

PRTMv2

Charnwood Local Plan Forecasting Report

Quality Information

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Section 1 – Overview

1.1 Introduction

- 1.1.1 Charnwood Borough Council (CBC) is in the process of producing a new Local Plan that proposes to cover a 15-year timescale to 2037. This will build on the committed developments in the existing Core Strategy for the borough. Initially there were two Local Plan options for consideration.
- 1.1.2 The proposed development sites for both Options were located throughout the borough, with key sites being proposed to expand existing urban areas, such as Loughborough, Shepshed and the Leicester Urban Area at Syston, and 'Service Centres', such as Anstey, Barrow Upon Soar, and Sileby. Table 1.1 and Table 1.2 show the size and scale of the proposed developments throughout the borough for Local Plan Option 1 and 2 respectively.

Table 1.1: Local Plan Option 1 Development Distribution

Hierarchy	Settlement	Homes (dwellings) & Employment (ha)	Schools (Form Entry)
Leicester Urban Area	Birstall, Glenfield, Syston and Thurmaston	1,852	2FE at Syston
Loughborough	Loughborough	2,262	2FE
Shepshed	Shepshed	2,021 & 5ha	3FE
Service Centres (2,302)	Anstey	700	1FE
	Barrow upon Soar	700	1FE
	Quorn	105	
	Rothley	97	
	Sileby	700	1FE
Other Settlements (510)	East Goscote	223	
	Hathern	85	
	Queniborough	155	
	Rearsby	47	
Total additional homes: 8,947 homes Total additional employment: 5 hectares Estimated school places at new schools: 2,100 places			

Table 1.2: Local Plan Option 2 Development Distribution

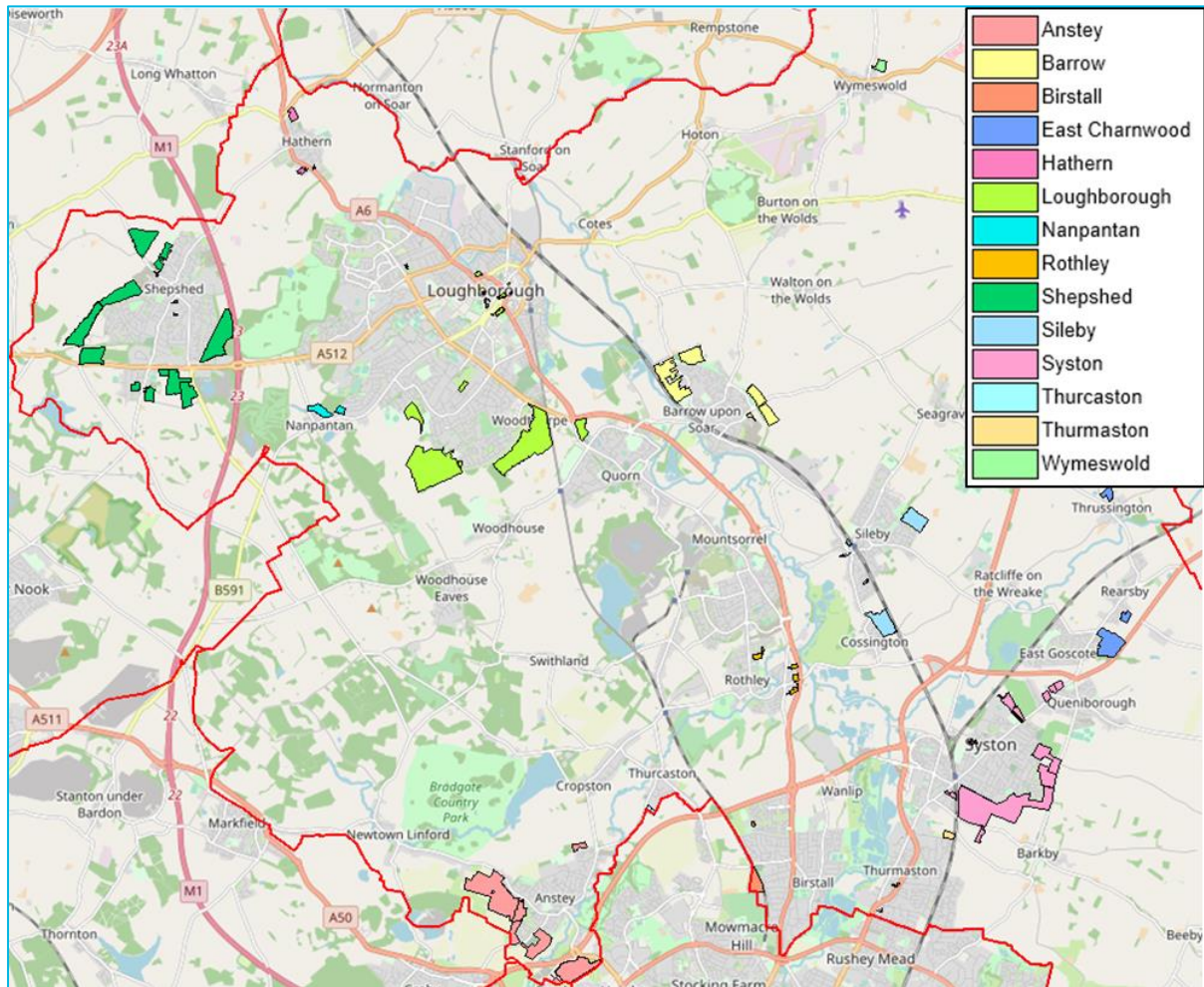
Hierarchy	Settlement	Homes (dwellings) & Employment (ha)	Schools (Form Entry)
Leicester Urban Area	Birstall, Glenfield, Syston and Thurmaston	2,725	2FE at Syston
Loughborough	Loughborough	2,319	2FE
Shepshed	Shepshed	2,212 & 5ha	3FE
Service Centres (1,518)	Anstey	350	1/2FE Ext.
	Barrow upon Soar	700	1FE
	Quorn	105	
	Rothley	97	
	Sileby	266	
Other Settlements (1,169)	Cossington	124	1/2FE Ext.
	East Goscote	223	
	Hathern	85	
	Queniborough	230	
	Rearsby	113	
	Thrussington	60	
	Thurcaston	31	
	Wymeswold	303	
Total additional homes: 9,943 homes Total additional employment: 5 hectares Estimated school places at new and extended schools: 1,890 places			

- 1.1.3 The purpose of testing two initial Local Plan options was to understand the impacts of the option-specific development distribution. Local Plan Option 1 tested a distribution which broadly focused development in the urban areas and three 'Service Centres' to support the provision of new schools. Local Plan Option 2 tested a distribution which reduced the development in two of the 'Service Centres' and focused additional development in the urban areas and a larger number of smaller 'Other Settlements'.
- 1.1.4 An assessment of the forecast transport impacts of the two Local Plan options was requested using Leicestershire County Council's (LCC) Pan-Regional Transport Model (PRTMv2) for a forecast year of 2037. This assessment sought to understand the forecast impacts of the proposed developments on the transport network without mitigation measures.
- 1.1.5 Whilst it was uncertain when the proposed developments will be fully occupied, the Local Plan options assumed full occupation of the tested developments by 2037 to ensure a robust assessment of their impacts.
- 1.1.6 The PRTMv2 transport model was used to model all scenarios for this transport assessment. In order to determine the suitability of the model for this assessment, AECOM undertook a base year highway model review in Spring 2020. Full details of the review are given in technical note '*PRTM – Charnwood Local Plan – Base Year Model Review v1.1.pdf*', which recommended several minor updates to the base year highway model for the purposes of assessing the Local Plan options. These were incorporated along with several other model updates from recent applications, including the Leicester City Strategic Sites and Local Plan applications.
- 1.1.7 Within the first stage of assessment, the following scenarios were produced:
- Baseline forecast for 2037;
 - Local Plan Option 1 forecast for 2037; and
 - Local Plan Option 2 forecast for 2037.
- 1.1.8 Following the issue of results for Local Plan Option 1 and Local Plan Option 2 to CBC, and discussion with relevant stakeholders, a third Local Plan hybrid option was developed. A summary of Hybrid Option 3 is outlined below, with Table 1.3 showing the settlement-specific development distribution.

Table 1.3: Hybrid Option 3 Development Distribution

Hierarchy	Settlement	Homes (dwellings) & Employment (ha)	Schools (Form Entry)
Leicester Urban Area	Birstall, Glenfield, Syston and Thurmaston	2,227	2FE Syston 1FE Glenfield
Loughborough	Loughborough	2,242	2FE
Shepshed	Shepshed	2,041 & 5ha	3FE
Service Centres (1,804)	Anstey	645	1FE
	Barrow upon Soar	700	1FE
	Quorn	105	
	Rothley	88	
	Sileby	266	
Other Settlements (791)	Cossington	124	1/2FE Ext.
	East Goscote	223	
	Hathern	85	
	Queniborough	155	
	Rearsby	47	
	Thrussington	60	
	Thurcaston	31	
	Wymeswold	66	
Total additional homes: 9,105 homes Total additional employment: 5 hectares Estimated school places at new and extended schools: 2,205 places			

- 1.1.9 The proposed development sites for Hybrid Option 3 were spread throughout the borough, with focus on expanding existing urban areas, such as Loughborough, Shepshed and the Leicester Urban Area including Syston; this was consistent with the locations tested in the development of Local Plan Option 1 and Local Plan Option 2. Figure 1.1 shows the locations of the proposed sites.
- 1.1.10 Work was undertaken by AECOM in parallel to compile a mitigation package aimed at reducing the impact of the Hybrid Option 3 developments on the highway network, whilst maintaining the distribution of growth across the borough. The details of the proposed mitigation schemes, and what was subsequently included in the modelling of the mitigation schemes, are outlined in Section 6. Full details of the mitigation work are supplied in “210527 Charnwood BC LP Mitigation Report February 21 Final .docx”.
- 1.1.11 Within the assessment for Hybrid Option 3 and the mitigation package, the following scenarios were produced:
- Baseline forecast for 2037;
 - Hybrid Option 3 forecast for 2037; and
 - Mitigation Scenario forecast for 2037.



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Figure 1.1: Charnwood Local Plan Hybrid Option 3 Development Sites

1.2 Report Structure

1.2.1 Following this introduction, this technical note contains the following sections:

- Section 2 – Initial Forecasting Approach and Assumptions: this section details the forecasting assumptions adopted for the assessment of Charnwood Local Plan Options 1 and 2.
- Section 3 – Initial Forecast Model Results: this section details the forecast results, based on the agreed forecasting assumptions, for Local Plan Options 1 and 2.
- Section 4 – Initial Summary and Conclusions: this section provides a summary of the transport assessment for Local Plan Options 1 and 2, and details the next steps taken.
- Section 5 – Mitigation Approach and Local Plan Hybrid Option 3: this section summarises the approach to developing the package of mitigations and describes the Hybrid Option 3 development.
- Section 6 – Revised Forecasting Approach and Assumptions: this section details the changes in forecasting assumptions from those described in Section 2, for the assessment of Hybrid Option 3 and the Mitigation Scenario.
- Section 7 – Revised Forecast Model Results: this section details the forecast results based on the agreed forecasting assumptions, for Hybrid Option 3 and the Mitigation Scenario.
- Section 8 – Summary and Conclusions: this section provides a summary of the transport assessment for Hybrid Option 3 and the Mitigation Scenario.
- Section 9 – Stakeholder Responses and Comments: this section summarises the stakeholder comments received in response to a previous version of this report and sets out the next steps.

1.2.2 In addition to this, this technical note contains the following appendices:

- Appendix A – Local Plan Option Data: this appendix provides site-specific information about the Hybrid Option 3 developments.
- Appendix B – Proposed Mitigation Schemes: this appendix provides a detailed list of all the mitigations proposed in the long list of schemes, and whether or not they were included in the Mitigation Scenario modelling.

Section 2 – Initial Forecasting Approach and Assumptions

2.1 Introduction

2.1.1 This section sets out the forecasting assumptions applied for this application, and the methodology adopted to create the required model forecasts. The following forecast scenarios have been produced:

- Baseline forecast for 2037;
- Local Plan Option 1 forecast for 2037; and
- Local Plan Option 2 forecast for 2037.

2.1.2 All the forecasts have made use of the highway, public transport, and variable demand model components of PRTMv2. The forecasts therefore include the forecast response of travel demand to changes in the costs of travel (including congestion, fuel prices, and public transport fares) and changes in assumed highway and public transport infrastructure over time.

2.2 Baseline Assumptions

2.2.1 The Baseline scenario builds on the Core Scenario produced as part of the development of the PRTMv2 model.

2.2.2 Network assumptions are based on the established uncertainty log agreed with LCC. A number of schemes were added to this following a review by CBC and Leicester City Council (LCiC) including:

- Abbey Park Road cycle provision;
- Ashton Green development highway network changes; and
- Transforming Cities Fund (TCF) Tranche 2 schemes:
 - New Beaumont Leys Park & Ride site (including link to Anstey under A46);
 - Melton Road (A607) bus lanes;
 - St Margaret's to Birstall (A6) bus lanes;
 - Abbey Park Rd/Beaumont Leys Lane bus lanes;
 - A50 Groby Road bus lane;
 - Soar Valley Way bus priority;
 - Anstey Lane (A5630) bus lane;
 - Great Central Street/Groby Road (A50) junction changes;
 - Duns Lane/Braunstone Gate bus priority; and
 - Saffron Lane (B5366) junction changes.

2.2.3 Table 2.1 provides a list the uncertainty log for highway schemes included in the model within Charnwood and the wider area.

Table 2.1: Highway Network Scheme Uncertainty Log

Location	Scheme Name	Timescale	Certainty
Kegworth	M1 J24	Oct-14	Complete
Nottingham	M1 Junction J23a-25 SMART motorway	2018	Complete
Leicestershire	M1 Junctions J19-23A	2020-2025	More than likely
Loughborough	Loughborough Integrated Transport Scheme	2013	Complete
Cotes	A60 Nottingham Road/Loughborough reduction of speed limit and traffic calming features	2016	Complete
SRFI	Southern access for new development	2016-2018	Complete

Location	Scheme Name	Timescale	Certainty
Loughborough	A512 widening B591 to M1 J23 Improvements to J23 and completion of dualling thereafter	2017-2020	Near certain
Castle Donington	Western Link Road from Back Lane to Tops Hill	2020	Near certain
Kegworth	Kegworth Bypass	2017-2019	Complete
SRFI	Highway improvements for new development	2016-2019	Complete
Loughborough	West of Loughborough SUE	2021-2026	More than likely
North West Leicestershire	M1 J22	2016	Complete
Blaby	Leicester North West Project Phase 1	2015/2016	Complete
Charnwood	North of Birstall SUE	2021-2026	Near certain
Charnwood	Mountsorrel Lane, Rothley Link Road	up to 2021	Complete
Charnwood	A512 junction improvements	2016-2021	Near certain
Blaby	Glenfield Park/Optimus Point S278 works	2014-2016	Complete
North of East Leicester	North of East Leicester Development Network - Thorpebury (previously Thurmaston) SUE.	2026	Near certain
Charnwood	A6 Loughborough Road Bus Lane and Parking Controls	2016	Complete
Leicester City	Removal of Belgrave Flyover	2014/15	Complete
Leicester City	Saffron Lane-Old Velodrome Improvements	2016	Complete
Leicester City	Traffic Calming Schemes	2016-2021	Near certain
Leicester City	East of Hamilton Development Improvements	2016	Complete
Leicester City	Pedestrianisation of Hotel Street, St Martins	2016	Complete
Leicester City	Haymarket/Charles St Bus Station Development	2016	Complete
Leicester City	Existing and proposed 20mph schemes	2012-2016	Complete
Leicester City	St Nicholas Circle	2015	Complete
Leicester City	Welford Road	2018	Complete
Leicester City	Waterside Development	Up to mid-2020s	More than likely
Leicester City	Belgrave Gate South	Nov-19	Near certain
Leicester City	Belvoir Street	2017	Complete
Leicester City	York Road/Bonnars Lane/Grange Road	Jul-19	Complete
Leicester City	King St	Jul-18	Complete
Leicester City	Lancaster Road	Sep-19	Complete
Leicester City	Mansfield Street & Church Gate	2020	Near certain
Leicester City	SMBS Access to Burleys Way	2019	Near certain
Leicester City	Vaughan Way	2019	Complete
Leicester City	Ashton Green	2021-2031	Near certain
Leicester City	London Road	Summer-19	Complete

Location	Scheme Name	Timescale	Certainty
Leicester City	LNW2 Ravensbridge Drive/Blackbird Road	Summer-19	Complete
Leicester City	Beaumont Leys Anstey Lane Improvements	Summer-19	Near certain
Leicester City	Putney Road West Improvement	2019	Near certain
Granby Street	Granby Street/Halford Street Improvements	2017	Complete
Loughborough	Alan Moss Road	2017	Complete
Leicester Forest East	Ratby Lane/Wembley Road junction	2017/18	Complete
Leicester City	Abbey Park Road Cycle Provision	2020	More than likely
Leicester City	Leicester TCF2 schemes	2022	More than likely
Blaby	A47/Kirby Lane Tesco Express	2020	Complete

2.2.4 A review of the Baseline planning data assumptions resulted in minor updates to the Charnwood and Blaby assumptions that were already contained within the model inputs. For Charnwood, the main change was to ensure that the profile of build out for the sustainable urban extensions (SUEs) at West of Loughborough (Garendon Park), North East of Leicester (Thorpebury) and North of Birstall (Broadnook) were up to date. These are set out in Table 2.2.

Table 2.2: Charnwood SUE Household Assumptions

SUE Site	Full Build Out	Build out expected by 2037
West of Loughborough	3,200	3,200
North East of Leicester	4,500	3,575
North of Birstall	1,950	1,950

2.2.5 For Blaby, the main changes were the addition of 750 households at land north of Hinckley Road (Kirby Muxloe) and confirmation of full build-out by 2037 of 4,250 households at the Lubbesthorpe SUE.

2.2.6 For Leicester City, more significant changes were made in order to ensure consistency with the draft Leicester City Local Plan. A full update was made to the housing assumptions using information provided by LCiC, amounting to growth of 35,471 households between 2014 and 2037. This includes a windfall of 150 houses per year across Leicester and an 'unmet need' of 7,742 households distributed across a number of neighbouring districts, solely for modelling purposes, in-line with allocations agreed through the Strategic Growth Plan (with an adjustment within Blaby to represent aspiration for a mixed-use community at Whetstone Pastures).

2.2.7 For employment within Leicester City, sites identified within the Local Plan have been added to the existing development assumed within the model inputs. In addition, around 6,000 additional jobs were added to ensure growth from 2014 to 2036 matches TEMPro 7.2 assumptions of around 16,000 extra jobs in total. These have been distributed uniformly across years and around Leicester City based on the 2014 base year employment distribution.

2.3 Local Plan Scenarios – Network Updates

2.3.1 In order to represent the loading of development traffic at key locations more accurately, as well as to make allowance for the potential for more detailed analysis of individual locations, a number of development zones have been adopted within the model. In all, 11 development zones have been used for the following locations:

- South and East of Syston (zone 9047);
- South and West of Anstey (9039 and 9046);
- Land east of Leicester Road, Thurcaston (9045);
- South of Loughborough (9043 and 9044);
- West of Shepshed (9037 and 9042);
- East of Shepshed (9041);

- South of Shepshed (9040);
- South East of Sileby (9038).

2.3.2 An indication of the access points for each of these locations was provided by CBC and these were coded into the highway network. In some cases, more access points were provided than were considered proportionate for coding into a strategic model and therefore some adjacent access points were combined. All the access points were assumed to be priority junctions with pocket lanes for turning right into the developments, and left turn flares for exiting the development areas, to ensure traffic was able to load in and out of the zones. The only exceptions to the priority junction coding were:

- South of A46 near Glenfield, where the north-western access on Gynsill Lane was coded as a roundabout, and a new arm was coded onto the existing roundabout at Anstey Lane/Bennion Road.
- South East of Sileby where the access on Ratcliffe Road was coded as a roundabout.

2.3.3 An initial model run highlighted large delays (~250 seconds in the 2037 PM Peak Baseline) at the junction between Queniborough Road and Barkby Road in Syston, which had been highlighted as a potential problem in the base year review. Signal optimisation was applied at this junction, and the resulting highway assignment showed a significant reduction in delay (~120 seconds in 2037 PM Baseline). It will be important to take into account the existing high level of delay at this location in the Baseline when considering the Local Plan scenario forecasts.

2.4 Local Plan Assumptions

2.4.1 This section details the development of the planning data inputs to represent the household and employment developments in each of the proposed sites, and the forecast assumptions used to represent the Local Plan options in PRTMv2.

2.4.2 Table 2.3 shows the proposed developments for Local Plan Options 1 and 2, highlighting the differences in development distribution between the two options.

Table 2.3: Local Plan Distribution Summary, Option 1 and 2

Hierarchy	Settlement	Homes (dwellings) & Employment (ha)		Schools (Form Entry)	
		Option 1	Option 2	Option 1	Option 2
Leicester Urban Area	Birstall, Glenfield, Syston and Thurmaston	1,852	2,275	2FE at Syston	2FE at Syston
Loughborough	Loughborough	2,262	2,319	2FE	2FE
Shepshed	Shepshed	2,021 & 5ha	2,212 & 5ha	3FE	3FE
Service Centres (1,518)	Anstey	700	350	1FE	1/2FE Ext.
	Barrow upon Soar	700	700	1FE	1FE
	Quorn	105	105		
	Rothley	97	97		
	Sileby	700	266	1FE	
Other Settlements (1,168)	Cossington		124		1/2FE Ext.
	East Goscote	223	223		
	Hathern	85	85		
	Queniborough	155	230		
	Rearsby	47	113		
	Thrussington		60		
	Thurcaston		31		
Wymeswold		302			

- 2.4.3 The employment land was detailed by CBC as being split between B1C, B2, and B8 (Light Industrial, General Industrial, and Warehouse & Distribution¹) employment types. It was assumed that a third of each employment site would be dedicated to each employment type, allowing conversion of floor space to jobs based on job type.
- 2.4.4 The schooling data were provided by CBC by number of school places. A 'Pupil to Adult' (PAR²) ratio was extracted from the government education statistics database³ for Leicestershire-based primary schools, which was then adjusted to reflect the ratio of pupils to all teaching and non-teaching staff. The resulting 'Pupil to All Adult' ratio of 9.9 allowed an estimation of number of jobs based on school size.
- 2.4.5 As described in Section 2.3, a number of the locations have been modelled using 'development zones'⁴. It was agreed with CBC and their stakeholders that the highway trip rates for these zones should reflect those used in a previous high-level study of the Local Plan, evidenced by Leicestershire County Council, and extracted from LLITM Lite⁵, as the alternative default NTEM trip rates would otherwise understate the proposed development trips. A summary of these trip rates is shown in Table 2.4.

Table 2.4: Trip Rates for Sites within Development Zones

	Origin trips per household	Destination trips per household
AM Peak Hour	0.410	0.142
PM Peak Hour	0.142	0.410

- 2.4.6 The model has therefore been calibrated to reflect these proposed trip rates based on the number of households in the proposed development zones. Where development has been placed within its respective geographical zones, the trip rates will reflect base year matrix trip rates.

¹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/378203/employ-den.pdf

² "Pupil to adult ratio, excluding administrative, clerical, and auxiliary"

³ <https://explore-education-statistics.service.gov.uk/data-tables/school-workforce-in-england>

⁴ "Spare" zones which can be included in the transport model to represent developments; used where assessment of the development is the explicit aim of the modelling work or the development is large enough to require its own zone, as opposed to being incorporated into an existing model zone.

⁵ https://www.charnwood.gov.uk/files/documents/charnwood_borough_council_local_plan_option_testing_no_mitigation/Charnwood%20Borough%20Council%20Local%20Plan%20Option%20Testing%20%28No%20Mitigation%29.pdf

Section 3 – Initial Forecast Model Results

3.1 Introduction

3.1.1 Based on the forecasting assumptions set out in Section 2, this section details the model forecasts produced in the assessment of the proposed Local Plan options. This analysis includes:

- forecast changes in land-use assumptions (see Section 3.2);
- forecast changes in travel demand (see Section 3.3);
- forecast changes in mode share proportions (see Section 3.4).
- high-level highway network statistics (see Section 3.5);
- forecast highway flow changes between the Baseline and Local Plan options (see Section 3.6);
- forecast location and change in highway delays (see Section 3.7); and
- forecast location and change in junction volume over capacity (VoC) ratio (see Section 3.8).

3.2 Forecast Land-use Changes

- 3.2.1 The changes in population, employment, and car ownership between the 2014 Base Year, 2037 Baseline, and the 2037 Local Plan options have been assessed at district and county level. Figure 3.1, Figure 3.2, and Figure 3.3 show the changes in population, employment, and car ownership respectively.
- 3.2.2 There is a forecast 10-25% increase in population, 10-25% increase in employment, and a 2-10% increase in car ownership from 2014 to 2037 across Charnwood, Leicester, Blaby, and Leicestershire.
- 3.2.3 There is a forecast 1 percentage point (pp) increase in employment between the 2037 Baseline and 2037 Local Plan options since the majority of the Local Plan developments relate to housing, see. There is also a very small decrease in car ownership in Figure 3.3; due to the Local Plan housing developments being located in areas of high car ownership. Conversely, there is around a 10pp increase in population in Charnwood forecast between the 2037 Baseline and 2037 Local Plan options, see Figure 3.1. This forecast increase in population can also be seen across the whole of Leicestershire, translating to around a 2pp increase in population countywide, while Leicester City and Blaby remain flat with no change in population growth between the 2037 Baseline and 2037 Local Plan options.
- 3.2.4 Figure 3.1 also shows the differences in assumed population growth between the two Local Plan options. It can be seen that Local Plan Option 2 has around 1-2pp more population growth than Local Plan Option 1, which is a direct result of the differences in the development options (with Local Plan Option 2 proposing around 10% more growth than Local Plan Option 1).

