0.17	0.13	0.45
F - WAREHOUSING	0.21	0.05	0.10	0.19

Table A1.12 – TRICS Person Trip Rates per 100sqm GFA

The trips generated have been split by mode as shown in A1.13 using journey to work mode split data taken from the 2001 National Census for all trips with a destination in the output.

Mode	Lancaster Way
Walk	4%
Cycle	6%
Motorcycle	2%
Car Driver	76%
Car Passenger	8%
Taxi	0%
Bus	1%
Train	0%
Work From Home	2%
Other	0%

Table A1.13 –Employment Mode Split

As most of the employment development locations falls in the periphery of study area i.e. in the external model zones as shown in Figure A1.2, there will be a significant proportion of trips from areas outside the ETM that will act as generators and attractors to these developments.

To make allowance for the external trip generation, a reduction factor giving the percent contribution of trips from Ely to the respective development area obtained from CSRМ.

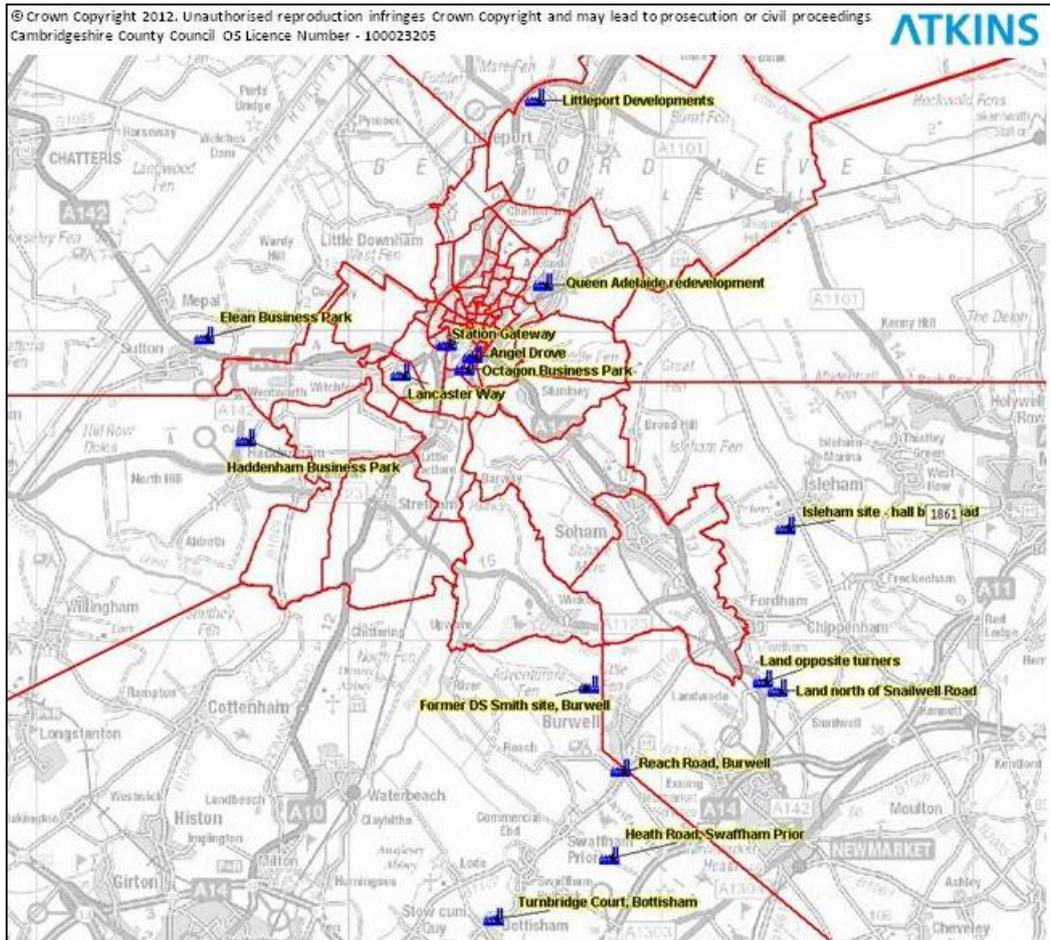


Figure A1.2: Employment Development Locations

A1.4 TRIP DISTRIBUTION

Residential Developments

The traffic demands for the developments with over 10 dwellings have been assigned to the model zone that contains the development and distributed based on the existing trip distribution pattern of the associated zone. This is also the case for the larger residential development sites in Littleport and Soham.

For the remaining small site developments, the total traffic demand from these developments has been modelled as background growth for Ely with traffic level assumed to grow following existing patterns of trip generation.

Employment Developments

Similar to the housing developments, the traffic demands for employment developments have been assigned to the model zone that contains the development, and distributed based on the existing trip distribution pattern of the associated zone.

Retail Developments

For retail developments, the model zones which contain the sites are not retail purpose in the base year, therefore it would be inappropriate to base the trip distribution of the retail developments on the existing demand distribution. Generalised cost matrices have been extracted from the base year models and relative attractiveness of each zone to the retail development sites have been calculated and used to distribute the generated retail trips using a gravity model formulation.

Northern Ely Development

Northern Ely expansion is considered as a Greenfield development. And the generated trips are distributed based on the combined trip distribution pattern of nearby existing Ely zones having similar land use.