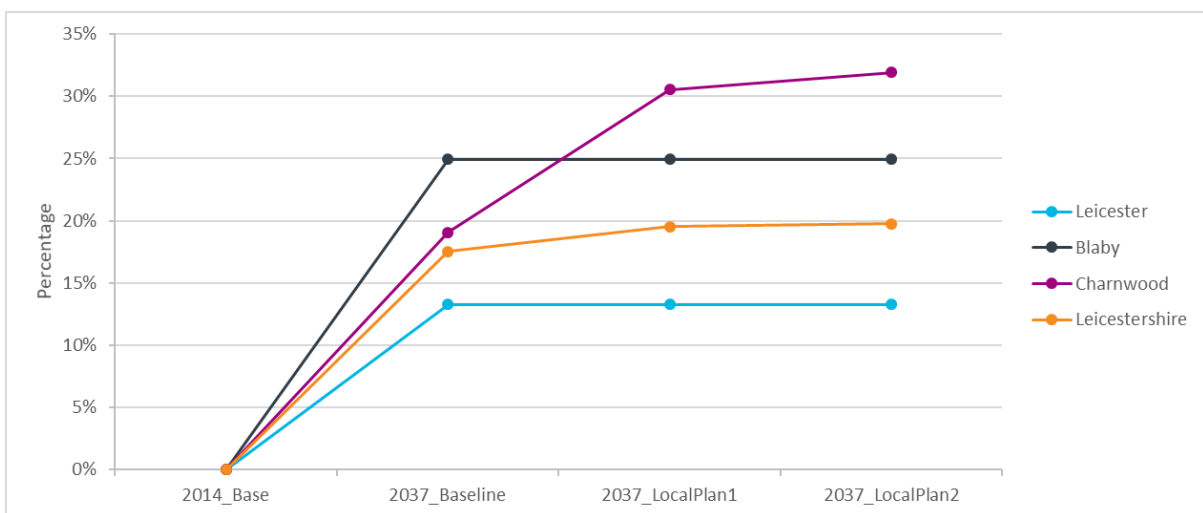


Figure 3.1: Population change between 2014 Base and 2037 Baseline and Local Plan options

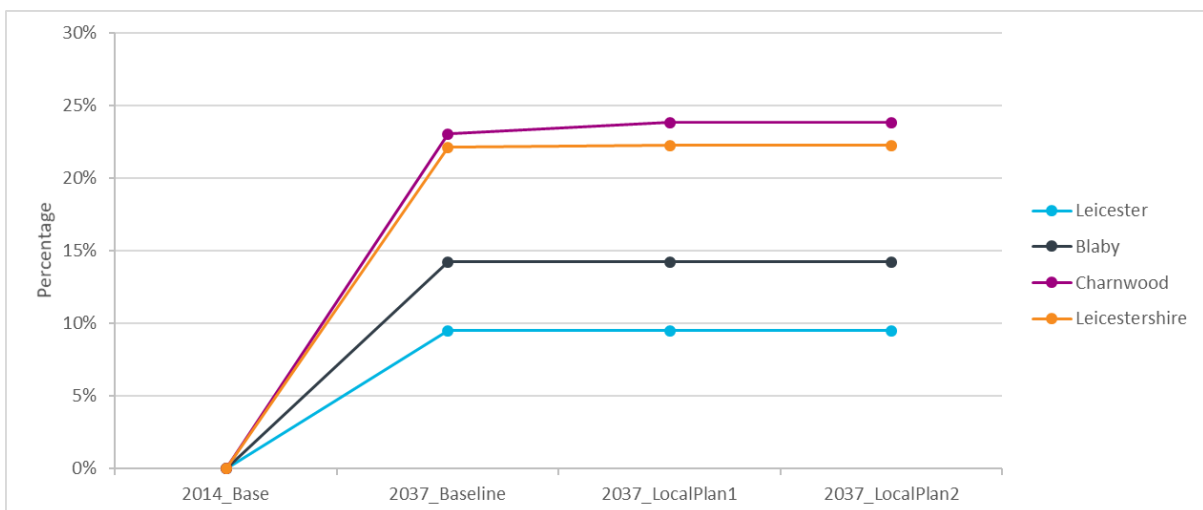


Figure 3.2: Employment change between 2014 Base and 2037 Baseline and Local Plan options

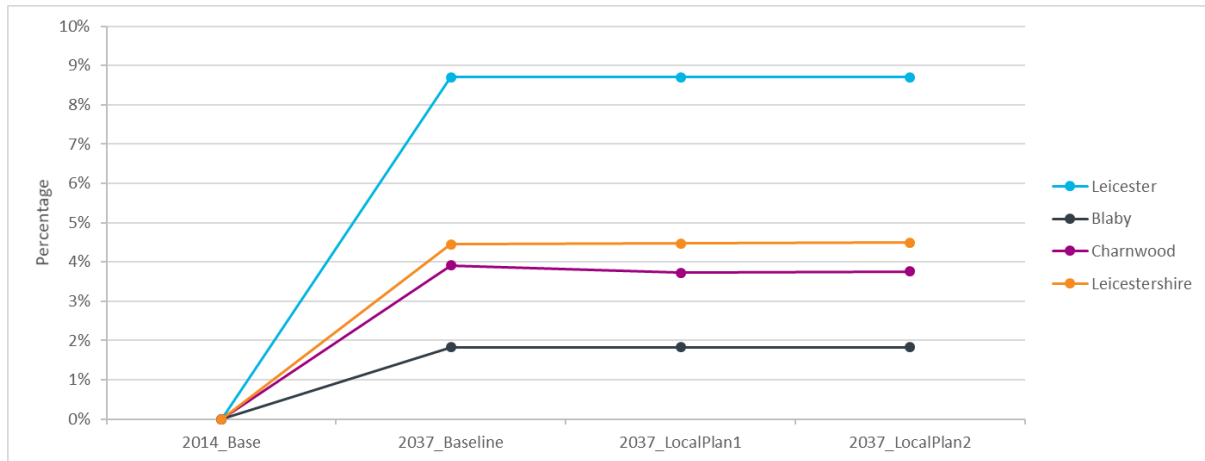


Figure 3.3: Car ownership change between 2014 Base and 2037 Baseline and Local Plan options

3.3 Forecast Travel Demand Changes

- 3.3.1 Figure 3.4, Figure 3.5, and Figure 3.6 show the demand growth from the 2014 Base Year for Commuting, Business, and Other purposes respectively.
- 3.3.2 All three graphs show around a 10-15% increase in forecast demand growth in Charnwood, dependent on travel purpose, between the 2014 Base Year and 2037 Baseline.
- 3.3.3 The growth in population between the 2037 Baseline and each of the Local Plan options is reflected in all three graphs with growth in demand within Charnwood. It can also be seen that for all three trip purposes there are small increases in demand in Leicester and Blaby between the 2037 Baseline and 2037 Local Plan options. This is due to the increase in trip attractions to Charnwood as a result of the proposed developments, and the resulting changes to trip distribution patterns as more people will travel between districts for work and leisure purposes.
- 3.3.4 There is also a small increase in forecast travel demand growth between Local Plan Option 1 and Local Plan Option 2 in Charnwood, and therefore also Leicestershire. This is due to the proposed additional ~1000 homes in Local Plan Option 2 and therefore forecast trip generation has increased across all purposes. Both Local Plan options propose five hectares of employment land, and Local Plan Option 1 proposes around 200 additional school places when compared with Local Plan Option 2, however the effect of this extra employment is small when compared with the additional population in Local Plan Option 1; hence the additional travel demand growth in Local Plan Option 2 compared with Local Plan Option 1 for leisure and work purposes is very similar.
- 3.3.5 Table 3.1, Table 3.2, and Table 3.3 show the same growth in demand as demonstrated in the graphs.

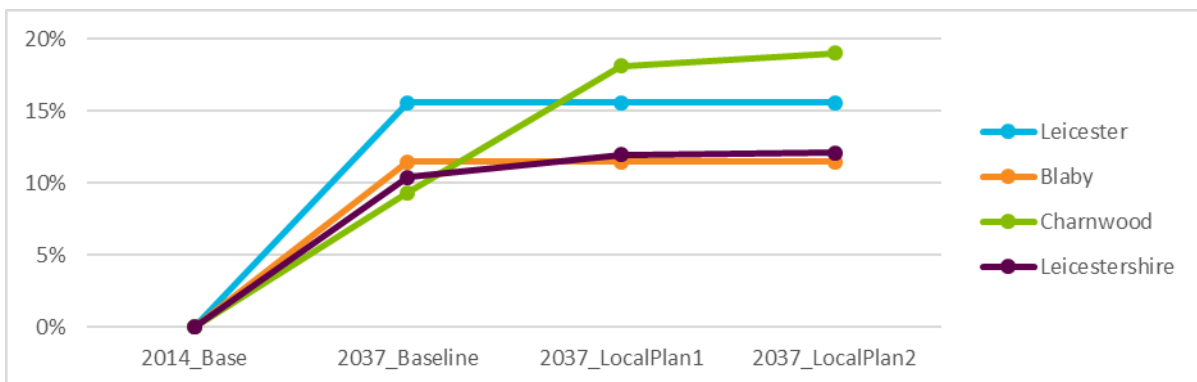


Figure 3.4: Travel demand growth from 2014, Commuting

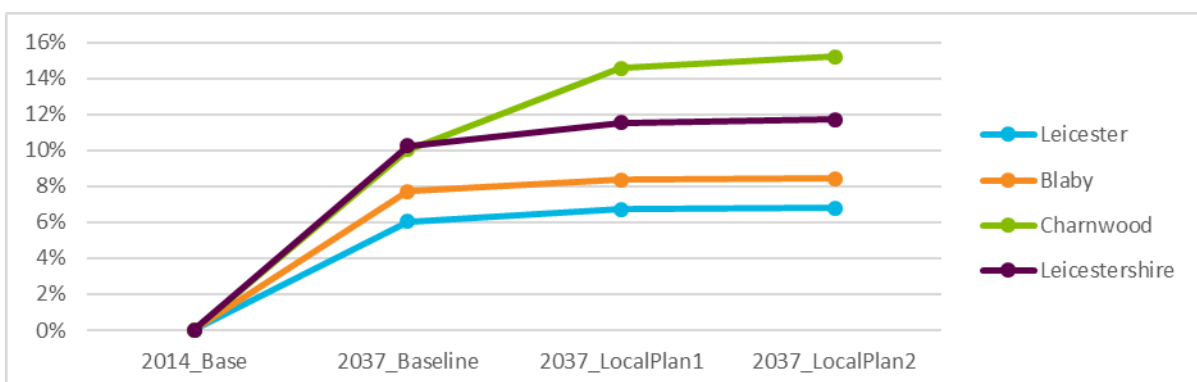


Figure 3.5: Travel demand growth from 2014, Business

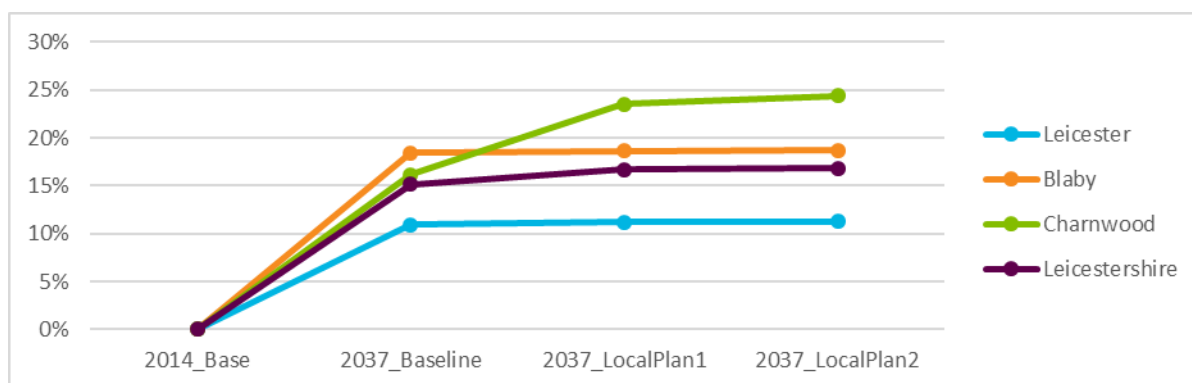


Figure 3.6: Travel demand growth from 2014, Other

Table 3.1: Travel demand growth from 2014, Commuting

District	2037 Baseline	2037 Local Plan 1	2037 Local Plan 2
Leicester	15.6%	15.6%	15.6%
Blaby	11.5%	11.5%	11.5%
Charnwood	9.3%	18.1%	19.0%
Leicestershire	10.4%	12.0%	12.1%

Table 3.2: Travel demand growth from 2014, Business

District	2037 Baseline	2037 Local Plan 1	2037 Local Plan 2
Leicester	6.1%	6.7%	6.8%
Blaby	7.7%	8.4%	8.4%
Charnwood	10.0%	14.6%	15.2%
Leicestershire	10.3%	11.5%	11.7%

Table 3.3: Travel demand growth from 2014, Other

District	2037 Baseline	2037 Local Plan 1	2037 Local Plan 2
Leicester	10.9%	11.2%	11.2%
Blaby	18.4%	18.7%	18.7%
Charnwood	16.1%	23.5%	24.4%
Leicestershire	15.2%	16.7%	16.8%

3.3.6 Figure 3.7 shows the freight demand growth between the 2014 Base Year and the 2037 Baseline and Local Plan options. The 25-40% growth seen across the districts and Leicestershire is in-line with the Road Traffic Forecasts 2018 (RTF18). It can be seen there is almost no variation in freight growth between the 2037 Baseline and 2037 Local Plan options. The small increase in growth between the 2037 Baseline and the 2037 Local Plan options in Charnwood, and by extension Leicestershire, is a result of the additional proposed employment locations. Table 3.4 shows the results in tabular format.

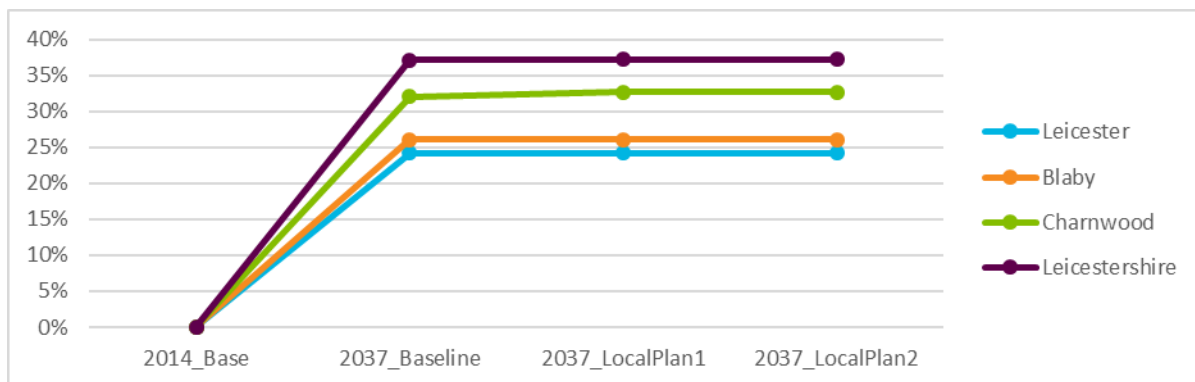


Figure 3.7: Travel demand growth from 2014, Freight

Table 3.4: Travel demand growth from 2014, Freight

District	2037 Baseline	2037 Local Plan 1	2037 Local Plan 2
Leicester	24.2%	24.2%	24.2%
Blaby	26.1%	26.1%	26.1%
Charnwood	32.1%	32.7%	32.7%
Leicestershire	37.2%	37.3%	37.3%

3.4 Forecast Mode Share Analysis

3.4.1 Figure 3.8, Figure 3.9, and Figure 3.10 show the 2014 Base Year, 2037 Baseline, and 2037 Local Plan options mode share proportions for highway, public transport, and active modes respectively. Highway mode share increases uniformly across the four geographical areas by 3-4pp. This is mode shift from public transport and active modes, which have around a 1pp and 3-4pp reduction in mode share respectively. Table 3.5, Table 3.6, and Table 3.7 show the tables of these results.

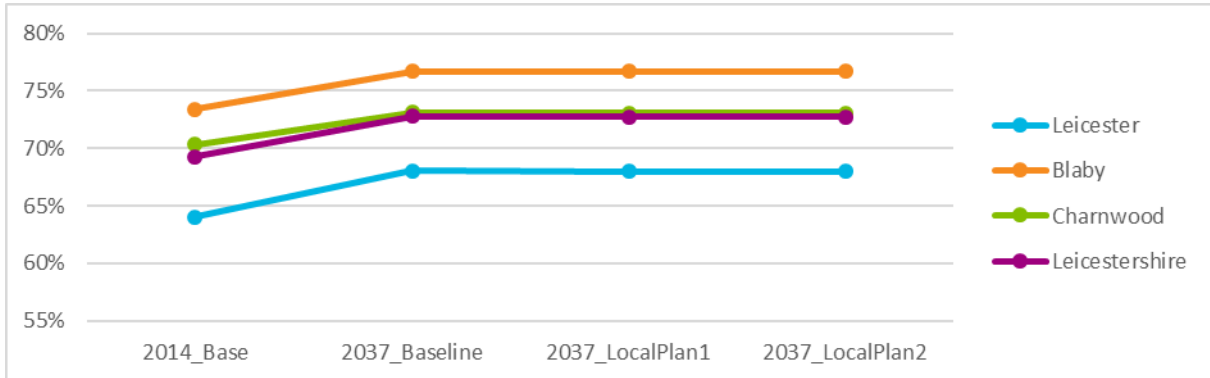


Figure 3.8: Forecast mode share by district, Highway

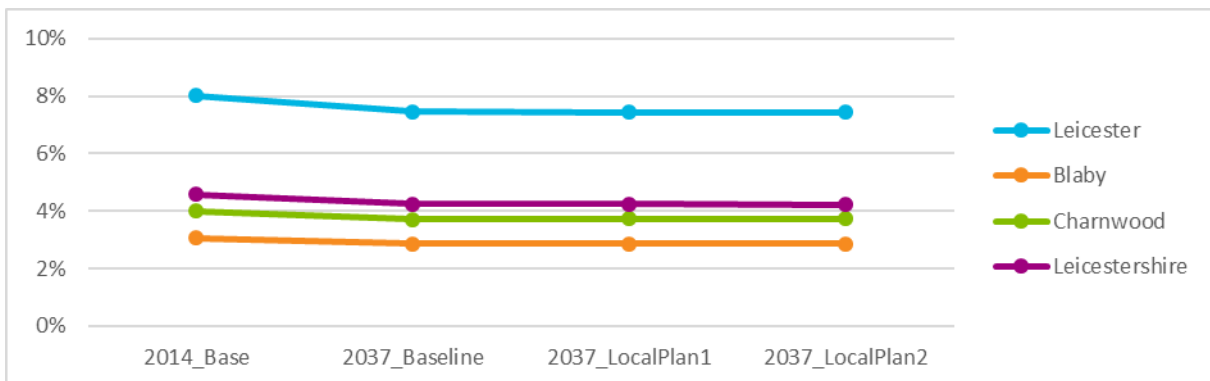


Figure 3.9: Forecast mode share by district, Public Transport

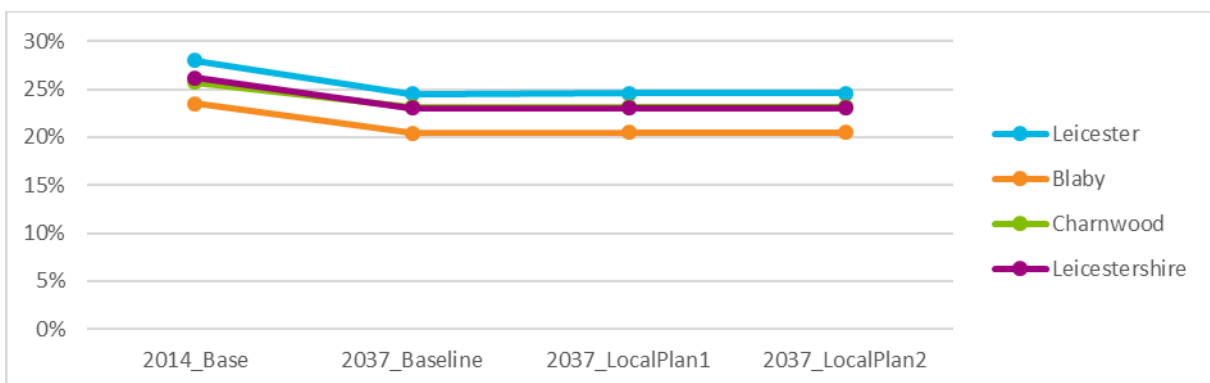


Figure 3.10: Forecast mode share by district, Active Modes

Table 3.5: Forecast mode share by district, Highway

District	2014 Base	2037 Baseline	2037 Local Plan 1	2037 Local Plan 2
Leicester	64%	68%	68%	68%
Blaby	73%	77%	77%	77%
Charnwood	70%	73%	73%	73%
Leicestershire	69%	73%	73%	73%

Table 3.6: Forecast mode share by district, Public Transport

District	2014 Base	2037 Baseline	2037 Local Plan 1	2037 Local Plan 2
Leicester	8%	7%	7%	7%
Blaby	3%	3%	3%	3%
Charnwood	4%	4%	4%	4%
Leicestershire	5%	4%	4%	4%

Table 3.7: Forecast mode share by district, Active Modes

District	2014 Base	2037 Baseline	2037 Local Plan 1	2037 Local Plan 2
Leicester	28%	25%	25%	25%
Blaby	24%	20%	20%	20%
Charnwood	26%	23%	23%	23%
Leicestershire	26%	23%	23%	23%

3.5 High-level Highway Network Statistics

- 3.5.1 Table 3.8, Table 3.9, and Table 3.10 show the high-level highway network statistics for 2037 in the AM Peak, Interpeak, and PM Peak, respectively. The 2037 Baseline is compared with the 2014 base year, and each Local Plan option is compared with the Baseline, across Charnwood, Blaby, Leicester City, and Leicestershire.
- 3.5.2 In 2037 for both Local Plan options within Charnwood, vehicle distance increases by around 3-4% and vehicle delay increases by around 14-15%, resulting in a drop in the average speed by around 3-4% in the AM and PM Peaks. These values are less pronounced in the Interpeak, with around a 2% increase in vehicle distance, 5% increase in vehicle delay, and hence a 1% decrease in average speed.
- 3.5.3 As expected, most of the changes are seen in Charnwood, however smaller changes are also seen across Leicester City and Blaby. Leicester City shows around a 1% increase in vehicle distance for both Local Plan options across all three time periods, while Blaby shows virtually no change. Leicester City shows a 2-3% increase in vehicle delay in the AM and PM Peaks, and around 1% in the Interpeak, while Blaby AM Peak and Interpeak show 1-2% increases in vehicle delays and the PM Peak increases by around 2-4%. This results in a reduction in average speed for Leicester City by around 1% in the AM and PM Peaks, with little to no change in the Interpeak, and a 1-2% reduction in average speed across Blaby in the PM Peak, with little to no change in the AM Peak and Interpeak.
- 3.5.4 When looking at the effects of the proposed developments across Leicestershire, both Local Plan options result in around a 1% increase in vehicle distance, a 3-4% increase in vehicle delay time, and therefore a 1% reduction in average speed for the AM and PM Peaks.
- 3.5.5 Overall, the differences in vehicle distance and vehicle delay between the two Local Plan options indicate Option 2 having a greater impact. Option 2 results in a 0-1pp greater increase in vehicle distance across the AM and PM Peaks, across all four areas, and a 0-2pp greater increase in vehicle delay. There is therefore a reduction in average speed around 1pp greater in Option 2 than Option 1. This is to be expected given the greater level of development modelled in Option 2 compared with Option 1.

Table 3.8: Highway Network Statistics: AM Peak

AM Peak		2014 Base	2037 Baseline	% change from 2014	2037 Local Plan Option 1	% change from Baseline	2037 Local Plan Option 2	% change from Baseline
Charnwood	Vehicle Distance (vehicle-km)	300,971	388,573	29%	402,075	3%	403,350	4%
	Vehicle Delay-Time (vehicle-hours)	1,657	2,707	63%	3,086	14%	3,108	15%
	Average Speed (kph)	48.2	44.8	-7%	43.3	-3%	43.2	-4%
Leicester City	Vehicle Distance (vehicle-km)	268,130	311,751	16%	313,778	1%	314,104	1%
	Vehicle Delay-Time (vehicle-hours)	4,444	6,515	47%	6,659	2%	6,705	3%
	Average Speed (kph)	25.7	22.8	-11%	22.7	-1%	22.6	-1%
Blaby	Vehicle Distance (vehicle-km)	279,999	330,215	18%	331,194	0%	331,239	0%
	Vehicle Delay-Time (vehicle-hours)	1,908	2,850	49%	2,888	1%	2,909	2%
	Average Speed (kph)	49.6	44.2	-11%	44.0	0%	43.9	-1%
Leicestershire	Vehicle Distance (vehicle-km)	2,101,240	2,688,127	28%	2,713,873	1%	2,716,265	1%
	Vehicle Delay-Time (vehicle-hours)	11,627	17,974	55%	18,631	4%	18,722	4%
	Average Speed (kph)	49.3	46.2	-6%	45.8	-1%	45.7	-1%

Table 3.9: Highway Network Statistics: Interpeak

Interpeak		2014 Base	2037 Baseline	% change from 2014	2037 Local Plan Option 1	% change from Baseline	2037 Local Plan Option 2	% change from Baseline
Charnwood	Vehicle Distance (vehicle-km)	192,894	273,506	42%	280,311	2%	281,201	3%
	Vehicle Delay-Time (vehicle-hours)	811	1,325	63%	1,386	5%	1,392	5%
	Average Speed (kph)	50.5	49.7	-2%	49.3	-1%	49.3	-1%
Leicester City	Vehicle Distance (vehicle-km)	202,581	247,863	22%	249,344	1%	249,631	1%
	Vehicle Delay-Time (vehicle-hours)	2,745	3,920	43%	3,968	1%	3,971	1%
	Average Speed (kph)	27.8	26.0	-6%	26.0	0%	26.0	0%
Blaby	Vehicle Distance (vehicle-km)	188,566	260,111	38%	260,905	0%	261,007	0%
	Vehicle Delay-Time (vehicle-hours)	727	1,230	69%	1,240	1%	1,241	1%
	Average Speed (kph)	58.3	55.7	-4%	55.6	0%	55.6	0%
Leicestershire	Vehicle Distance (vehicle-km)	1,472,108	2,039,459	39%	2,053,082	1%	2,054,883	1%
	Vehicle Delay-Time (vehicle-hours)	6,179	9,930	61%	10,070	1%	10,082	2%
	Average Speed (kph)	52.7	51.8	-2%	51.7	0%	51.7	0%

Table 3.10: Highway Network Statistics: PM Peak

PM Peak		2014 Base	2037 Baseline	% change from 2014	2037 Local Plan Option 1	% change from Baseline	2037 Local Plan Option 2	% change from Baseline
Charnwood	Vehicle Distance (vehicle-km)	306,742	397,204	29%	409,883	3%	411,118	4%
	Vehicle Delay-Time (vehicle-hours)	1,593	2,880	81%	3,272	14%	3,312	15%
	Average Speed (kph)	49.5	44.6	-10%	43.0	-4%	42.8	-4%
Leicester City	Vehicle Distance (vehicle-km)	266,222	306,610	15%	308,543	1%	308,957	1%
	Vehicle Delay-Time (vehicle-hours)	4,378	6,225	42%	6,323	2%	6,363	2%
	Average Speed (kph)	25.9	23.3	-10%	23.2	0%	23.1	-1%
Blaby	Vehicle Distance (vehicle-km)	288,701	340,307	18%	340,731	0%	342,521	1%
	Vehicle Delay-Time (vehicle-hours)	1,636	2,773	70%	2,825	2%	2,896	4%
	Average Speed (kph)	52.6	45.2	-14%	44.9	-1%	44.5	-2%
Leicestershire	Vehicle Distance (vehicle-km)	2,154,787	2,759,407	28%	2,784,608	1%	2,789,862	1%
	Vehicle Delay-Time (vehicle-hours)	11,485	18,236	59%	18,853	3%	19,023	4%
	Average Speed (kph)	50.1	46.5	-7%	46.1	-1%	46.0	-1%

3.6 Forecast Change in Highway Flows

- 3.6.1 Figure 3.11 to Figure 3.14 show the forecast highway flow changes in the AM and PM Peaks between the Local Plan options and the Baseline scenario. The same plots for the Interpeak are shown in Figure 3.15 and Figure 3.16. It is worth noting the different scale used for the Interpeak plots compared with the peaks.
- 3.6.2 For both Local Plan options there is a consistent increase in traffic seen across Charnwood and north Leicester in both AM and PM Peaks, with larger traffic flows around Shepshed, Loughborough, and Syston. This is consistent with the locations of the proposed Local Plan developments, and highlights both the routing of the development trips accessing the Strategic Road Network (SRN) and travelling to urban attraction areas, such as Loughborough and Leicester.
- 3.6.3 There are also small reductions in traffic flow on the A46 towards Newark and the A607 towards Melton Mowbray. This is likely to be modelled changes in the patterns of trips due to the introduction of more housing and employment sites in Charnwood, and therefore fewer trips being made from external urban areas.
- 3.6.4 In the AM Peak it can be seen there is a reduction of southbound traffic on the A6004 just south of Loughborough. Upon further inspection of the highway assignment, and also highlighted in the delay plots in Figure 3.19 and Figure 3.21 in Section 3.7, there is significant delay at One Ash Roundabout where the A6004 meets the A6. This is due to the increase in AM Peak traffic produced from the additional ~1000 homes in the developments to the west of the roundabout joining the A6004, and hence some local rerouting of traffic choosing to join the A6 earlier has occurred.
- 3.6.5 In the PM Peaks it can be seen there is a reduction of traffic on the A46 just north of Bradgate Heights with a similar increase in traffic along Groby Road and Leicester Road, near Anstey. The increase in traffic towards Bradgate Park is due to the two (Local Plan Option 2) or three (Local Plan Option 1) developments proposed north of the A46. The additional traffic from the developments increases the flows joining the A46 from the Leicester Road junction, and the resulting flow from the slip road is causing an increase in delay on the main A46 carriageway, resulting in routing of traffic away from the A46 route onto local roads. There is also some rerouting at the A46 junction with Ratby Lane shown by an increase in traffic on the A46 and reduction on the entry slip road in the Local Plan options when compared with the Baseline. This is indicative of large delays and pre-existing congestion on the A46 in the Baseline as there is no corresponding material change in delay in the same location; this is shown further in Figure 3.20 and Figure 3.22 in Section 3.7.
- 3.6.6 The Interpeak is generally less congested than the AM and PM Peaks, which is shown in Figure 3.15 and Figure 3.16, as there is much less local rerouting across Charnwood. There is a consistent increase in traffic flow across the borough, which is expected due to the additional housing developments in both Local Plan options, and minor rerouting around Syston. There is also some local rerouting in Leicester City in Local Plan Option 1, however the scale of this is small and is not due to the introduction of a proposed development in the vicinity.

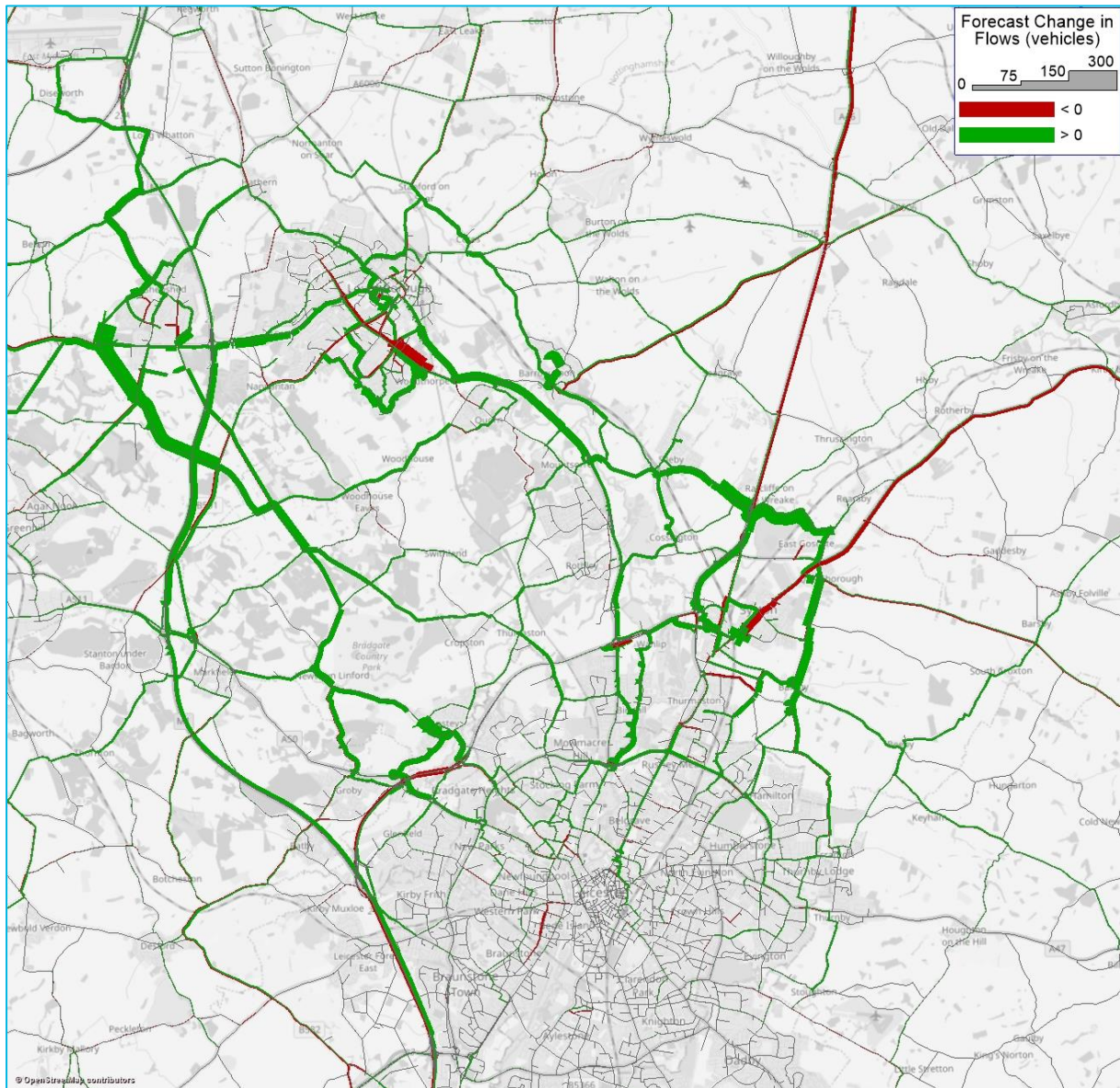


Figure 3.11: Highway Traffic Flow Change, Local Plan 1 minus Baseline, AM Peak

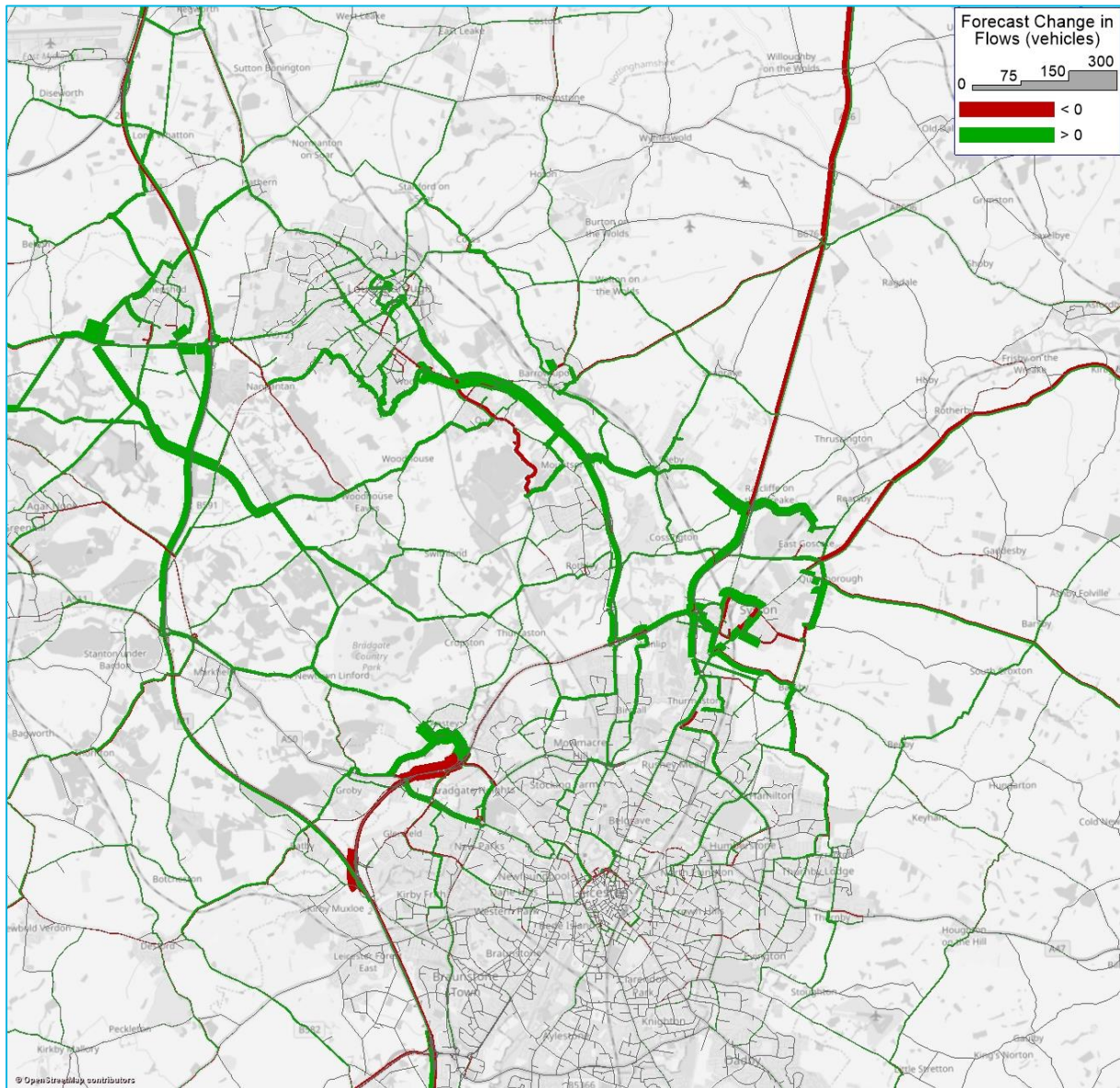


Figure 3.12: Highway Traffic Flow Change, Local Plan 1 minus Baseline, PM Peak

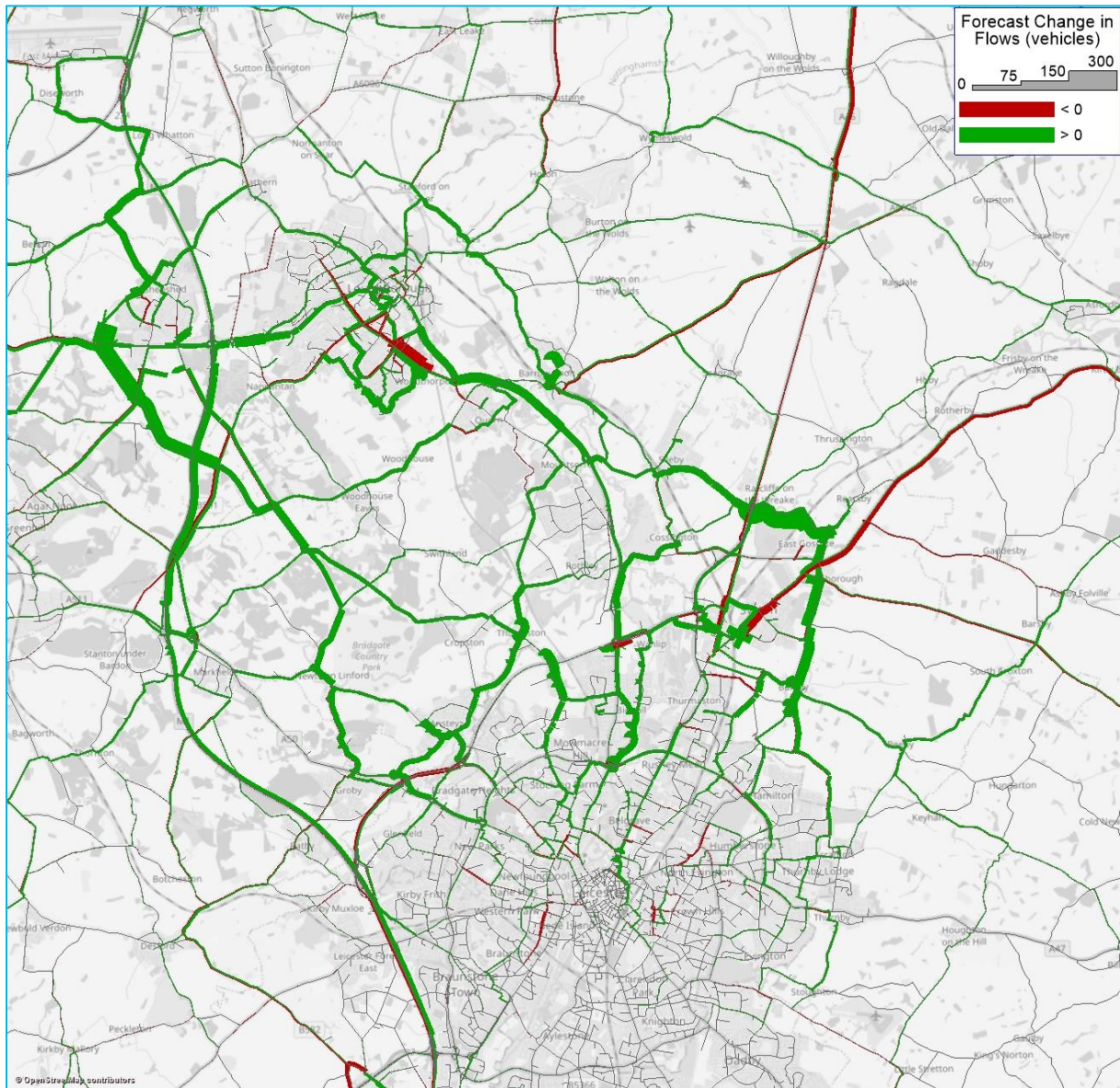


Figure 3.13: Highway Traffic Flow Change, Local Plan 2 minus Baseline, AM Peak

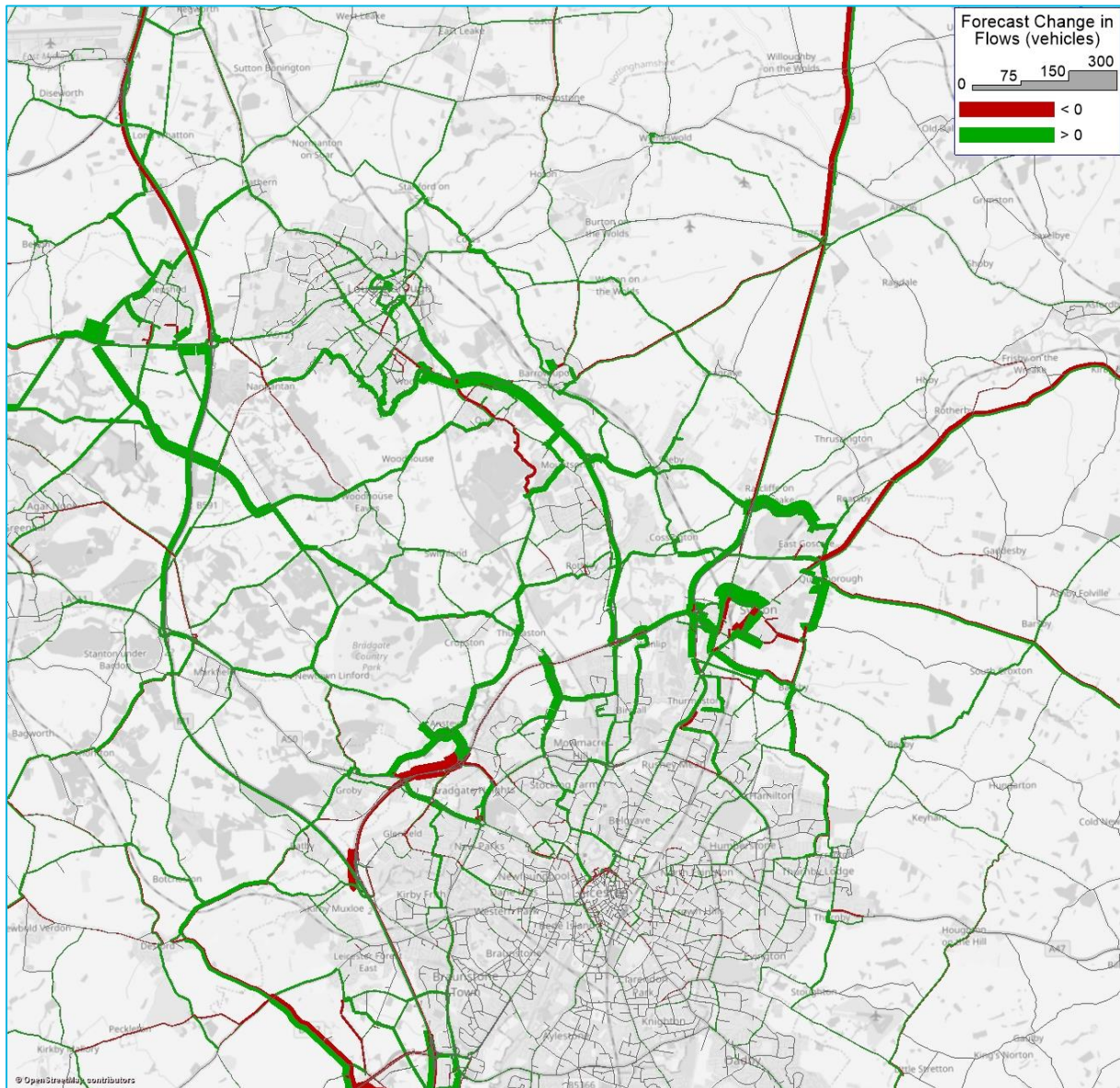


Figure 3.14: Highway Traffic Flow Change, Local Plan 2 minus Baseline, PM Peak

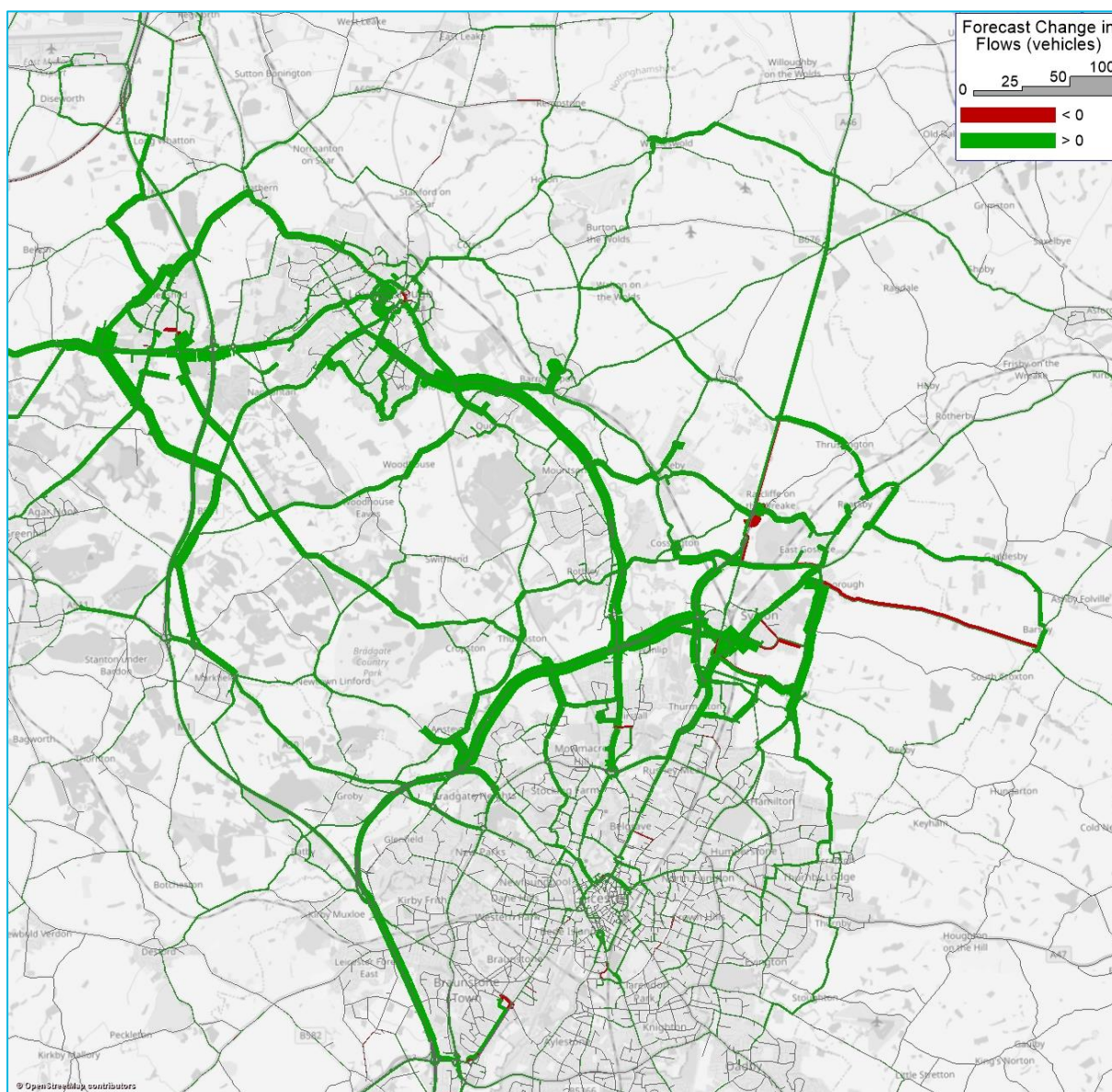


Figure 3.16: Highway Traffic Flow Change, Local Plan 2 minus Baseline, Interpeak

- 3.6.7 It can be seen from Figure 3.11 to Figure 3.16 that the model response to the two Local Plan options is of a similar scale, hence it is useful to look at the flow changes between the two Local Plan options directly.
- 3.6.8 Figure 3.17 and Figure 3.18 show the forecast highway flow changes in the AM and PM Peaks between Local Plan Option 1 and Local Plan Option 2, where the change shown is relative to Local Plan Option 2. Note the scale used in these figures has been changed from the Baseline comparison figures above.
- 3.6.9 The largest difference in flow between Local Plan Option 1 and Local Plan Option 2 across both the AM and PM Peaks is the reduction in traffic on Leicester Road north and south of Thurstaston in Local Plan Option 1 from Local Plan Option 2. This is a result of the different planning data proposed for each Option, with Local Plan Option 2 including development in this location which is not included in Option 1.
- 3.6.10 Similarly, the increase in traffic seen near Ratcliffe on the Wreake is due to the development located south east of Sileby, in Option 1 which is not included in Option 2. The smaller changes in flow to the south of Shepshed are also due to the differences in Local Plan options.
- 3.6.11 The remainder of the changes in flows are small in magnitude, fewer than 50 vehicles, and are due to small localised delays and rerouting. Figure 3.18 also shows some rerouting occurring south west of Leicester which is a known area of instability in the model network. Since this area is not close to the proposed developments it has little to no impact on the changes due to the Local Plan options.

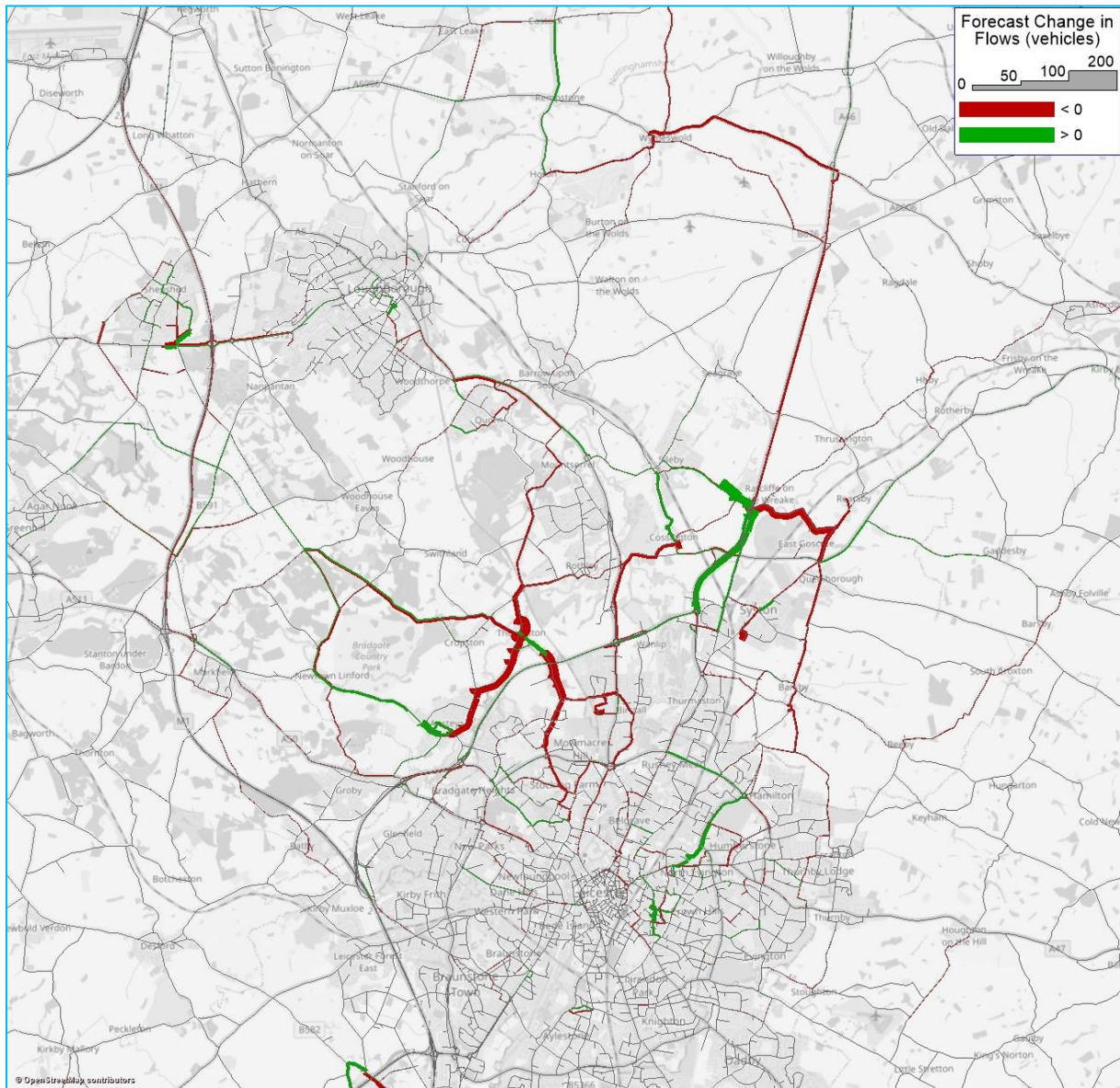


Figure 3.17: Highway Traffic Flow Change, Local Plan 1 minus Local Plan 2, AM Peak

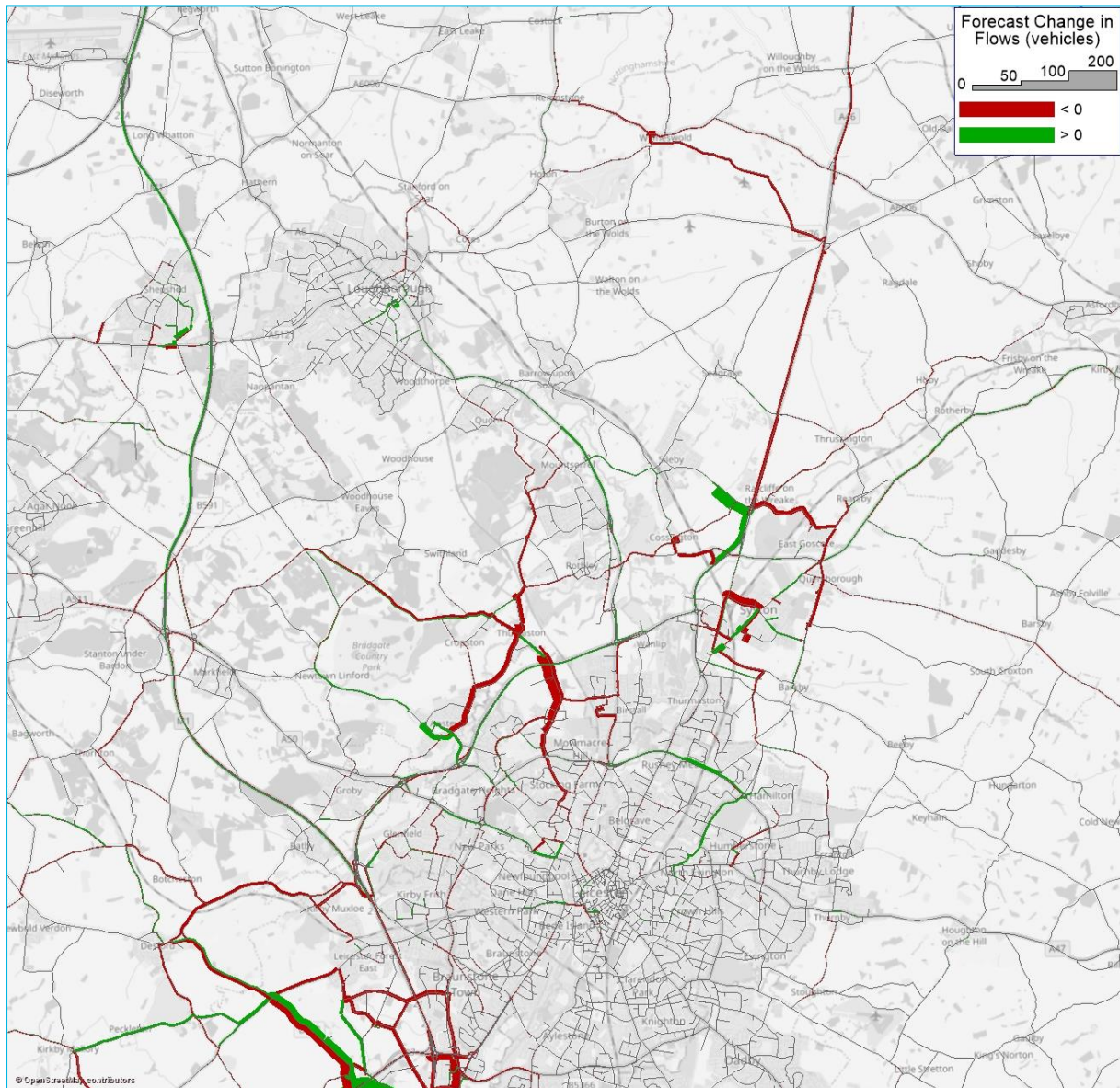


Figure 3.18: Highway Traffic Flow Change, Local Plan 1 minus Local Plan 2, PM Peak

3.7 Forecast Change in Highway Delay

- 3.7.1 Figure 3.19 to Figure 3.22 show the forecast highway delay change in the AM and PM Peaks between the Local Plan options and the Baseline scenario. The same plots for the Interpeak are shown in Figure 3.23 and Figure 3.24. It is worth noting the change of scale used for the Interpeak plots compared with the peaks.
- 3.7.2 For both Local Plan options in the AM Peak there is an increase in delay focused in and around Loughborough, Nanpantan, and Shepshed to the west. The delay points shown in Figure 3.19 and Figure 3.21 are in the vicinity of the larger scales of development surrounding Loughborough, or are on the main access routes into Loughborough from the development areas. This is consistent with the pattern of people generally entering more urban areas in the AM Peak to access employment. Similarly, the delays shown around Syston are adjacent to areas with a larger scale of development proposed where traffic is accessing main roads heading towards Leicester in the AM Peak.
- 3.7.3 For both Local Plan options in the PM Peak there is an increase in delays focused around Syston. The delay points shown in Figure 3.20 and Figure 3.22 are on links adjacent to two of the key development zones south of Loughborough in both Local Plan Option 1 and 2. This is the junction previously mentioned in the base year review and in §2.3.3.
- 3.7.4 Overall the delays across both the AM and PM Peaks are localised around the larger proposed developments around Loughborough and Syston, with some smaller delays showing near the development in and around Nanpantan and Shepshed. Despite the flow differences on the A46 seen in Figure 3.12 and Figure 3.14, there do not appear to be large delays causing this, as mentioned in §3.6.5. This indicates the A46 is already congested in the Baseline and hence the additional traffic brought on by the Local Plan options is the driving force behind the rerouteing seen on an already unstable section of the network.
- 3.7.5 The Interpeak is generally less congested than the AM and PM Peaks, which is shown in the scale of the delays in Figure 3.23 and Figure 3.24. There are small increases in delay around Loughborough and Syston, in locations similar to what is seen in the AM and PM Peaks, around the development proposed in these areas. In Local Plan Option 1 and 2 there are small increases in delay within Leicester City, however this is not due to the introduction of any proposed development, and they are of relatively small magnitude for an urban area. In Local Plan Option 2 there is a small increase in delay to the north west of Leicester which, upon further inspection of the assignment, is attributable to trips originating from Glenfield Hospital and therefore is not due to the introduction of a proposed development in the vicinity.

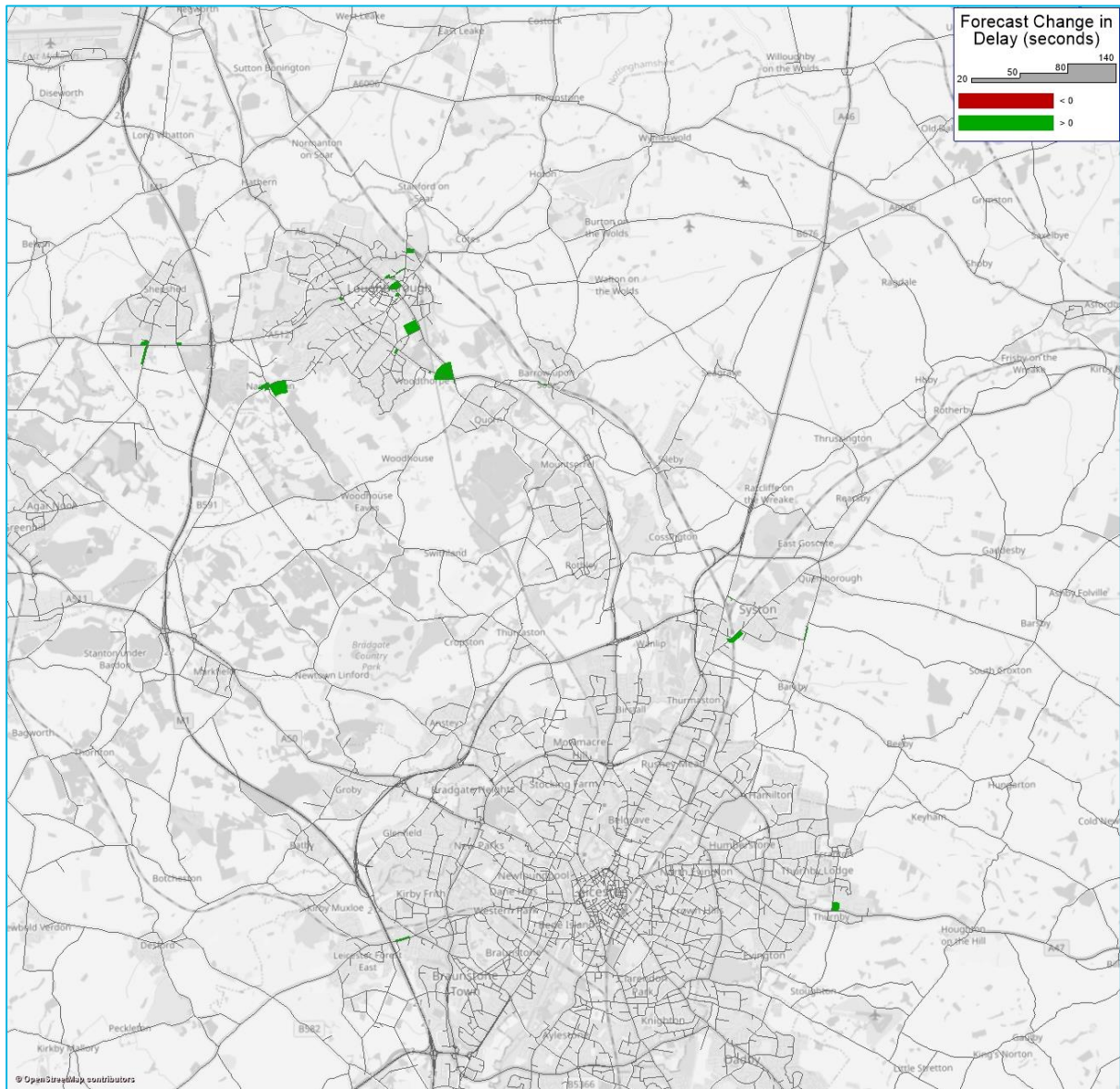


Figure 3.19: Highway Delay Change, Local Plan 1 minus Baseline, AM Peak

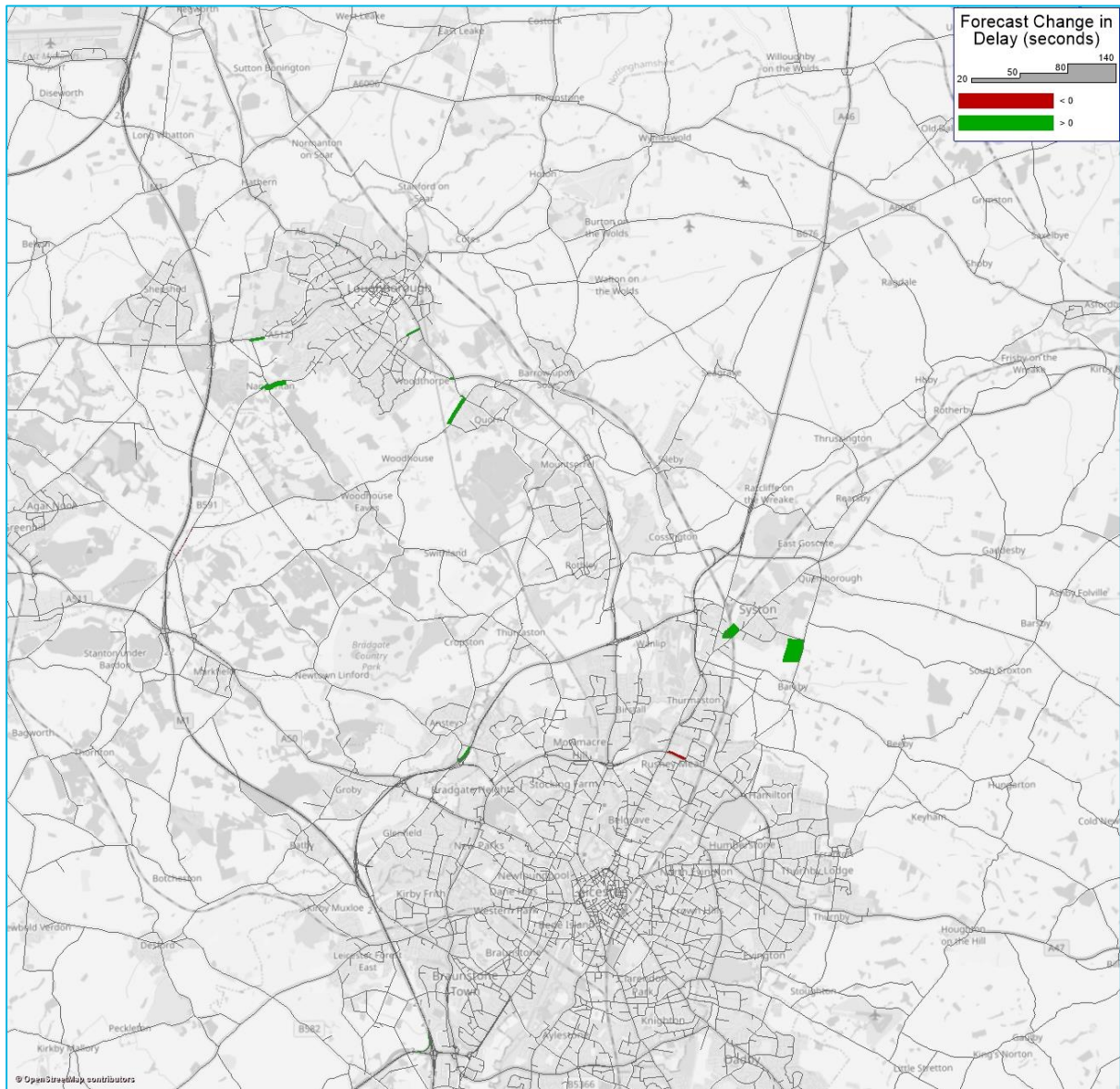


Figure 3.20: Highway Delay Change, Local Plan 1 minus Baseline, PM Peak

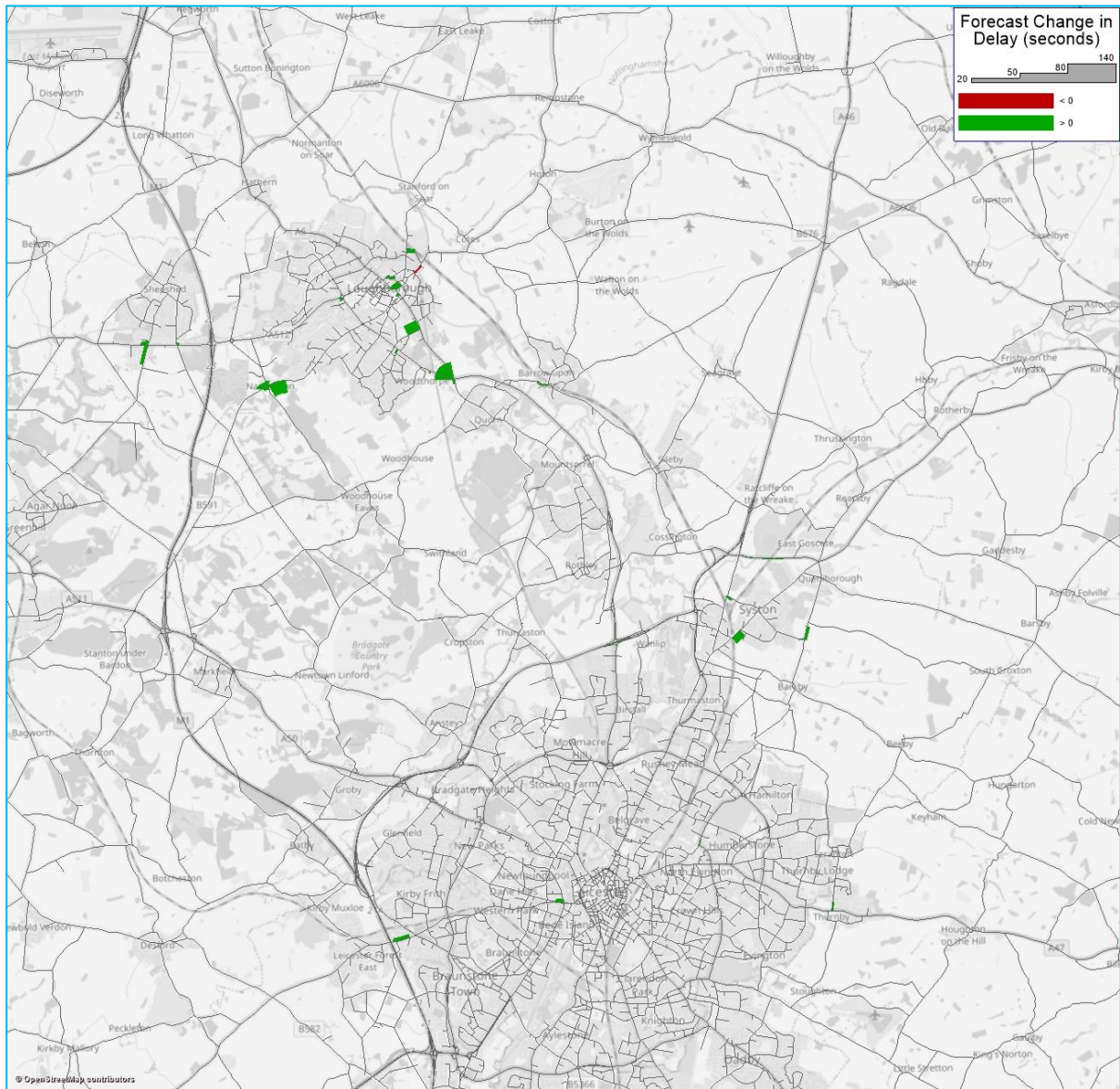


Figure 3.21: Highway Delay Change, Local Plan 2 minus Baseline, AM Peak

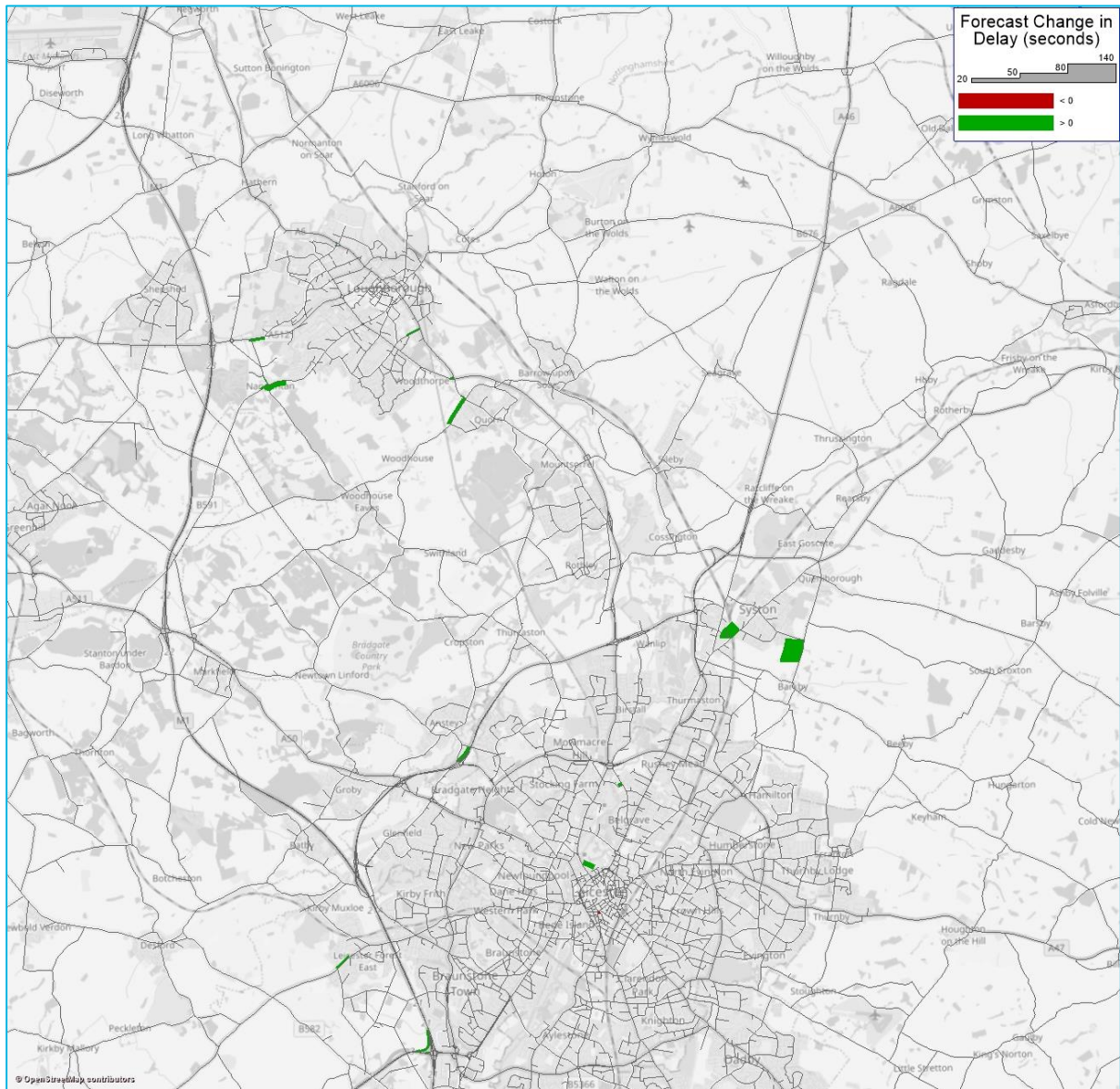


Figure 3.22: Highway Delay Change, Local Plan 2 minus Baseline, PM Peak

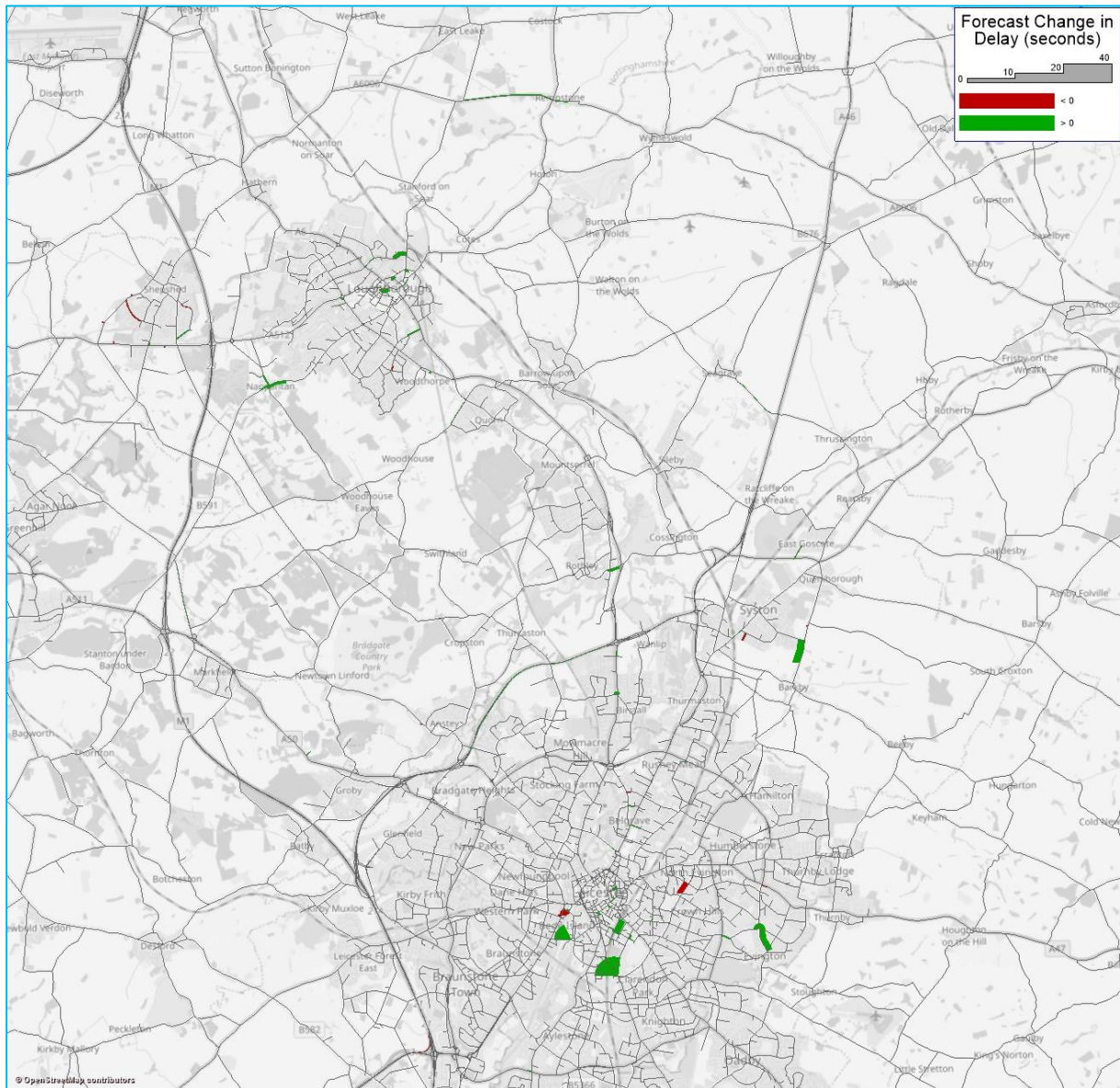


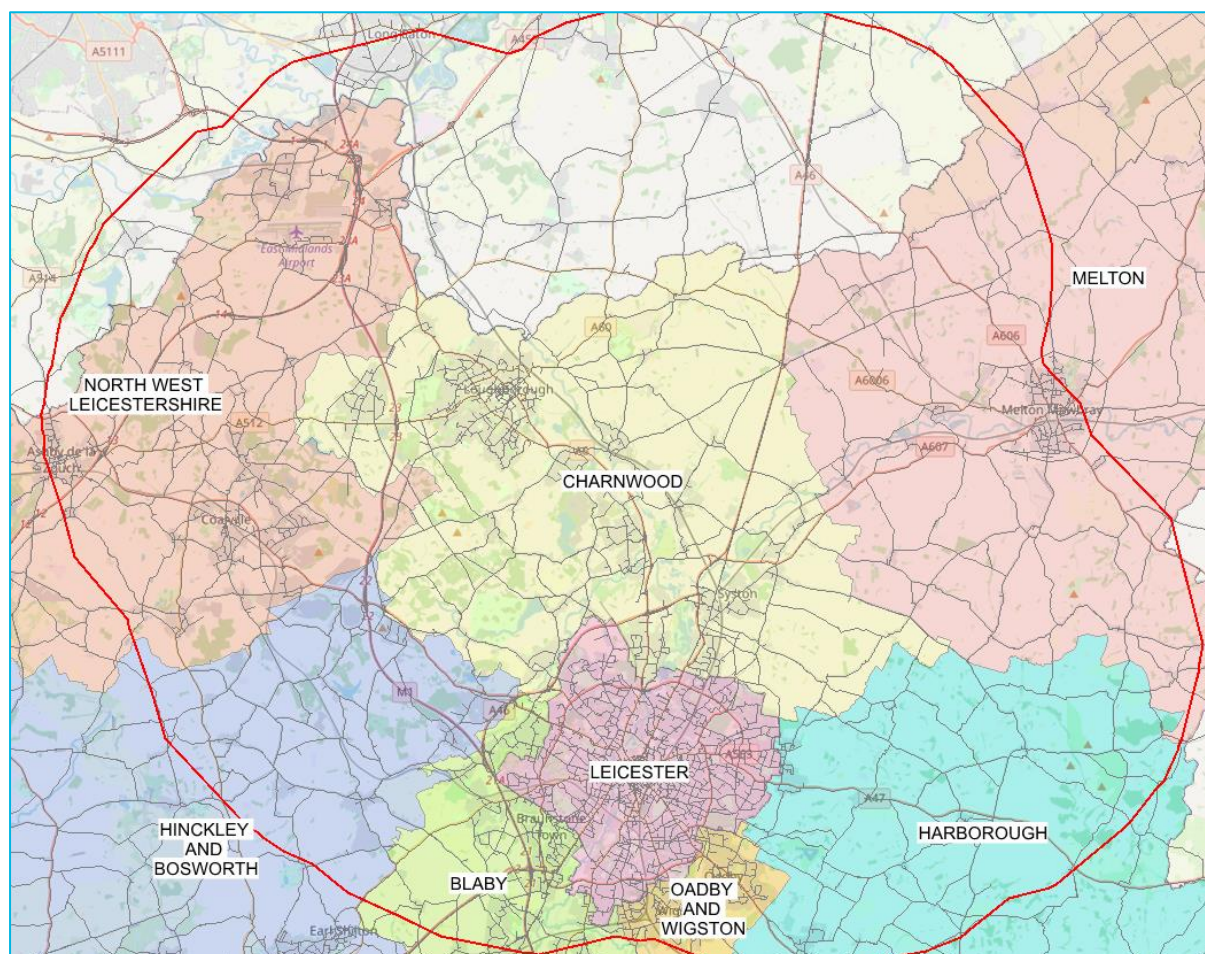
Figure 3.23: Highway Delay Change, Local Plan 1 minus Baseline, Interpeak



Figure 3.24: Highway Delay Change, Local Plan 2 minus Baseline, Interpeak

3.8 Forecast Junction Volume-Capacity Analysis

3.8.1 The assessment of junction volume over capacity (VoC) ratios has been undertaken for all links within the study area defined in the base year review, see Figure 3.25.



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Figure 3.25: Base Year Review Study Area Definition

- 3.8.2 Table 3.11 and Table 3.12 show the list of junctions for the AM and PM Peaks which have a maximum VoC ratio (across any arm) either greater than 80% in the Baseline, or becomes over 80% in at least one of the Local Plan options, and the change between the Baseline and at least one of the Local Plan options is greater than 5pp. These lists therefore exclude any junctions which have a maximum VoC across all arms over 80% in the Baseline which do not exhibit at least a 5pp change due to the assumed Local Plan developments.
- 3.8.3 The entries highlighted in red show the junctions that exhibit over 100% VoC ratio in at least one of the Local Plan options (allowing for rounding). These lists exclude any junctions which already have a maximum VoC, across all arms, over 100% in the Baseline, as these junctions are already under strain without the Local Plan developments.
- 3.8.4 The criteria for this VoC assessment have been defined based on an attempt to isolate the effect of the Local Plan option developments, and therefore assess the most likely points of congestion based on the added development demand.
- 3.8.5 The entries highlighted in yellow indicate a junction that satisfies the conditions described in §3.8.2 across both the AM and PM Peaks.

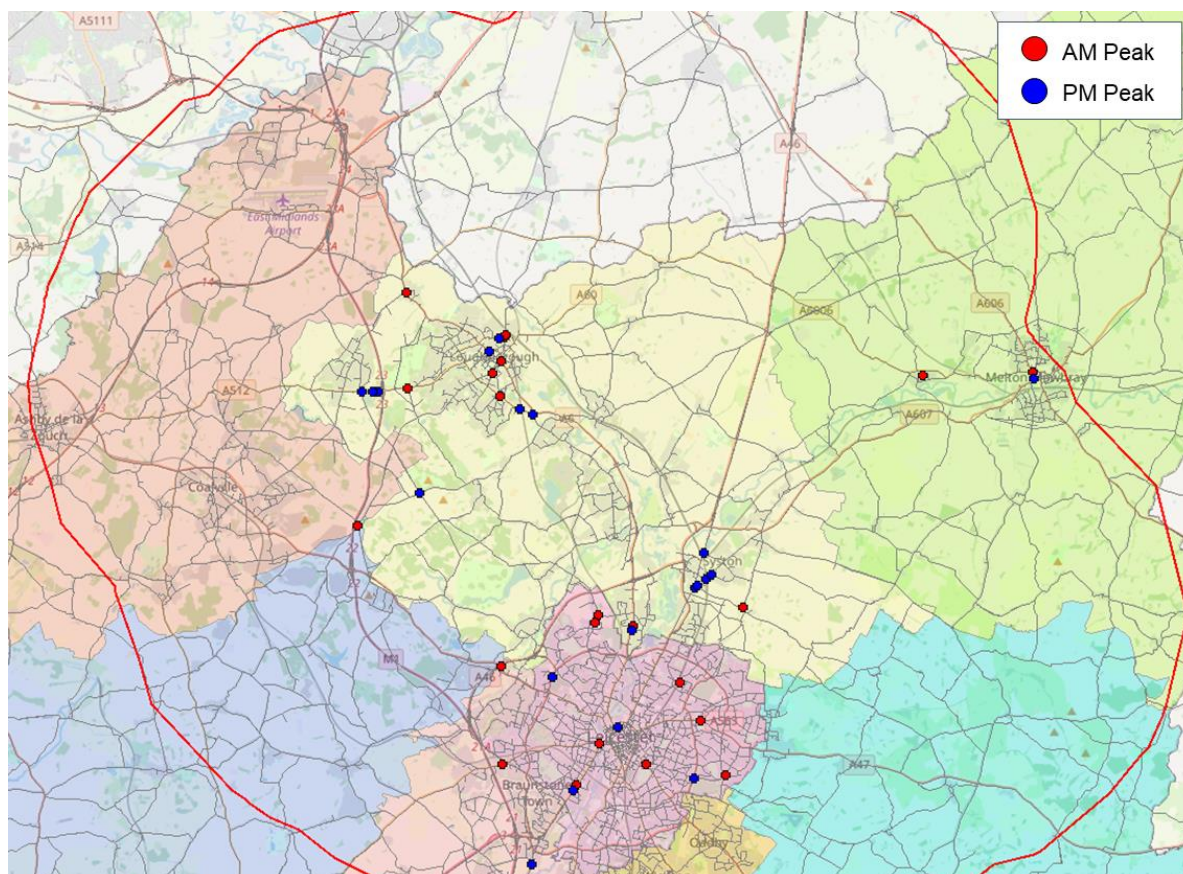
Table 3.11: Volume over Capacity Ratios over 80%, 2037 AM Peak

AM Peak VoC			Junction
Baseline	Option 1	Option 2	
82%	80%	87%	Junction of Narborough Road and Fullhurst Avenue, Leicester
86%	90%	94%	Junction of Ashton Green Road and Greengate Lane, Leicester
91%	100%	100%	Junction of the A6 London Road and Granville Road/Evington Road, Leicester
75%	80%	81%	Junction of Barkby Road and Fairfax Road, Leicester
77%	79%	83%	Junction of the A47 Uppingham Road and Humberstone Drive, Leicester
71%	91%	93%	Junction of Fosse Way and Syston High Street, Syston, Charnwood
83%	87%	89%	Junction of Spencefield Lane and Goodwood Road/Marydene Drive, Leicester
62%	78%	80%	Junction of Queniborough Road and Barkby Main Street, Barkby, Charnwood
85%	83%	93%	Junction of the A47 King Richards Road/St Augustine Road and Tudor Road/Narborough Road North, Leicester
87%	99%	100%	Junction of the A47 Hinckley Road and Holmfield Avenue West, Leicester
67%	66%	92%	Southbound slip road of the A46 Leicester Western Bypass junction with the A50, Anstey, Charnwood
72%	81%	81%	Junction of the A606 Nottingham Road/A606 Wilton Road and the A607/Ashfordby Road, Melton Mowbray, Melton
86%	91%	91%	Junction of Whitwick Road and Copt Oak Road, Coalville, North West Leicestershire
79%	84%	84%	Junction of Ling Road and Woodthorpe Road, Loughborough, Charnwood
71%	81%	78%	Junction of Belton Road/Ratcliffe Road and Meadow Lane, Loughborough, Charnwood
81%	89%	89%	Junction of Woodgate and Leicester Road/Loughborough High Street, Loughborough, Charnwood
72%	80%	80%	Junction of the A512 and Snell's Nook Lane, Nanpantan, Charnwood
73%	84%	84%	Junction of Shepshed Road and the A6 Derby Road, Hathern, Charnwood
80%	85%	85%	Forest Road northbound approach to Epinal Way roundabout, Loughborough, Charnwood
89%	95%	94%	Junction of Royland Road and Park Road, Loughborough, Charnwood
81%	84%	88%	Junction of Johnson Road and the A6 Loughborough Road, Leicester
89%	91%	94%	Junction of Ashton Green Road and proposed road from Thurcaston Road, Leicester
56%	100%	101%	Junction of Meadow Avenue and Meadow Lane, Loughborough, Charnwood

Table 3.12: Volume over Capacity Ratios over 80%, 2037 PM Peak

PM Peak VoC			Junction
Baseline	Option 1	Option 2	
81%	100%	100%	Junction of Burleys Way/Vaughan Way and St. Margaret's Way, Leicester
88%	93%	93%	Junction of School Lane and the A6 Loughborough Road, Leicester
78%	86%	85%	Junction of Melton Road and Fosse Way, Syston, Charnwood
80%	85%	85%	Junction of Evington Road and Stoughton Drive/Wakerley Road, Leicester
71%	84%	83%	Junction of Melton Road and Barkby Lane, Syston, Charnwood
73%	77%	84%	Junction of Fosse Way and Syston High Street, Syston, Charnwood
84%	101%	101%	Junction of Melton Road and Goodes Lane, Syston, Charnwood
87%	95%	95%	Exit of the M1 Junction 23 to the A512 Ashby Road East, Shepshed, Charnwood
76%	81%	81%	Junction of Broad Street and the A6 Derby Road, Loughborough, Charnwood
58%	58%	100%	Junction of Somerville Road and Narborough Road, Leicester
83%	84%	92%	Blaby Road southbound approach to St Johns/Leicester Road roundabout, Enderby, Blaby
91%	92%	98%	Junction of the Enderby Park-and-Ride and St Johns, Enderby, Blaby
89%	93%	94%	Junction of Glenfrith Way and Hallgate Drive, Leicester
87%	77%	100%	Junction of the A606 Leicester Street and the A607 Leicester Road/A606 Wilton Road, Melton Mowbray, Melton
80%	89%	89%	Junction of the access to the Woodthorpe Development south of Loughborough and the A6004, Loughborough, Charnwood
87%	96%	96%	Junction of the B5330 and Beacon Road, Beacon Hill, Charnwood
87%	95%	95%	Approach to the M1 Junction 23 from the A512 Ashby Road East, Shepshed, Charnwood
81%	89%	89%	Exit of One Ash Roundabout to Terry Yardley Way northbound, Quorn, Charnwood
87%	95%	95%	Approach to Ingleberry Road junction on the A512 Ashby Road East, Shepshed, Charnwood
94%	100%	99%	Junction of Wanlip Road and Melton Road, Syston, Charnwood
45%	82%	82%	Junction of Belton Road and Bottleacre Lane, Loughborough, Charnwood

3.8.6 Figure 3.26 shows the locations of the junctions listed in Table 3.11 and Table 3.12 in relation to the locations of the proposed Local Plan Option developments. It can be seen that there is clustering of impacted junctions in the vicinity of the development proposed in Local Plan Option 1 and 2, for instance around Shepshed, Syston, and Loughborough; however, there are additional VoC increases in other areas, for instance in Leicester City and Melton Mowbray. Each junction should be considered in detail to understand whether the change in VoC ratio is significant in terms of the Local Plan options, before being fed into the forthcoming mitigation analysis.



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Figure 3.26: Locations of Identified Junctions Using 80% Threshold

3.8.7 Table 3.13 and Table 3.14 show the list of junctions for the AM and PM Peaks which have VoC ratios of less than 100% in the Baseline and become over 100% in one of the Local Plan options.

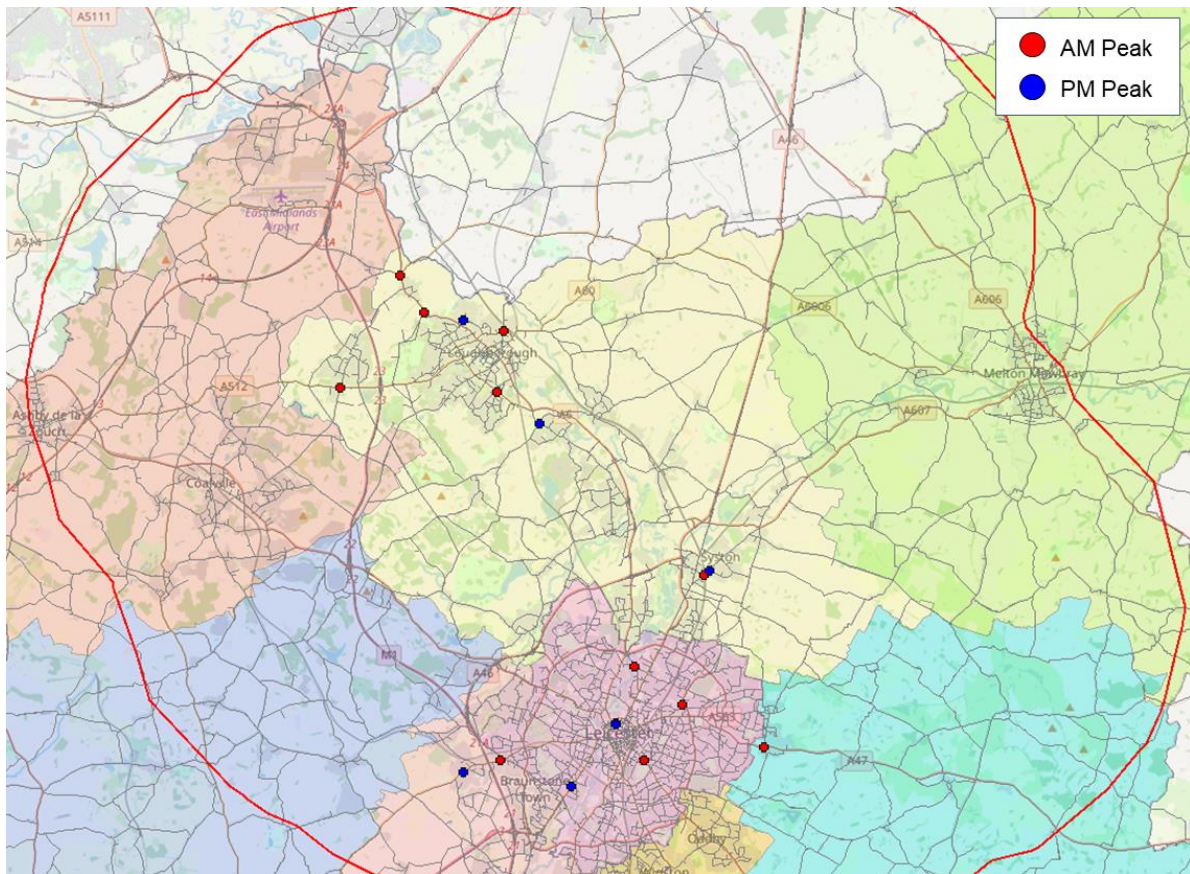
Table 3.13: Volume over Capacity Ratios over 100%, 2037 AM Peak

AM VoC			Junction
Baseline	Option 1	Option 2	
99%	100%	101%	Junction of Soar Lane/Sanvey Gate and Great Central Street/Highcross Street, Leicester
91%	100%	100%	Junction of the A6 London Road and Granville Road/Evington Road, Leicester
98%	98%	100%	Junction of Hastings Road and Tailby Avenue, Leicester
98%	100%	98%	Junction of Station Road and the A47 Uppingham Road, Thurnby, Harborough
99%	101%	101%	Junction of Thurcaston Road and Loughborough Road, Leicester
87%	99%	100%	Junction of the A47 Hinckley Road and Holmfield Avenue West, Leicester
98%	102%	101%	Junction of Ling Road and Beaumont Road, Loughborough, Charnwood
99%	102%	102%	Junction of Iveshead Road/Charnwood Road and the A512 Ashby Road Central, Shepshed, Charnwood
99%	101%	101%	Junction of the A6 Derby Road and the proposed bypass from the A512, Hathern, Charnwood
99%	100%	100%	Junction of Whatton Road and the A6 Derby Road, Hathern, Charnwood
56%	100%	101%	Junction of Meadow Avenue and Meadow Lane, Loughborough, Charnwood
99%	102%	103%	Junction of Wanlip Road and Melton Road, Syston, Charnwood

Table 3.14: Volume over Capacity Ratios over 100%, 2037 PM Peak

PM VoC			Junction
Baseline	Option 1	Option 2	
81%	100%	100%	Junction of Burleys Way/Vaughan Way and St. Margaret's Way, Leicester
99%	100%	100%	Junction of Burleys Way/Vaughan Way and St. Margaret's Way, Leicester
84%	101%	101%	Junction of Melton Road and Goodes Lane, Syston, Charnwood
58%	58%	100%	Junction of Somerville Road and Narborough Road, Leicester
99%	101%	101%	Junction of Loughborough Road and Woodhouse Road/Farley Way, Quorn, Charnwood
99%	100%	100%	Junction of Belton Road West and Bishop Meadow Road, Loughborough, Charnwood
96%	98%	100%	Junction of the A47 Hinckley Road and Warren Lane, Leicester Forest East, Blaby

3.8.8 Figure 3.27 shows the locations of the junctions listed in Table 3.13 and Table 3.14 in relation to the proposed Local Plan Option developments. As mentioned above, each site should be considered in detail to understand the nature of the change in VoC ratio in relation to the Local Plan options before feeding into the forthcoming mitigation work.



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Figure 3.27: Locations of Identified Junctions Using 100% Threshold

3.8.9 Some of the identified junctions are duplicated across Table 3.11, Table 3.12, Table 3.13, and Table 3.14. In total there are 55 junctions identified across the four tables. Table 3.15 shows a non-duplicated list of the 55 junctions identified, and whether or not they are duplicated between the VoC analysis scenarios outlined in §3.8.2 and §3.8.7.

Table 3.15: VoC analysis junction summary

Junction	Table 3.11	Table 3.12	Table 3.13	Table 3.14
Junction of Narborough Road and Fullhurst Avenue, Leicester	✓	x	x	x
Junction of Ashton Green Road and Greengate Lane, Leicester	✓	x	x	x
Junction of the A6 London Road and Granville Road/Evington Road, Leicester	✓	x	✓	x
Junction of Barkby Road and Fairfax Road, Leicester	✓	x	x	x
Junction of the A47 Uppingham Road and Humberstone Drive, Leicester	✓	x	x	x
Junction of Fosse Way and Syston High Street, Syston, Charnwood	✓	✓	x	x
Junction of Spencefield Lane and Goodwood Road/Marydene Drive, Leicester	✓	x	x	x
Junction of Queniborough Road and Barkby Main Street, Barkby, Charnwood	✓	x	x	x
Junction of the A47 King Richards Road/St Augustine Road and Tudor Road/Narborough Road North, Leicester	✓	x	x	x
Junction of the A47 Hinckley Road and Holmfield Avenue West, Leicester	✓	x	✓	x
Southbound slip road of the A46 Leicester Western Bypass junction with the A50, Anstey, Charnwood	✓	x	x	x
Junction of the A606 Nottingham Road/A606 Wilton Road and the A607/Ashfordby Road, Melton Mowbray, Melton	✓	x	x	x
Junction of Whitwick Road and Copt Oak Road, Coalville, North West Leicestershire	✓	x	x	x
Junction of Ling Road and Woodthorpe Road, Loughborough, Charnwood	✓	x	x	x
Junction of Belton Road/Ratcliffe Road and Meadow Lane, Loughborough, Charnwood	✓	x	x	x
Junction of Woodgate and Leicester Road/Loughborough High Street, Loughborough, Charnwood	✓	x	x	x
Junction of the A512 and Snell's Nook Lane, Nanpantan, Charnwood	✓	x	x	x
Junction of Shepshed Road and the A6 Derby Road, Hathern, Charnwood	✓	x	x	x
Forest Road northbound approach to Epinal Way roundabout, Loughborough, Charnwood	✓	x	x	x
Junction of Royland Road and Park Road, Loughborough, Charnwood	✓	x	x	x
Junction of Johnson Road and the A6 Loughborough Road, Leicester	✓	x	x	x
Junction of Ashton Green Road and proposed road from Thurcaston Road, Leicester	✓	x	x	x
Junction of Meadow Avenue and Meadow Lane, Loughborough, Charnwood	✓	x	✓	x
Junction of Burleys Way/Vaughan Way and St. Margaret's Way, Leicester	x	✓	x	✓
Junction of School Lane and the A6 Loughborough Road, Leicester	x	✓	x	x
Junction of Melton Road and Fosse Way, Syston, Charnwood	x	✓	x	x
Junction of Evington Road and Stoughton Drive/Wakerley Road, Leicester	x	✓	x	x
Junction of Melton Road and Barkby Lane, Syston, Charnwood	x	✓	x	x

Junction	Table 3.11	Table 3.12	Table 3.13	Table 3.14
Junction of Melton Road and Goodes Lane, Syston, Charnwood	x	✓	x	✓
Exit of the M1 Junction 23 to the A512 Ashby Road East, Shepshed, Charnwood	x	✓	x	x
Junction of Broad Street and the A6 Derby Road, Loughborough, Charnwood	x	✓	x	x
Junction of Somerville Road and Narborough Road, Leicester	x	✓	x	✓
Blaby Road southbound approach to St Johns/Leicester Road roundabout, Enderby, Blaby	x	✓	x	x
Junction of the Enderby Park-and-Ride and St Johns, Enderby, Blaby	x	✓	x	x
Junction of Glenfrith Way and Hallgate Drive, Leicester	x	✓	x	x
Junction of the A606 Leicester Street and the A607 Leicester Road/A606 Wilton Road, Melton Mowbray, Melton	x	✓	x	x
Junction of the access to the Woodthorpe Development south of Loughborough and the A6004, Loughborough, Charnwood	x	✓	x	x
Junction of the B5330 and Beacon Road, Beacon Hill, Charnwood	x	✓	x	x
Approach to the M1 Junction 23 from the A512 Ashby Road East, Shepshed, Charnwood	x	✓	x	x
Exit of One Ash Roundabout to Terry Yardley Way northbound, Quorn, Charnwood	x	✓	x	x
Approach to Ingleberry Road junction on the A512 Ashby Road East, Shepshed, Charnwood	x	✓	x	x
Junction of Wanlip Road and Melton Road, Syston, Charnwood	x	✓	✓	x
Junction of Belton Road and Bottleacre Lane, Loughborough, Charnwood	x	✓	x	x
Junction of Soar Lane/Sanvey Gate and Great Central Street/Highcross Street, Leicester	x	x	✓	x
Junction of Hastings Road and Tailby Avenue, Leicester	x	x	✓	x
Junction of Station Road and the A47 Uppingham Road, Thurnby, Harborough	x	x	✓	x
Junction of Thurcaston Road and Loughborough Road, Leicester	x	x	✓	x
Junction of Ling Road and Beaumont Road, Loughborough, Charnwood	x	x	✓	x
Junction of Iveshead Road/Charnwood Road and the A512 Ashby Road Central, Shepshed, Charnwood	x	x	✓	x
Junction of the A6 Derby Road and the proposed bypass from the A512, Hathern, Charnwood	x	x	✓	x
Junction of Whatton Road and the A6 Derby Road, Hathern, Charnwood	x	x	✓	x
Junction of Burleys Way/Vaughan Way and St. Margaret's Way, Leicester	x	x	x	✓
Junction of Loughborough Road and Woodhouse Road/Farley Way, Quorn, Charnwood	x	x	x	✓
Junction of Belton Road West and Bishop Meadow Road, Loughborough, Charnwood	x	x	x	✓
Junction of the A47 Hinckley Road and Warren Lane, Leicester Forest East, Blaby	x	x	x	✓

Section 4 – Initial Summary and Conclusions

- 4.1.1 The first sections of this report have described in detail the approach of assessing the two initial Charnwood Local Plan options, the forecasting approach and assumptions, and the forecast model results.
- 4.1.2 Forecast models were run for 2037. Baseline, Local Plan Option 1 and Local Plan Option 2 scenarios were modelled with up-to-date assumptions for forecast highway schemes and planning data.
- 4.1.3 Analysis of the forecast land-use changes shows that most population growth from the 2014 Base occurs in the 2037 Local Plan Option 2 in Charnwood. This is consistent with the assumption of approximately 10% more housing proposed in Local Plan Option 2 than Local Plan Option 1. The changes in employment and car ownership are almost nil between Local Plan Option 1 and Local Plan Option 2 due to the similarity of the proposed employment and education development.
- 4.1.4 Analysis of the forecast travel demand changes show Local Plan Option 2 features around 1-2pp higher growth in demand than Local Plan Option 1 in Charnwood from the 2014 Base for Commuting, Business, and Other trip purposes. Comparing with the 2037 Baseline, both Local Plan Option 1 and Local Plan Option 2 result in around a 2pp increase in 'commuting' demand growth, around a 1pp increase in 'business' demand growth, and a 1.5pp increase in 'other' demand growth across Leicestershire. The effect of the Local Plan developments on freight growth is minimal, with less than a 1pp difference in growth in Charnwood between the 2037 Baseline and both 2037 Local Plan options.
- 4.1.5 Analysis of the forecast mode share shows a consistent increase in car trips in the 2037 Baseline from the 2014 Base, with Local Plan Option 1 and Local Plan Option 2 having no effect on mode splits. This is to be expected as the model assumptions for the proposed developments do not include any schemes to discourage car usage or encourage shift towards public transport or active modes of travel.
- 4.1.6 Analysis of the district level results and high-level highway statistics generated by the model scenarios indicate that Local Plan Option 1 results in slightly less district wide delay and vehicle distance travelled than Local Plan Option 2. This is as expected since Local Plan Option 1 totals around 1,000 fewer homes than Local Plan Option 2.
- 4.1.7 Analysis of the flow differences shows that the increase in traffic flows as a result of the introduction of Local Plan Option 1 and Local Plan Option 2 is largely consistent across both the AM and PM Peaks. Both Local Plan options highlight rerouteing in already busy urban areas, like Leicester and Loughborough, and show an increase in flow from the Local Plan traffic accessing the SRN.
- 4.1.8 Analysis of the delay changes as a result of each option shows that the location of areas of increased delay are largely centred around the Local Plan developments and are consistent with the local rerouteing shown in the corresponding flow difference plots.
- 4.1.9 Analysis of the VoC ratios of the junctions in the study area show that the most significant changes occur at junctions close by or adjacent to the Local Plan Option developments, however some of the VoC increases are seen in Leicester City and Melton Mowbray. The number of junctions resulting in over 80% VoC is slightly less in Local Plan Option 1, with 19 in the AM Peak and 18 in the PM Peak, as opposed to Local Plan Option 2, with 21 in both the AM and PM Peaks.

Section 5 – Mitigation Approach and Local Plan Hybrid Option 3

5.1 Introduction

- 5.1.1 This section details the approach taken in development of the mitigation package coupled with understanding the impact of Hybrid Option 3 compared with Option 1.

5.2 Additional Analysis

- 5.2.1 Initially, additional analysis of Local Plan Option 1 was undertaken to understand which key issues were to inform the mitigation package development. Undertaking a more detailed analysis of junction delays and VoCs that had been reported previously, as well as discussing existing issues in the Baseline with key stakeholders, allowed the filtering of issues to remove those that were not directly attributable to the Local Plan developments.
- 5.2.2 The AECOM mitigation team began the development of the mitigation package based on the filtered list from Local Plan Option 1. In parallel, CBC undertook independent work to develop the hybrid Hybrid Option 3, which was more akin to Local Plan Option 1 than Local Plan Option 2 in terms of scale and distribution of the proposed development sites. A full summary of Hybrid Option 3 is outlined in Appendix A .
- 5.2.3 Upon completion of the development of Hybrid Option 3 by CBC, the 2037 Hybrid Option 3 scenario was run and the detailed junction analysis of delays and VoCs were compared with what had been previously provided to the mitigation team. Full model results of Hybrid Option 3 are outlined in Section 6.

5.3 Summary of Issues Identified for Mitigation

- 5.3.1 Based on the additional analysis outlined above and discussion with stakeholders, a number of issues were identified relating to routeing of strategic traffic on local roads in the 2037 Baseline scenario. A summary of these locations is shown in Table 5.1.

Table 5.1: Baseline Issues by Broad Location

Identified Issue	Broad Location
Traffic from Shepshed using Charnwood Forest routes rather than M1 to travel southbound	Shepshed / SRN
Traffic from Shepshed using Hathern route rather than A512 to access Loughborough north	Shepshed / SRN
Traffic from Thurstaston towards Loughborough choosing to route through Mountsorrel to join A6 at Sileby Road/Granite Way junctions (not at Rothley/Mountsorrel dumbbell junction)	SRN
Traffic from Syston using Broome Lane rather than A607 bypass	Syston
Traffic from Syston to A46 routeing along Wanlip Road rather than through Hobby Horse junction	Syston / SRN
Traffic from A607 Melton to A46 and A6 on Broome Lane rather than A607 Syston bypass	Syston / SRN
Charley Road carrying significant strategic traffic	Shepshed / SRN
Cotes Road carrying significant strategic traffic	Loughborough
Beaumont Leys Lane traffic south of A563 routeing along Strasbourg Drive to access A563 at Orwell Drive	Leicester
Significant traffic using Birstall Road southbound towards Redhill Circle rather than A6	Birstall
Westbound traffic on A563 to Ashton Green area using A6 rather than A563	Leicester
Parker Drive carrying significant non-local levels of traffic	Leicester

5.3.2 In terms of Local Plan development impacts, a number of junctions which were previously flagged as VoC and delay issues in the assessment of Local Plan Option 1 were found to no longer exist in Hybrid Option 3. Conversely, several junctions which were not previously flagged as issues in Local Plan Option 1 were identified in the assessment of Hybrid Option 3. A summary of all junctions that were carried through as an issue in the assessment of Hybrid Option 3 is shown in Table 5.2 and Table 5.3, for the AM and PM Peaks respectively. These lists of issues, along with the Baseline Issues highlighted in Table 5.1, were subsequently used to develop and refine the mitigation package.

Table 5.2: Summary of AM Peak Junction Issues, Hybrid Option 3

Junction	VoC	Delay
Junction of Fosse Way and Syston High Street, Syston, Charnwood	Increased congestion on High Street westbound approach	
Junction of the A47 Hinckley Road and Holmfield Avenue West, Leicester	Increased congestion on A47 Hinckley Road eastbound approach	
Junction of Whitwick Road and Copt Oak Road, Coalville, North West Leicestershire	Increased congestion on B591 Copt Oak Road southbound approach	
Junction of Ling Road and Woodthorpe Road, Loughborough, Charnwood	Increased congestion on A6004 Ling Road northbound approach	
Junction of Woodgate and Leicester Road/Loughborough High Street, Loughborough, Charnwood	Increased congestion on Woodgate Lane eastbound approach	
Junction of Iveshead Road/Charnwood Road and the A512 Ashby Road Central, Shepshed, Charnwood		Delay increase on A512 eastbound and Iveshead Road northbound approaches
Junction of Leicester Road and A512 Ashby Road Central, Shepshed, Charnwood		Delay increase on Leicester Road southbound approach
Junction of Leicester Road and Shelthorpe Road, Loughborough, Charnwood		Delay increase on Shelthorpe Road eastbound approach
One Ash roundabout, Loughborough, Charnwood		Delay increase on A6004 eastbound approach
Junction of Nanpantan Road and Woodhouse Lane, Nanpantan, Charnwood		Delay increase on all arms
Junction of Wanlip Road and Melton Road, Syston, Charnwood		Delay increase on Melton Road southbound approach
Junction of Station Road and the A47 Uppingham Road, Thurnby, Harborough		Delay increase on Station Road southbound approach
Various Loughborough town centre locations		Delay increases in various Loughborough town centre locations
Junction of the A47 Uppingham Road and Humberstone Drive, Leicester	Increased congestion on Humberstone Drive southbound approach	
Junction of Spencefield Lane and Goodwood Road/Marydene Drive, Leicester	Increased congestion on Spencefield Lane southbound approach	
Junction of the A512 and Snell's Nook Lane, Nanpantan, Charnwood	Increased congestion on A512 westbound approach	
Junction of Catherine Street and Brandon Street, Leicester	Increased congestion on Catherine Street southbound approach	
Junction of Arthur Street and Frederick Street, Loughborough, Charnwood	Increased congestion on Frederick Street northbound approach	
Junction of Nottingham Road and Clarence Street, Loughborough, Charnwood	Increased congestion on A60 Nottingham Road southbound approach	
Access from the Wanlip Sewage Treatment Works onto the A46, Leicester	Increased congestion on the A46 eastbound approach	

Junction	VoC	Delay
Junction between Ashby Road Central and Ashby Road East, Shepshed, Charnwood		Northbound approach from Ingleberry Road
Junction of Queniborough Road and Barkby Road, Syston, Charnwood		All approaches

Table 5.3: Summary of PM Peak Junction Issues, Hybrid Option 3

Junction	VoC	Delay
Junction of Burleys Way/Vaughan Way and St. Margaret's Way, Leicester	Increased congestion on Burleys Way westbound approach (blocks back to 1505)	
Junction of School Lane and the A6 Loughborough Road, Leicester	Increased congestion on Loughborough Road northbound approach	
Junction of Melton Road and Fosse Way, Syston, Charnwood	Increased congestion on Melton Road northbound approach	
Junction of Melton Road and Barkby Lane, Syston, Charnwood	Increased congestion on Barkby Lane westbound approach	
Junction of Melton Road and Goodes Lane, Syston, Charnwood	Increased congestion on Melton Road northbound approach	Delay increase on Melton Road northbound approach
Exit of the M1 Junction 23 to the A512 Ashby Road East, Shepshed, Charnwood	Increased congestion on Ashby Road East westbound exit	
Junction of the access to the Woodthorpe Development south of Loughborough and the A6004, Loughborough, Charnwood	Increased congestion on A6004 Terry Yardley Way westbound approach	
Junction of the B5330 and Beacon Road, Beacon Hill, Charnwood	Increased congestion on Beacon Road eastbound approach	
Approach to the M1 Junction 23 from the A512 Ashby Road East, Shepshed, Charnwood	Increased congestion on Ashby Road East westbound exit	
Exit of One Ash Roundabout to Terry Yardley Way northbound, Quorn, Charnwood	Increased congestion on Terry Yardley Way westbound exit	
Approach to Ingleberry Road junction on the A512 Ashby Road East, Shepshed, Charnwood	Increased congestion on A512 Ashby Road East westbound approach (1 lane to 2 not at junction)	
Junction of Wanlip Road and Melton Road, Syston, Charnwood	Increased congestion on Melton Road northbound approach	
Junction of the A512 and Snell's Nook Lane, Nanpantan, Charnwood		Delay increase on A512 westbound approach
Junction of Nanpantan Road and Woodhouse Lane, Nanpantan, Charnwood		Delay increase on all arms
Junction of Loughborough Road and Woodhouse Road/Farley Way, Quorn, Charnwood		Delay increase on Loughborough Road southbound and Woodhouse Road eastbound approaches
A46 eastbound merge from A5630 roundabout, Anstey, Charnwood		Delay increase on A46 main carriageway eastbound approach to on-slip
Junction of Queniborough Road and Barkby Road, Syston, Charnwood		Delay increase on Queniborough Road northbound approach
Junction of Somerville Road and Narborough Road, Leicester	Increased congestion on Somerville Road westbound approach	
Junction of Glenfrith Way and Hallgate Drive, Leicester	Increased congestion on Glenfrith Way northbound approach	
Junction between Ashby Road Central and Ashby Road East, Shepshed, Charnwood	Increased congestion from Ingleberry Road northbound approach	Northbound approach from Ingleberry Road

Junction	VoC	Delay
Junction of Iveshead Road/Charnwood Road and the A512 Ashby Road Central, Shepshed, Charnwood		Northbound approach from Iveshead Road, southbound approach from Charnwood Road, and eastbound approach from Ashby Road West

5.4 Development of the Package of Mitigations

5.4.1 The mitigation package was developed by AECOM and was initially derived from the summary of issues brought forward from Local Plan Option 1, as Hybrid Option 3 was still under development by CBC. The mitigation package was focused on several broad locations highlighted in the preceding analysis; these broad locations were identified as:

- Anstey;
- Barrow-upon-Soar;
- Birstall;
- Loughborough;
- Shepshed;
- Syston and Sileby; and
- the SRN.

5.4.2 Full details of the mitigation schemes are detailed in Section 6.

Section 6 – Revised Forecasting Approach and Assumptions

6.1 Introduction

- 6.1.1 This section sets out the forecasting assumptions that have been adopted for the assessment of Hybrid Option 3 and the Mitigation Scenario, building upon what was previously laid out in Section 2.

6.2 Baseline – Network Updates

- 6.2.1 Several network updates were agreed with CBC and fed into the updated 2037 Baseline scenario for the assessment of the Hybrid Option 3 and Mitigation Scenario. The changes have been identified in the following work, and are outlined below:

- Leicester City Local Plan Base Year Model Review:
 - A46/A50 gyratory lane allocation correction;
 - ‘Pork Pie’ roundabout lane allocation correction; and
 - Lane coding correction at the Aylestone Road/Welford Road junction.
- Leicester City Local Plan forecast scheme review:
 - Scheme at Fosse Road North/Blackbird Road/Groby Road/Woodgate junction to be removed; and
 - Correction to number of lanes exiting Belgrave Circle northbound.

- 6.2.2 Information relating to the M1 J19-23a Smart Motorway scheme previously included in the Baseline and Local Plan options has been updated by Highways England. The scheme is at an early stage of development and has been divided into two schemes; M1 J21-21a and M1 J21a-23a separately. The exact details of the schemes are yet to be agreed and the likelihood of the schemes being taken forward is ‘reasonably foreseeable’. Hence it was decided to not include either of these schemes in the Baseline or Hybrid Option 3 assessment; with consideration being given to them as part of the package of mitigations instead.

6.3 Local Plan Scenario – Network Updates

- 6.3.1 The development zones used to represent key housing sites are set out below:

- land south east of Syston/Barkby Road, Syston/Land north of Barkby Road, Syston (zone 9047);
- land at Gynsill Lane & Anstey Lane, Glenfield (9046);
- Park Grange Farm, Loughborough (9044);
- land south of Loughborough (9043);
- land at Tickow Lane (Phase 2), Shepshed/Land west of Tickow Lane (9042);
- land off Fairway Road (9041);
- land fronting Ashby Road & Ingleberry Road, Shepshed (9040);
- High Leys Farm / Manor Farm, Anstey (9039); and
- land at Tickow Lane, Shepshed (9037).

- 6.3.2 For Hybrid Option 3, five development zones were also added to allow separation of the employment/education demand from the housing demand at development locations which have mixed land-use. The development zones used to represent key employment sites are set out below:

- land south east of Syston/Barkby Road, Syston/land north of Barkby Road, Syston (9036);
- land south of Loughborough (9035);
- High Leys Farm / Manor Farm, Anstey (9034);

- land at Tickow Lane (Phase 2), Shepshed/land west of Tickow Lane (9033); and
- land off Fairway Road (9032).

6.3.3 This separation of housing and employment allowed more detailed analysis of the development specific traffic, and facilitated the home-based trip rate adjustments. The employment/education demand and the housing demand share the same access points, so no change to junction coding was required.

6.4 Local Plan Assumptions

6.4.1 Table 6.1 shows the proposed developments for Hybrid Option 3. A full breakdown of the developments is shown in Appendix A .

Table 6.1: Local Plan Development Summary, Option 3

Development type	Option 3
Household	9,105 homes
Employment	5 hectares
Schooling	2,205 school places

6.4.2 Where the proposed development was provided in employment area or school places, the conversion to jobs was calculated using the same method used for Local Plan Option 1 and Option 2 modelling; see §2.4.3 and §2.4.4.

6.4.3 Where the development has been modelled using a 'development zone', the expected trip rate for the site has been calibrated to the same peak hour trip rates outlined in Table 2.4.

6.5 Mitigation Scenario Assumptions

6.5.1 This section provides a summary of the model assumptions included to represent the mitigation package. Table 6.2 provides a list of all the schemes that were included in the Mitigation Scenario. Some of the mitigation proposals were not included; these were mainly local active travel schemes which cannot be represented realistically in a strategic model of this nature. A list of all schemes proposed as part of the mitigation package is provided in Appendix B , which also indicates the schemes that were excluded and the reasons for this.

Table 6.2: Modelled Mitigation Schemes

ID	Broad Location	Junction	Intervention Type	Description
AN1	Anstey	A46/Leicester Road/A5630 Anstey Lane junction	Highway	Extend 2-lane flare on Leicester Road (Anstey) approach and amend east-facing merge and diverge to incorporate an auxiliary lane layout to aid the efficient merging and diverging of traffic.
AN2	Anstey	A46/A50	Highway	Introduce signal-control on eastbound off slip and opposing circulatory. Introduce a segregated left turn (bypass) lane from the A50 onto the A46 eastbound on slip. Introduce third lane flare on eastbound off slip (nearside for left-turn only, middle and offside lanes for right turn towards Leicester).
AN3	Anstey	A50/Anstey Lane	Highway	Introduce signal-controlled right turn from A50 into Anstey Lane including auxiliary diverge lane on the offside of existing north-westbound carriageway.
BA5	Barrow-upon-Soar	High Street-South Street-Bridge Street	Highway	Introduce give-ways on roundabout circulatory so that Bridge St-High Street movements have priority through the junction. Retain roundabout island.
BI1	Birstall	A46/A6 Loughborough	Highway	Extend flares and marked lanes on westbound off slip approach. Provide two lanes left turn onto A6 (Leicester). Widen A6 southbound on exit from the

ID	Broad Location	Junction	Intervention Type	Description
		Road Interchange		junction to provide third lane for access into Park-and-Ride.
AN6/BI2	Birstall	Wanlip Lane	Highway	Introduce additional traffic calming features and a revised 20mph speed limit to discourage through-traffic (between Myrtle Ave and Sibson Road)
BI4	Birstall	Leicester Park-and-Ride Sites	Bus	Extend Park-and-Ride bus services out to nearby small satellite settlements (Birstall Park & Ride to Rothley and Mountsorrel).
LO1	Loughborough	A6/A6004 One Ash Roundabout	Highway	Introduce partial signalisation on the junction, including A6 South and A6004 arms; introduce bus gating signals on Loughborough Road (Quorn) approach; extend 2-lane taper exit onto A6004.
LO2 / LO3 / LO4 / SH3	Loughborough	Loughborough Town Wide	Behavioural	Loughborough Smarter Choices - personalised travel planning / public transport incentives / cycle hire schemes / cycle network improvement
LO5/SH1	Loughborough	Loughborough-Shepshed	Bus	Divert existing bus service from Shepshed to Loughborough (and vice-versa) via the hospital, Belton Road (industrial estates), railway station and town centre
LO6	Loughborough	A6004 Epinal Way-Beacon Road	Highway	Extend 2 lane flares by 30m on both A6004 arms
LO7	Loughborough	A6004 Epinal Way-Beacon Road	Highway	Introduce traffic signals on roundabout
LO8	Loughborough	Epinal Way-Warwick Way-Sandringham Drive-Maxwell Drive	Highway	Extend 2 lane flares on Epinal Way and Warwick Way arms by 30m each
LO9	Loughborough	Epinal Way-Alan Moss Road	Highway	Introduce traffic signals and extend 2-lane flare on Epinal Way northern arm by 30m
SH2	Shepshed	A512 Charley Road/Tickow Lane	Highway	Junction improvement to help facilitate development. Effectively banning straight ahead movement from Tickow Lane onto Charley Road and right turn from A512 onto Charley Road. Retain priority control.
SH5	Shepshed	Nanpantan	Bus	Increase bus frequencies through Nanpantan, especially during peak times; increase 129X to 30min frequency during AM and PM Peaks
STRAT7	Shepshed	M1 Junction 23	Highway	Lower Cost: Additional improvements (over and above committed scheme) comprising: permitting the left turn movement from lanes 1 and 2 of the northbound off-slip (once widened) (whilst maintaining the straight ahead movement); extending the lane 1 flare by 60m; extending the A512 westbound lane 1 nearside flare by 60m; widen the southbound circulatory to 3 lanes at the stop line, with lanes 1 and 2 permitting the straight ahead movement (towards the M1s) and lanes 2 and 3 permitting the right turn movement (towards Shepshed).

ID	Broad Location	Junction	Intervention Type	Description
STRAT8	Shepshed	M1 Junction 23	Highway	Higher Cost (Additional to Lower Cost): Widen eastbound and westbound circulatory overbridges to 3 lanes each, with lanes 1 and 2 permitting the straight ahead movement onto the A512 and lanes 2 and 3 permitting the right turn movement around the circulatory towards the M1; provide a segregated left turn bypass lane from the A512 westbound to the M1 S.
SY3	Syston & Sileby	Syston Eastern developments	Highway	Queniborough Road-Barkby Road traffic signal junction improvement, incorporating additional lane on Barkby Road approach (nearside lane for left/ahead and offside lane for right turning traffic) and widen the southbound approach to incorporate a right turn filter.
SY4	Syston & Sileby	Broome Lane (Sileby-East Goscote)	Highway	Localised restrictions to make the route less attractive, e.g. signal-control single lane sections (shuttle working) over River Wreake.
SY5	Syston & Sileby	Syston - Melton Road	Highway	Streetscape, semi-pedestrianised, enhance high street, 20mph max speed limit, raised speed tables, shared space.
SY11	Syston & Sileby	Ratcliffe Road	Highway	Introduce additional traffic calming features between Cemetery Road and Peashill Close. Incorporate formalised parking bays to reduce occurrence of parking on footways (creating chicanes to manage traffic flow and speeds).
SY12	Syston & Sileby	Brook Street-High Street-Cossington Road	Highway	Convert to mini roundabout
SY13	Syston & Sileby	Barkley Road, Queniborough	Highway	Introduce additional traffic calming features and a revised 20mph speed limit to discourage through-traffic (south of Syston Road/Queniborough Road junction).
SY14	Syston & Sileby	Broome Lane, north of East Goscote	Highway	Introduce additional traffic calming features and a revised 30mph speed limit to discourage through-traffic on section on northern edge of East Goscote.
STRAT11	Syston & Sileby	A46/Wanlip Road slip road	Highway	Amend the merge layout to provide an auxiliary lane merge. Would need to tie in downstream prior to where cycle lane converges with A46 and River Soar bridge.
STRAT1	SRN	A46/A607 Hobby Horse Roundabout	Highway	Large Scale Improvements (A): Grade separation of the junction
STRAT3	SRN	M1 Junction 21 - M1/M69/A5460	Highway	Free flow interchange links between M1 and M69
STRAT4	SRN	M1 Leicester Western Access	Highway	Smart Motorway scheme J21-J21a
STRAT5	SRN	M1 North Leicestershire Extra Capacity	Highway	Smart Motorway Scheme J21a-J23
STRAT10	SRN	M1 Junction 21 - M1/M69/A5460	Highway	Interim Intervention: Extend the offside flare on the southbound off-slip by approximately 20-30 m. Introduce a fourth lane on the eastbound

ID	Broad Location	Junction	Intervention Type	Description
				circulatory. Introduce signal control with increased flare on M69 approach.

- 6.5.2 To model the proposed behavioural mitigation schemes in Loughborough, the existing Smarter Choices functionality contained within PRTM was used. Existing Smarter Choices interventions are already represented in the model based on guidance in TAG Unit M5.2 which details the sources and the evidence underlying the assumptions contained within its guidance. Smarter Choices measures are split into three types: workplace travel planning, school travel planning and targeted marketing. Schemes LO2, LO3, LO4 and SH3 were considered as targeted marketing for the purposes of calculating an appropriate reduction in car trips. The benchmark Smarter Choices impact for targeted marketing is an 8% reduction in car trips for every £5 spent per person per year (for up to five years).
- 6.5.3 The total cost of the behavioural change schemes outlined in Table 6.2 is assumed to be £2,043,000 (in 2021 prices), and it is assumed this will be spent on a population of 68,289⁶ individuals over 10 years. This resulted in a £2.11 (in 2005 prices) spend per person per year, producing a 3.4% decrease in car trips.
- 6.5.4 In order to model this reduction, the highway and public transport mitigation measures were firstly coded into the model and the model was run to provide a starting point for calibrating the behavioural change interventions. The Mitigation Scenario model was then calibrated to reflect this decrease in car mode share for any car trip produced in Loughborough⁷.
- 6.5.5 Similarly, to reflect the target of reduced car travel in the new developments within Loughborough that are modelled using 'development zones', the calibrated peak hour trip rates have been adjusted by 3.4%. Table 6.3 shows these adjusted trip rates.

Table 6.3: Trip Rates for Sites within Development Zones

	Origin trips per household	Destination trips per household
AM Peak Hour	0.396	0.137
PM Peak Hour	0.137	0.396

⁶ TEMPro 7.2 population data for seven Loughborough MSOAs, 2027

⁷ Any car trip starting or ending at the driver's home location in Loughborough

Section 7 – Revised Forecast Model Results

7.1 Introduction

7.1.1 Based on the forecasting assumptions set out in Section 2 and Section 6, this section details the model forecasts produced in the assessment of the proposed Hybrid Option 3 scenario. This analysis includes:

- forecast changes in land-use assumptions (see Section 7.2);
- forecast changes in travel demand (see Section 7.3);
- forecast changes in mode share proportions (see Section 7.4);
- high-level highway network statistics (see Section 7.5);
- forecast highway flow changes between the Baseline and Hybrid Option 3 (see Section 7.6);
- forecast highway delay changes between the Baseline and Hybrid Option 3 (see Section 7.7);
- forecast highway flow changes between the Hybrid Option 3 and Mitigation scenario (see Section 7.8);
- forecast highway delay changes between the Hybrid Option 3 and Mitigation scenario (see Section 7.9);
- forecast mitigation results by broad location (see Section 7.10); and
- forecast junction impacts of the Mitigation Scenario (see Section 7.11).

7.2 Forecast Land-use Changes

- 7.2.1 The changes in population, employment, and car ownership between the 2014 Base Year, 2037 Baseline, and 2037 Hybrid Option 3 have been assessed at district and county level. Figure 7.1, Figure 7.2, and Figure 7.3 show the changes in population, employment, and car ownership respectively.
- 7.2.2 There is a forecast 10-25% increase in population, 10-25% increase in employment, and a 2-10% increase in car ownership from 2014 to 2037 across all four areas.
- 7.2.3 There is a forecast 1pp increase in employment between the 2037 Baseline and 2037 Hybrid Option 3 since the vast majority of the Local Plan developments relate to housing, see Appendix A . There is also a very small decrease in car ownership in Figure 7.3; due to the Local Plan housing developments largely being located in areas of already high car ownership. Conversely, there is around a 10pp increase in population in Charnwood forecast between the 2037 Baseline and 2037 Hybrid Option 3. This increase in population can also be seen across Leicestershire, with around a 2pp increase in population countywide, while Leicester City and Blaby remain flat with no change in population growth between the 2037 Baseline and 2037 Hybrid Option 3.
- 7.2.4 The 2037 Mitigation Scenario land-use changes are not shown on these graphs as the input planning data are the same as in 2037 Hybrid Option 3.

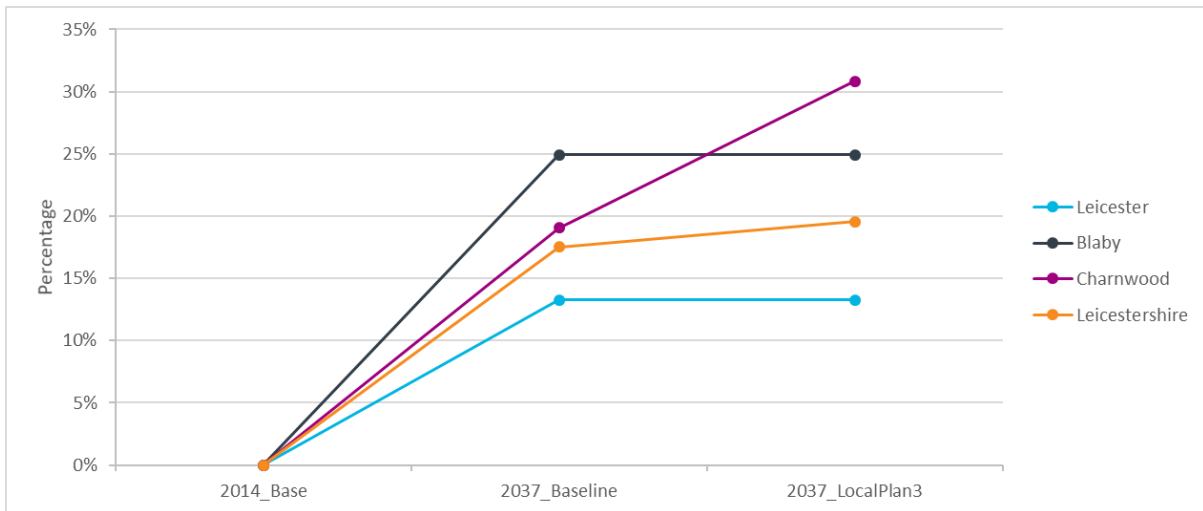


Figure 7.1: Population change between 2014 Base, 2037 Baseline, and 2037 Option 3

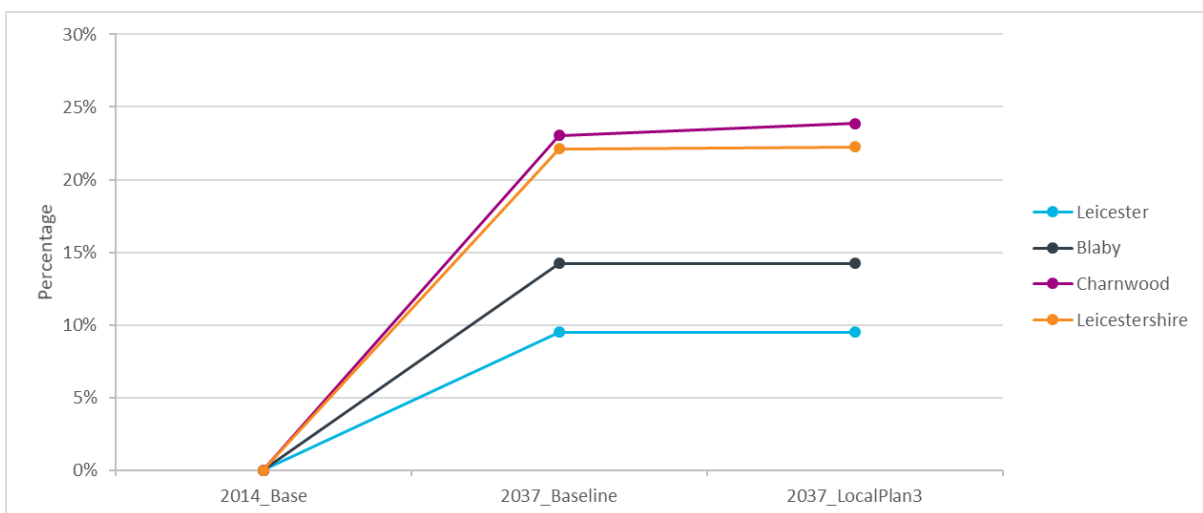


Figure 7.2: Employment change between 2014 Base, 2037 Baseline, and 2037 Option 3

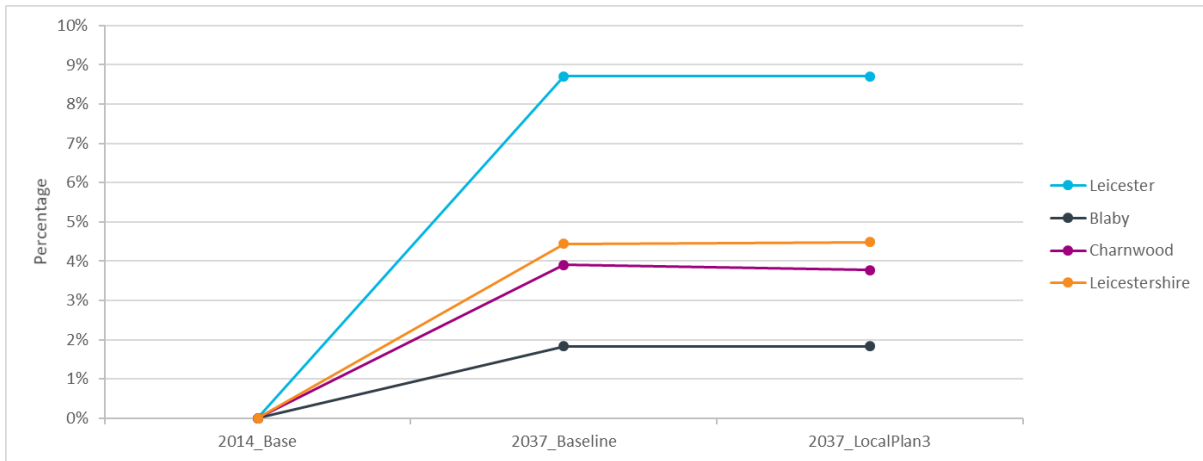


Figure 7.3: Car ownership change between 2014 Base, 2037 Baseline, and 2037 Option 3

7.3 Forecast Travel Demand Changes

- 7.3.1 Figure 7.4, Figure 7.5, and Figure 7.6 show the demand growth from the 2014 Base Year for Commuting, Business, and Other purposes respectively.
- 7.3.2 All three graphs show around a 10-15% increase in forecast demand growth in Charnwood, dependent on travel purpose, between the 2014 Base Year and 2037 Baseline.
- 7.3.3 The growth in population between the 2037 Baseline and 2037 Hybrid Option 3 is reflected in all three graphs with growth in demand within Charnwood (and therefore Leicestershire). It can also be seen that for all three purposes there are small increases in demand in Leicester and Blaby between the 2037 Baseline and 2037 Hybrid Option 3. This is due to the increase in trip attractions to Charnwood as a result of the proposed developments, and the resulting changes to trip distribution patterns as more people will travel between the districts for work and leisure purposes.
- 7.3.4 There are negligible changes in growth between the 2037 Baseline and 2037 Mitigation Scenario in Charnwood because this analysis is across all modes; the next section demonstrates the impact of mode shift between these scenarios as a result of the package of mitigations.
- 7.3.5 Table 7.1, Table 7.2, and Table 7.3 show the same results in tabular format. The freight demand growth results are consistent with what has been reported previously in §3.3.6.

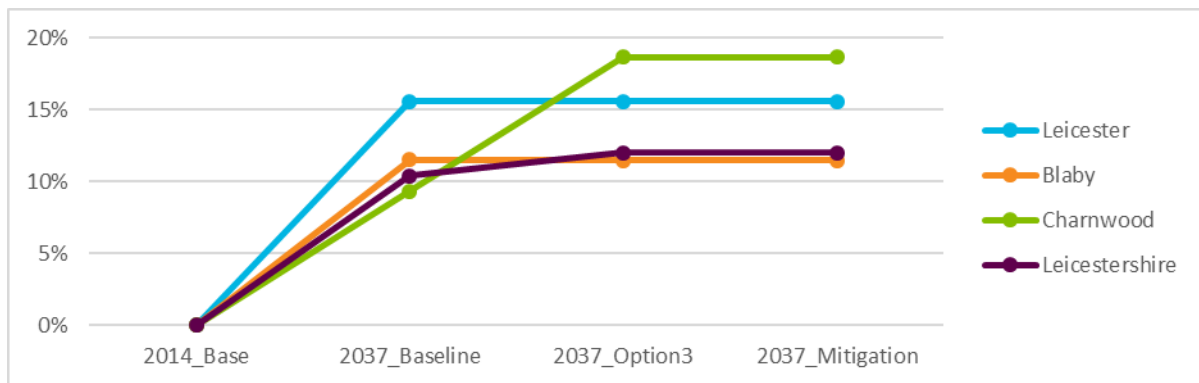


Figure 7.4: Travel demand growth from 2014, Commuting

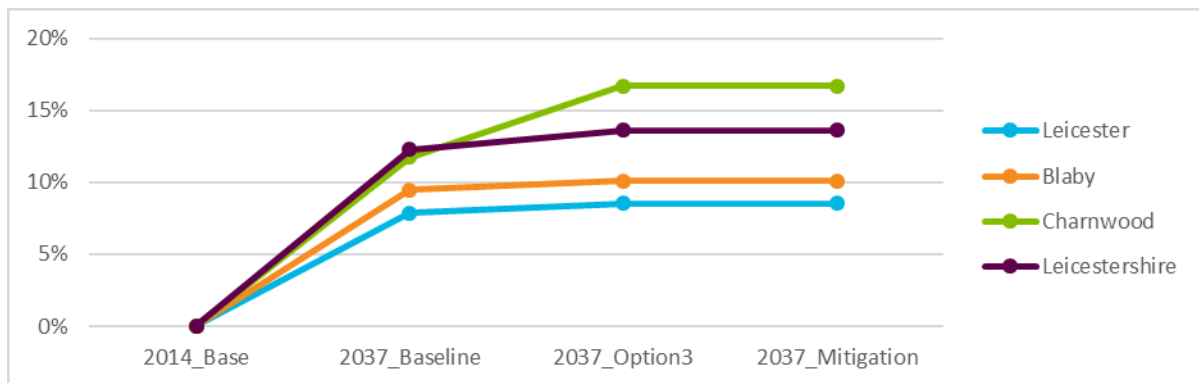


Figure 7.5: Travel demand growth from 2014, Business

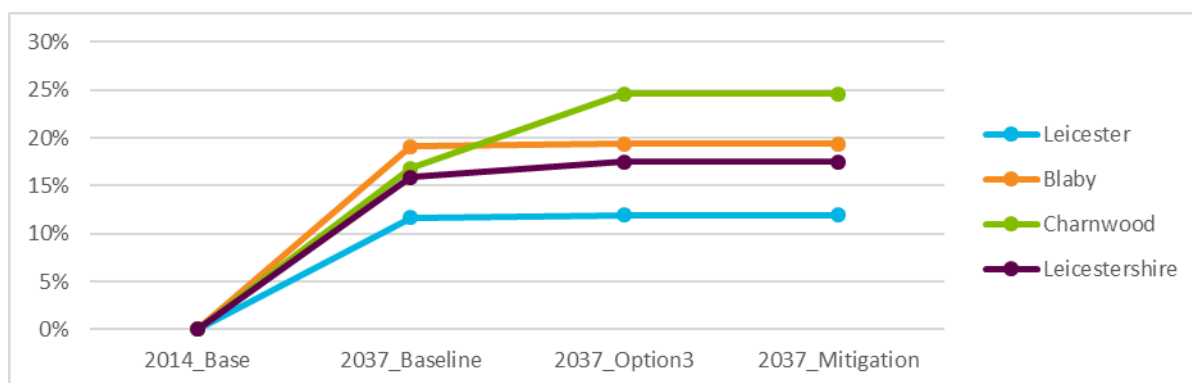


Figure 7.6: Travel demand growth from 2014, Other

Table 7.1: Travel demand growth from 2014, Commuting

District	2037 Baseline	2037 Hybrid Option 3	2037 Mitigation
Leicester	15.6%	15.6%	15.6%
Blaby	11.5%	11.5%	11.5%
Charnwood	9.3%	18.7%	18.7%
Leicestershire	10.4%	12.0%	12.0%

Table 7.2: Travel demand growth from 2014, Business

District	2037 Baseline	2037 Hybrid Option 3	2037 Mitigation
Leicester	7.9%	8.5%	8.5%
Blaby	9.5%	10.1%	10.1%
Charnwood	11.7%	16.7%	16.7%
Leicestershire	12.3%	13.6%	13.6%

Table 7.3: Travel demand growth from 2014, Other

District	2037 Baseline	2037 Hybrid Option 3	2037 Mitigation
Leicester	11.7%	12.0%	12.0%
Blaby	19.1%	19.4%	19.4%
Charnwood	16.8%	24.6%	24.6%
Leicestershire	15.9%	17.5%	17.5%

7.4 Forecast Mode Share Analysis

7.4.1 Figure 7.7, Figure 7.8, and Figure 7.9 show the 2014 Base Year, 2037 Baseline, 2037 Hybrid Option 3, and 2037 Mitigation Scenario mode share proportions for highway, public transport and active modes respectively. Highway mode share increases uniformly across the four geographical areas by 3-4pp between the 2014 Base Year and 2037 Baseline. This is mode shift from public transport and active modes, which have around a 1pp and 3-4pp reduction in mode share respectively.

7.4.2 In Charnwood between the 2037 Hybrid Option 3 and 2037 Mitigation Scenario there is a small decrease in highway mode share, and corresponding small increases in public transport and active mode shares. This is due to the inclusion of the behavioural change mitigation schemes focused on Loughborough. The 3.4% reduction in car trips modelled in the town results in a just over 1pp reduction in car mode share across the borough.

7.4.3 Table 7.4, Table 7.5, and Table 7.6 show the same data in tabular format.

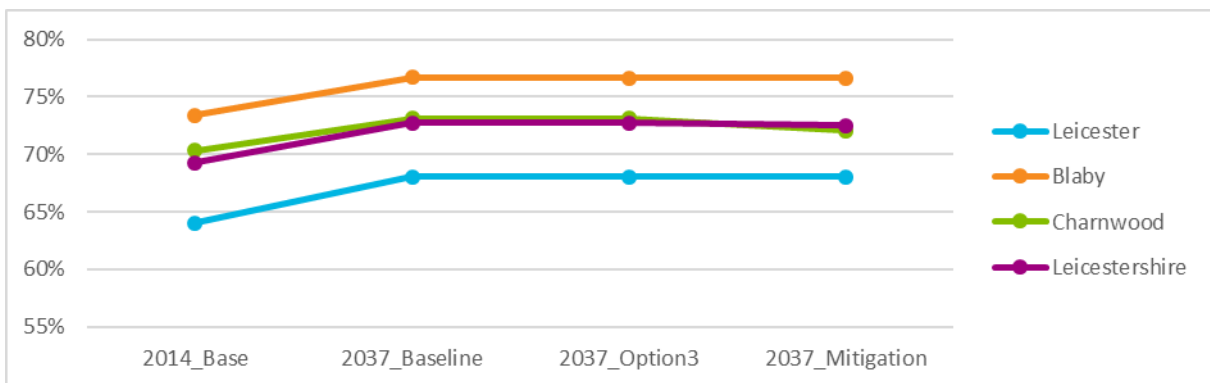


Figure 7.7: Forecast mode share by district, Highway

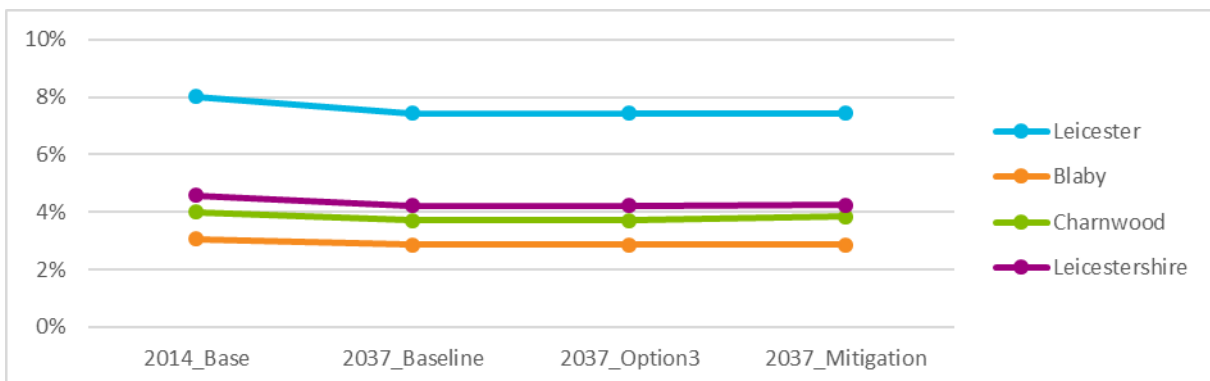


Figure 7.8: Forecast mode share by district, Public Transport

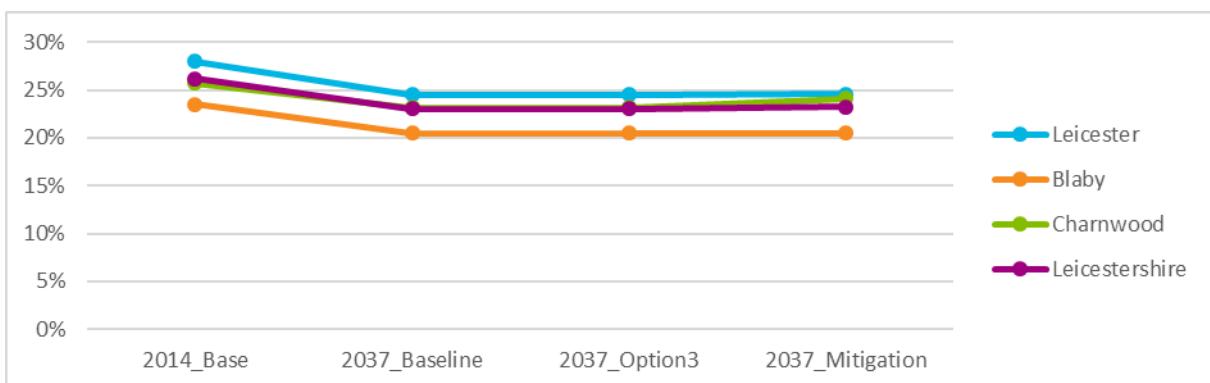


Figure 7.9: Forecast mode share by district, Active Modes

Table 7.4: Forecast mode share by district, Highway

District	2014 Base	2037 Baseline	2037 Hybrid Option 3	2037 Mitigation
Leicester	64%	68%	68%	68%
Blaby	73%	77%	77%	77%
Charnwood	70%	73%	73%	72%
Leicestershire	69%	73%	73%	73%

Table 7.5: Forecast mode share by district, Public Transport

District	2014 Base	2037 Baseline	2037 Hybrid Option 3	2037 Mitigation
Leicester	8%	7%	7%	7%
Blaby	3%	3%	3%	3%
Charnwood	4%	4%	4%	4%
Leicestershire	5%	4%	4%	4%

Table 7.6: Forecast mode share by district, Active Modes

District	2014 Base	2037 Baseline	2037 Hybrid Option 3	2037 Mitigation
Leicester	28%	25%	25%	25%
Blaby	24%	20%	20%	20%
Charnwood	26%	23%	23%	24%
Leicestershire	26%	23%	23%	23%

7.5 High-level Highway Network Statistics

- 7.5.1 Table 7.7, Table 7.8, and Table 7.9 show the high-level network statistics in the AM Peak, Interpeak, and PM Peak respectively. The 2037 Baseline is compared with the 2014 Base Year, Hybrid Option 3 is compared with the Baseline, and the Mitigation Scenario is compared with Hybrid Option 3.
- 7.5.2 In 2037 for Hybrid Option 3 within Charnwood, vehicle distance increases by around 3-4% and vehicle delay increases by around 14%, resulting in a drop in average speed of around 4% in the AM and PM Peaks. These values are less pronounced in the Interpeak, with around a 2% increase in vehicle distance and 5% increase in vehicle delay, resulting in a 1% reduction in average speed.
- 7.5.3 As expected, most of the changes are seen in Charnwood, yet smaller changes are seen across Leicester City and Blaby due to the increase in traffic from the developments to the surrounding areas. Leicester City shows a 1% increase in vehicle distance across all three time periods, while Blaby shows a 1% increase in the AM Peak only. There is a small reduction in average speed in Leicester City in the AM and PM Peaks, with virtually no change in the Interpeak, and little to no change in Blaby across all three time periods.
- 7.5.4 Overall the changes to vehicle distance, vehicle delays, and average speeds as a result of Hybrid Option 3 are broadly consistent with what was seen as a result of Local Plan Option 1 and Local Plan Option 2, shown in Section 3.5, aligning slightly more with the results of Local Plan Option 1.
- 7.5.5 The introduction of the mitigation schemes decreases the vehicle delay time across Charnwood by around 4% in the AM and PM Peaks, compared with Hybrid Option 3, while increasing the average speed by around 1%. There are minimal changes in Leicester City due to the mitigation schemes, and across Leicestershire as a whole the effects of the mitigation are dampened due to the geographical aggregation. Blaby however also sees around a 5-6% decrease in vehicle delay time in the AM and PM Peaks, compared with Hybrid Option 3, due to the inclusion of the mitigation schemes; this is likely to be due to the capacity enhancing mitigation schemes on the M1 and at M1 J21, and can also be observed in the increase in average speed.

Table 7.7: Highway Network Statistics: AM Peak

AM Peak		2014 Base	2037 Baseline	% change from 2014	2037 Local Plan Option 3	% change from Baseline	2037 Mitigation	% change from Hybrid Option 3
Charnwood	Vehicle Distance (vehicle-km)	300,971	393,824	31%	407,628	4%	401,348	-2%
	Vehicle Delay-Time (vehicle-hours)	1,657	2,841	71%	3,239	14%	3,109	-4%
	Average Speed (kph)	48.2	44.4	-8%	42.9	-4%	43.1	0%
Leicester City	Vehicle Distance (vehicle-km)	268,130	312,566	17%	314,664	1%	314,571	0%
	Vehicle Delay-Time (vehicle-hours)	4,444	6,574	48%	6,751	3%	6,760	0%
	Average Speed (kph)	25.7	22.8	-11%	22.5	-1%	22.5	0%
Blaby	Vehicle Distance (veh-km)	279,999	335,446	20%	337,787	1%	349,369	3%
	Vehicle Delay-Time (vehicle-hours)	1,908	3,048	60%	3,074	1%	2,911	-5%
	Average Speed (kph)	49.6	43.9	-11%	44.0	0%	45.4	3%
Leicestershire	Vehicle Distance (vehicle-km)	2,101,240	2,730,960	30%	2,756,375	1%	2,758,120	0%
	Vehicle Delay-Time (vehicle-hours)	11,627	19,121	64%	19,797	4%	19,195	-3%
	Average Speed (kph)	49.3	46.1	-7%	45.7	-1%	45.9	0%

Table 7.8: Highway Network Statistics: Interpeak

Interpeak		2014 Base	2037 Baseline	% change from 2014	2037 Local Plan Option 3	% change from Baseline	2037 Mitigation	% change from Hybrid Option 3
Charnwood	Vehicle Distance (vehicle-km)	192,894	276,967	44%	283,837	2%	281,658	-1%
	Vehicle Delay-Time (vehicle-hours)	811	1,344	66%	1,406	5%	1,403	0%
	Average Speed (kph)	50.5	49.8	-1%	49.4	-1%	49.2	0%
Leicester City	Vehicle Distance (vehicle-km)	202,581	248,656	23%	250,129	1%	250,530	0%
	Vehicle Delay-Time (vehicle-hours)	2,745	3,937	43%	3,990	1%	3,985	0%
	Average Speed (kph)	27.7	26.0	-6%	26.0	0%	26.0	0%
Blaby	Vehicle Distance (vehicle-km)	188,566	263,494	40%	264,323	0%	266,507	1%
	Vehicle Delay-Time (vehicle-hours)	727	1,240	71%	1,251	1%	1,259	1%
	Average Speed (kph)	58.3	55.9	-4%	55.8	0%	56.0	0%
Leicestershire	Vehicle Distance (vehicle-km)	1,472,108	2,065,339	40%	2,079,411	1%	2,078,931	0%
	Vehicle Delay-Time (vehicle-hours)	6,179	10,092	63%	10,244	2%	10,243	0%
	Average Speed (kph)	52.7	51.8	-2%	51.7	0%	51.7	0%

Table 7.9: Highway Network Statistics: PM Peak

PM Peak		2014 Base	2037 Baseline	% change from 2014	2037 Local Plan Option 3	% change from Baseline	2037 Mitigation	% change from Hybrid Option 3
Charnwood	Vehicle Distance (vehicle-km)	306,742	400,915	31%	414,495	3%	410,473	-1%
	Vehicle Delay-Time (vehicle-hours)	1,593	3,114	95%	3,552	14%	3,406	-4%
	Average Speed (kph)	49.5	43.7	-12%	42.1	-4%	42.4	1%
Leicester City	Vehicle Distance (vehicle-km)	266,222	307,609	16%	309,413	1%	311,019	1%
	Vehicle Delay-Time (vehicle-hours)	4,378	6,256	43%	6,370	2%	6,453	1%
	Average Speed (kph)	25.9	23.3	-10%	23.1	-1%	23.0	0%
Blaby	Vehicle Distance (vehicle-km)	288,701	348,722	21%	347,606	0%	355,769	2%
	Vehicle Delay-Time (vehicle-hours)	1,636	3,032	85%	3,013	-1%	2,843	-6%
	Average Speed (kph)	52.6	44.8	-15%	44.9	0%	46.0	2%
Leicestershire	Vehicle Distance (vehicle-km)	2,154,787	2,801,296	30%	2,825,184	1%	2,830,040	0%
	Vehicle Delay-Time (vehicle-hours)	11,485	19,580	70%	20,216	3%	19,684	-3%
	Average Speed (kph)	50.1	46.3	-8%	45.9	-1%	46.0	0%

7.6 Forecast Change in Highway Flows – Hybrid Option 3

- 7.6.1 Figure 7.10, Figure 7.11, and Figure 7.12 show the forecast highway flow changes in the AM Peak, Interpeak, and PM Peak between the Hybrid Option 3 and Baseline. It is worth noting the scale on the Interpeak plot is different to the scale of change in the peaks.
- 7.6.2 Similar to the preceding analysis of Local Plan Option 1 and Local Plan Option 2 in Section 3.6, there is a consistent increase in traffic across Charnwood and north Leicester across all three time periods, with larger traffic flows around Shepshed, Loughborough, and Syston. This is consistent with the locations of the Hybrid Option 3 development sites and highlights the routeing of development trips accessing both the SRN and travelling to larger urban areas, like Loughborough and Leicester.
- 7.6.3 There are also small reductions in traffic to the east of Charnwood, on the A46 and A607. Similar to Local Plan Option 1 and Local Plan Option 2, this is likely to be reflecting changes in the distribution of trips due to the introduction of more housing and employment sites in Charnwood, and hence fewer trips being made from external urban areas.
- 7.6.4 In all three time periods there is significant routeing across Charnwood Forest, and along Charley Road at Shepshed, despite the option of using more strategic routes. There is also significant routeing along Broome Lane at Syston, yet almost no change in the traffic levels along the Syston Northern Bypass despite the suitability of this route. The AM Peak shows a reduction in southbound traffic south of Loughborough along the A6004, which is choosing to cut across and join the A6 before One Ash roundabout. This is near the access point of the Woodthorpe developments⁸ and is likely to be due to the additional traffic from these developments, as well as existing congestion on the roundabouts along the A6004.
- 7.6.5 The Interpeak is generally less congested as much less secondary rerouteing is apparent in Figure 7.11. There is a consistent increase in flow, with almost no examples of local rerouteing, demonstrating that Interpeak traffic is more able to choose the most direct route due to lower levels of congestion.

⁸ Individual development site access was not assessed as part of this scope

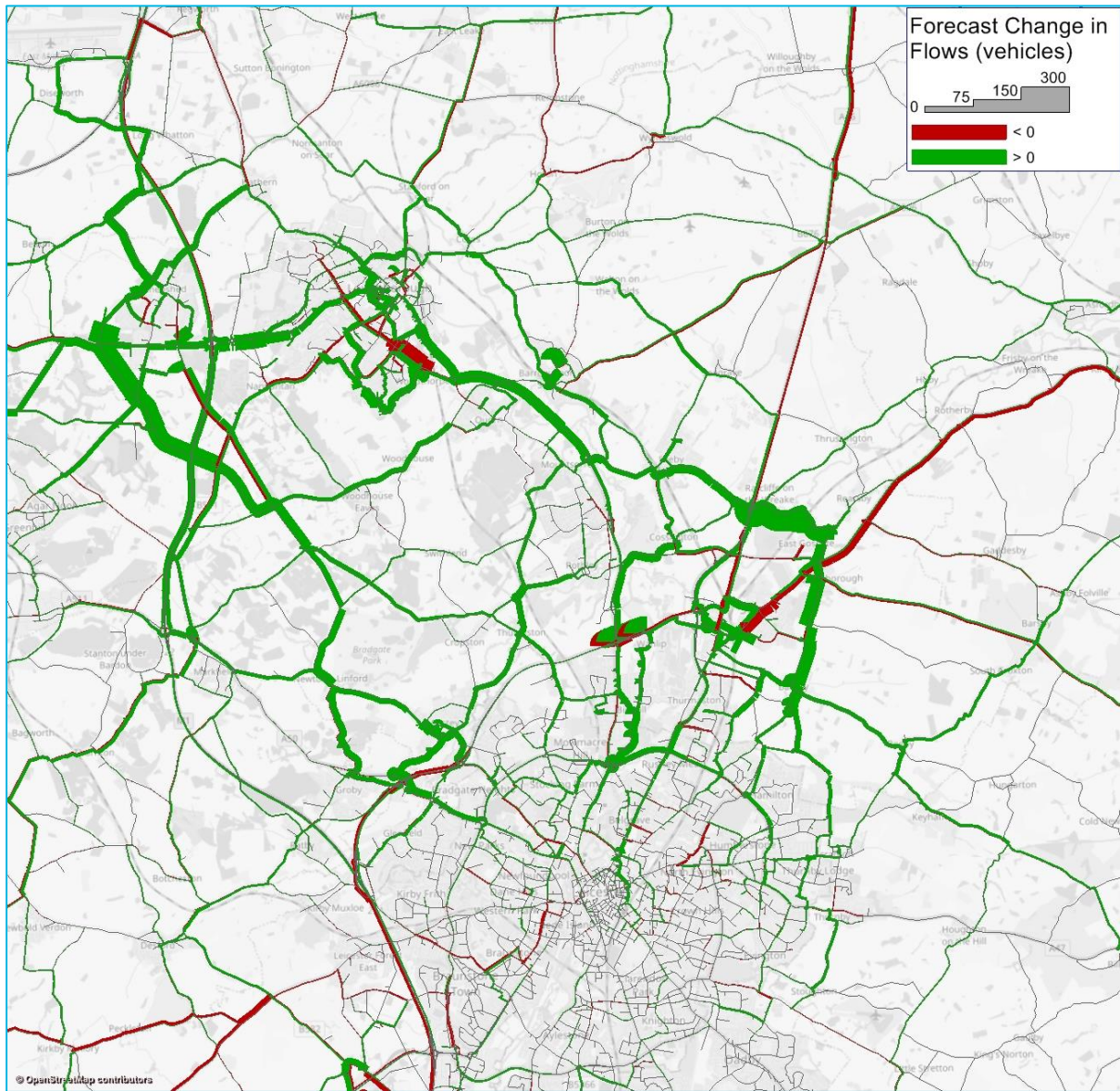


Figure 7.10: Highway Traffic Flow Change, Hybrid Option 3 minus Baseline, AM Peak

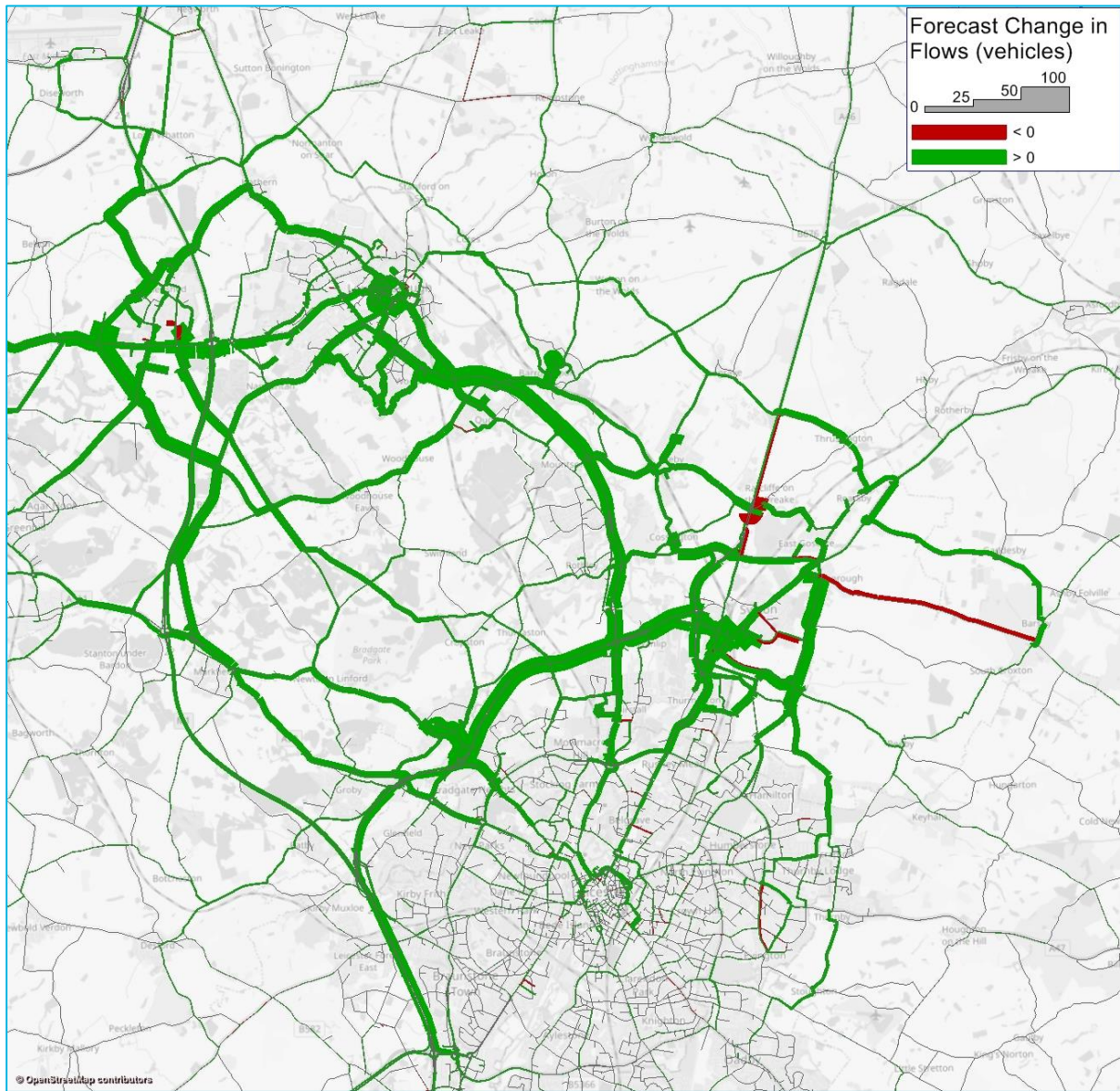


Figure 7.11: Highway Traffic Flow Change, Hybrid Option 3 minus Baseline, Interpeak

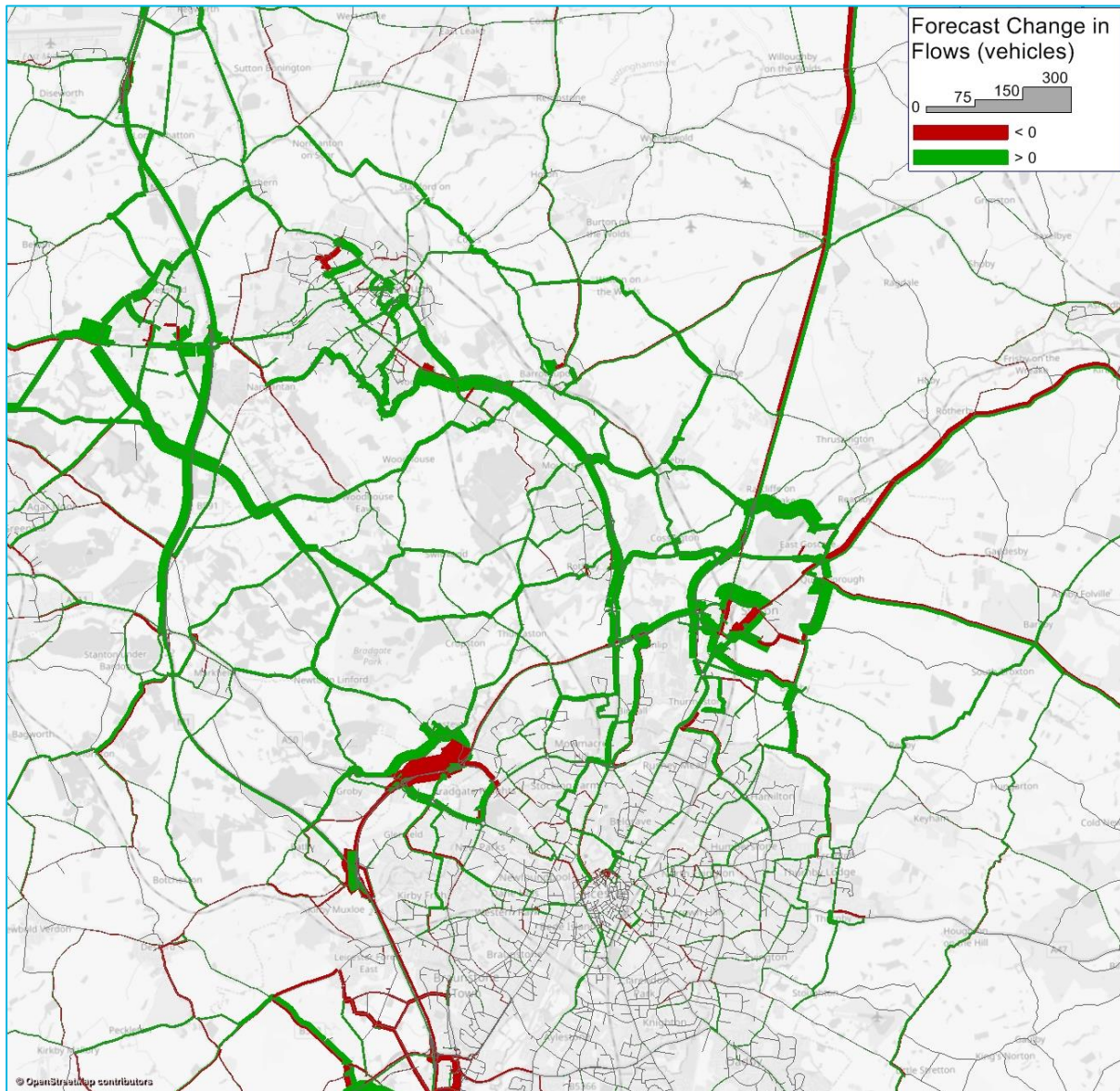


Figure 7.12: Highway Traffic Flow Change, Hybrid Option 3 minus Baseline, PM Peak

7.7 Forecast Change in Highway Delay – Hybrid Option 3

7.7.1 Figure 7.13, Figure 7.14, and Figure 7.15 show the forecast highway delay change in the AM Peak, Interpeak, and PM Peak between the Hybrid Option 3 and Baseline.

7.7.2 The delay difference results are largely consistent with what was reported for Local Plan Option 1 and Local Plan Option 2 in Section 3.7. Overall the delays across both the AM and PM Peaks are localised around the larger proposed development sites, like Loughborough and Syston, with some smaller delays showing near the development sites at Shepshed. There are also some delay increases at Nanpantan and Barrow-upon-Soar which are likely to be due to traffic routeing via more rural routes to avoid congestion on the SRN. There is a small increase in delay on the A46 in the PM Peak which is likely to be linked to flow differences in the same area shown in Figure 7.12, highlighting the fact that even a small change in flow or delay can have large impacts on the modelled traffic due to the existing high levels of congestion.

7.7.3 The Interpeak is generally much less congested than the AM and PM Peaks, with changes in delay located in areas of existing congestion in Leicester resulting in secondary rerouteing within the model which cannot be attributed directly to the Hybrid Option 3 development.

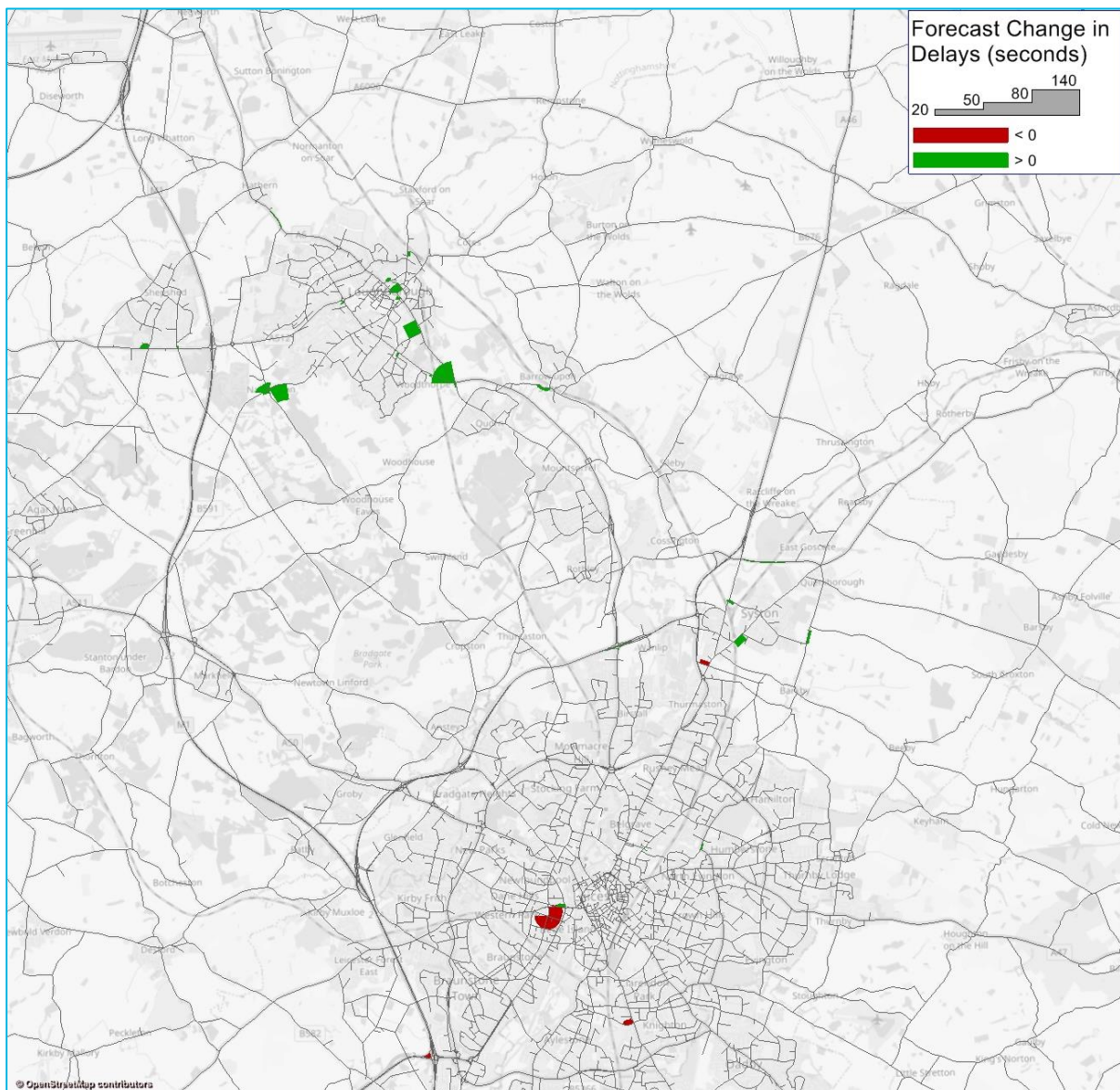


Figure 7.13: Highway Delay Change, Hybrid Option 3 minus Baseline, AM Peak

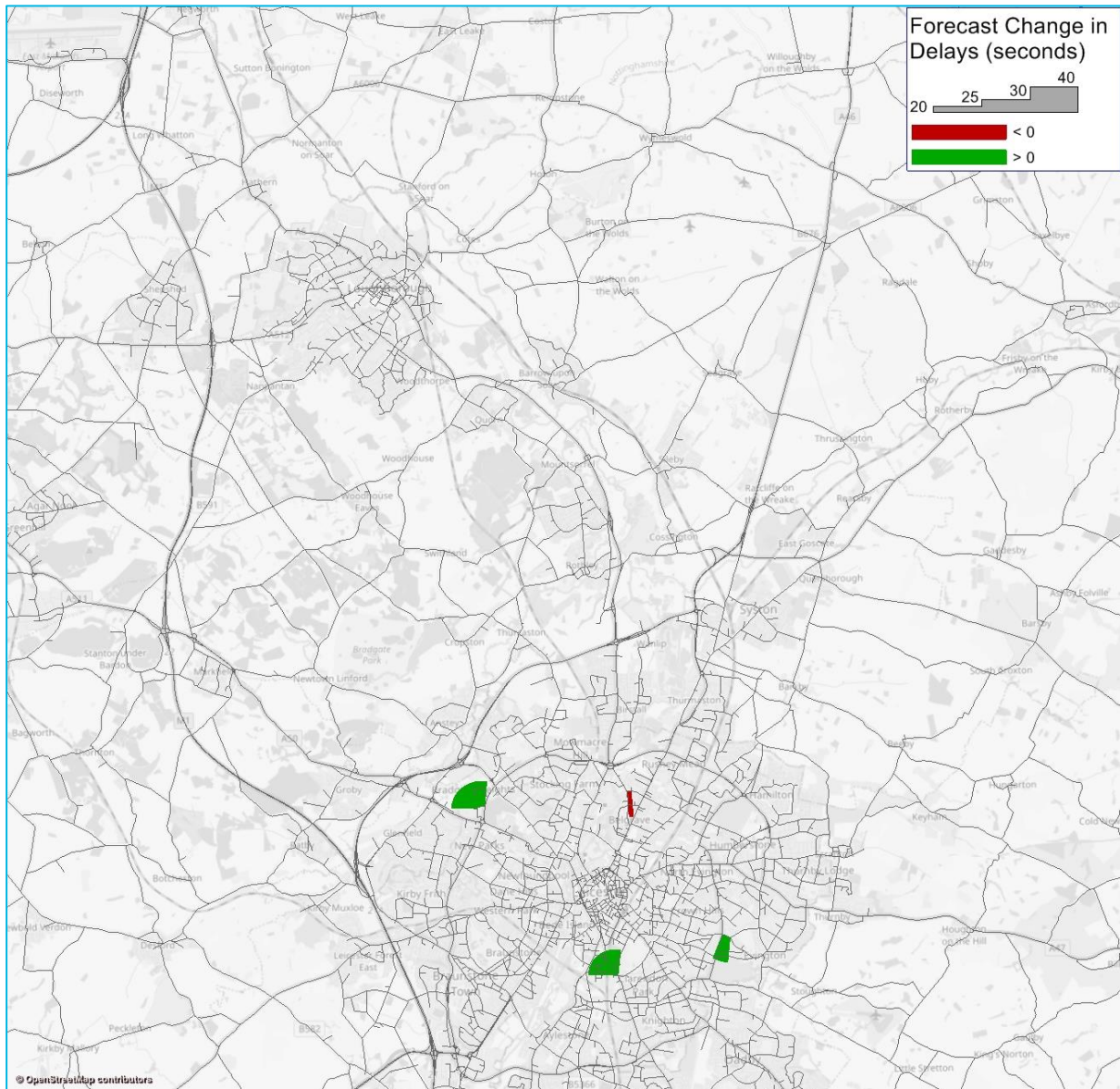


Figure 7.14: Highway Delay Change, Hybrid Option 3 minus Baseline, Interpeak

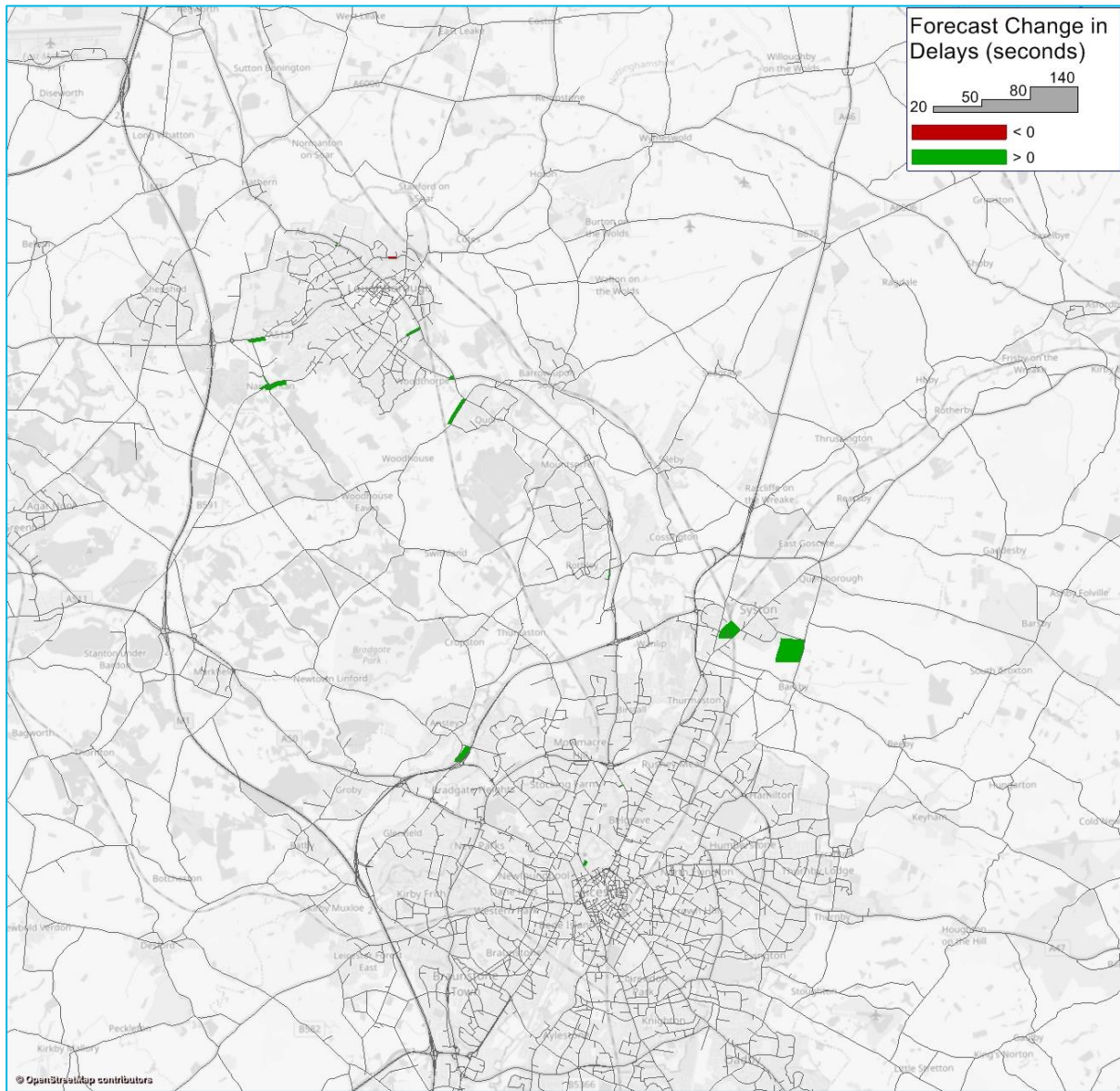


Figure 7.15: Highway Delay Change, Hybrid Option 3 minus Baseline, PM Peak

7.8 Forecast Change in Highway Flows – Mitigation Scenario

- 7.8.1 Figure 7.16, Figure 7.17, and Figure 7.18 show the forecast changes in flow between the Hybrid Option 3 and Mitigation Scenario for the AM Peak, Interpeak, and PM Peak. At a high level there is an increase in traffic on the M1 for all three time periods, due to the inclusion of the Smart Motorway widening schemes. There is also a marked decrease in flow routeing across Charnwood Forest, particularly in the AM Peak, highlighting the introduction of the mitigation schemes in and around Shepshed encouraging traffic to take more strategic and direct routes.
- 7.8.2 There is also an increase, across all three time periods, of traffic between Melton Mowbray and Loughborough travelling across east Charnwood, using the signed route along the A60, B676 and A6006. This is as a result of the mitigation measures introduced on Broome Lane designed to encourage traffic onto more suitable routes.
- 7.8.3 There are more localised changes around specific mitigation schemes across all three time periods. There are increases and reductions in flow within Loughborough, indicating rerouteing along more appropriate routes; there is also continuing instability in flow on the A46 and A50 near Anstey, but also changes in flow due to the inclusion of the A50/A46 dedicated slip road. Other large areas of change can be seen at Hobby Horse roundabout and M1 J21 as a result of the SRN schemes introduced at these locations. The impact of the mitigation at specific locations is explored in more detail in Section 7.10.

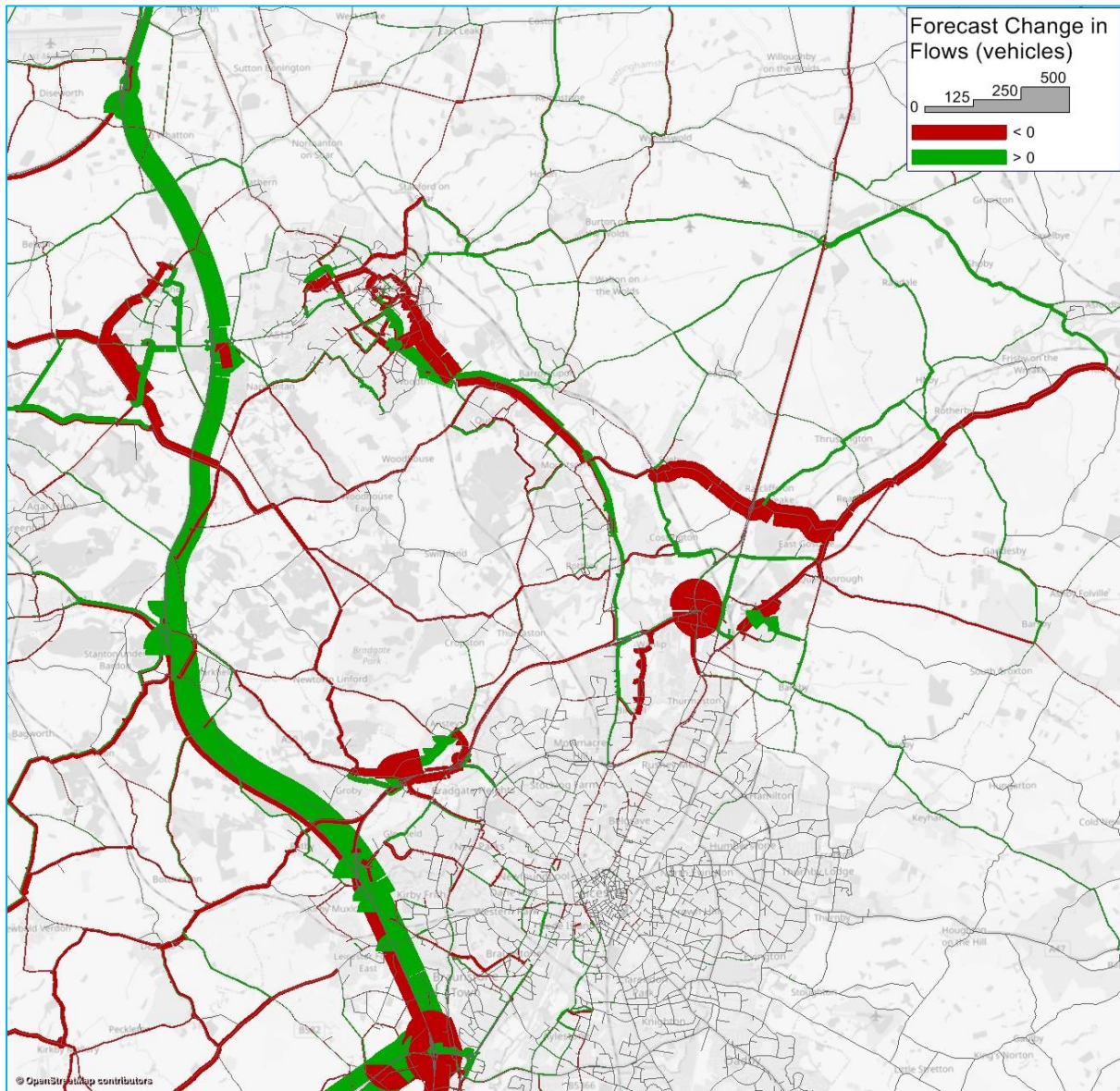


Figure 7.16: Highway Traffic Flow Change, Mitigation minus Hybrid Option 3, AM Peak

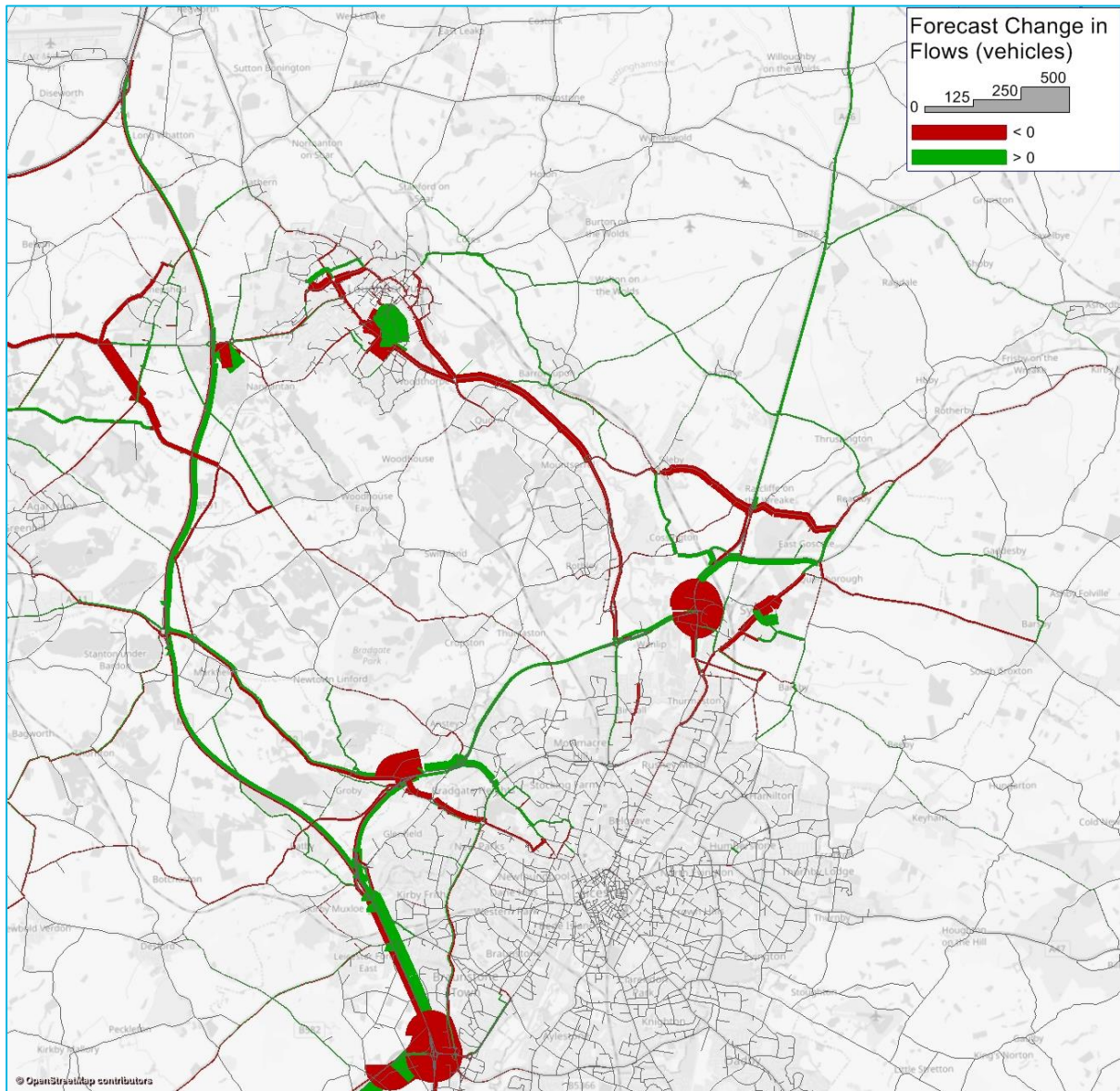


Figure 7.17: Highway Traffic Flow Change, Mitigation minus Hybrid Option 3, Interpeak

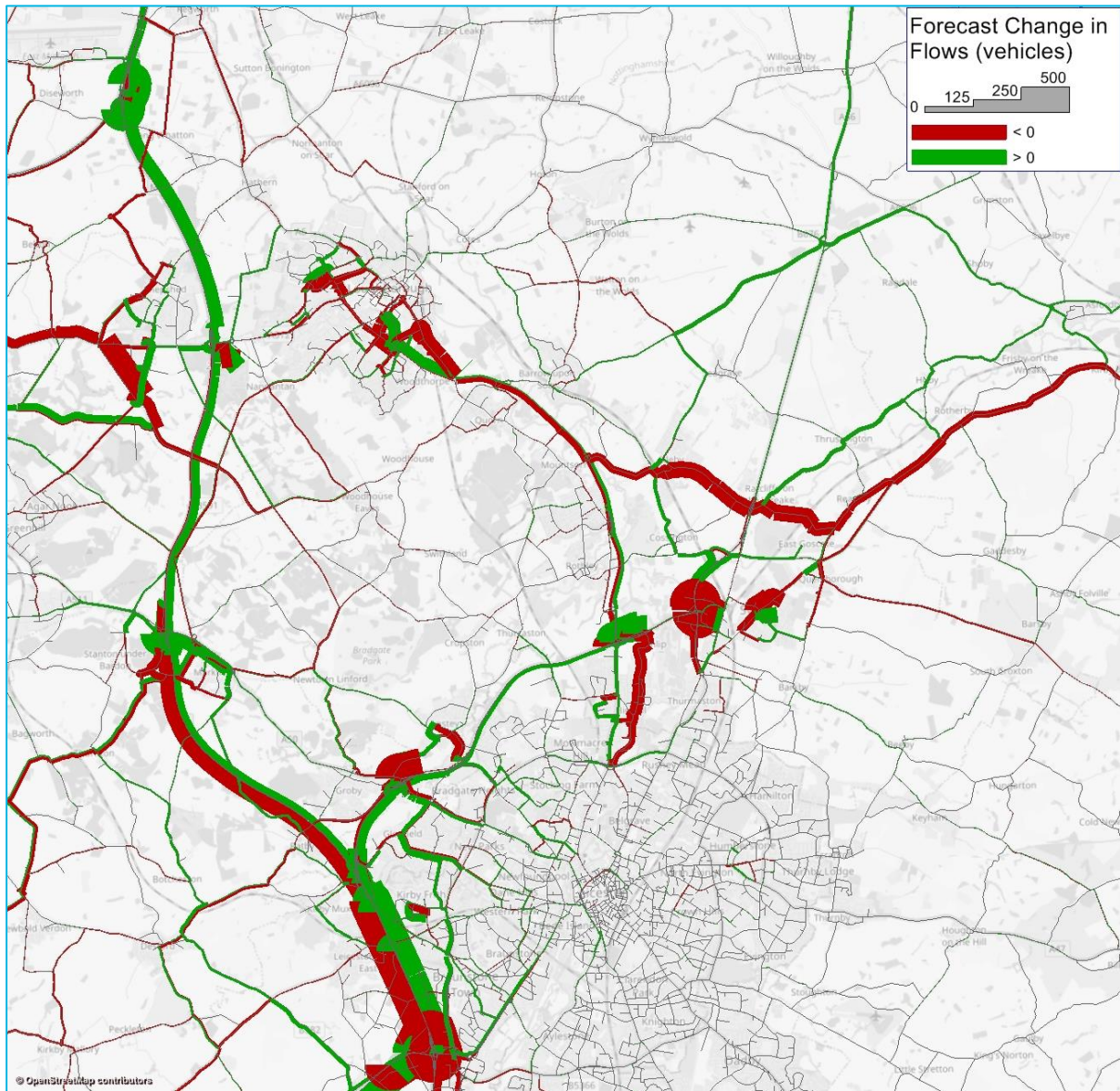


Figure 7.18: Highway Traffic Flow Change, Mitigation minus Hybrid Option 3, PM Peak

7.9 Forecast Change in Highway Delays – Mitigation

7.9.1 Figure 7.19, Figure 7.20, and Figure 7.21 show the forecast changes in delay between the Hybrid Option 3 and Mitigation Scenario for the AM Peak, Interpeak, and PM Peak. At a high level it can be seen that there are consistent reductions in delays along the M1, due to the smart motorway widening schemes, and also consistent reduction in delay within Loughborough town centre, due to the highway improvements and behavioural change schemes.

7.9.2 There are also large delay (and corresponding flow) fluctuations between M1 J21 and the A46, and subsequently on the A46 itself, due to the SRN junction improvements in these locations with no general change in A46 capacity.

7.9.3 In the PM Peak there is an increase in delay to the east of the M1 at Copt Oak. There is no corresponding increase or decrease in flow as a direct cause or response to this delay, hence it is likely to be due to instability in the network due to the proximity of the signalised junctions at this location. The impact of the mitigation at specific locations is explored in more detail in Section 7.10

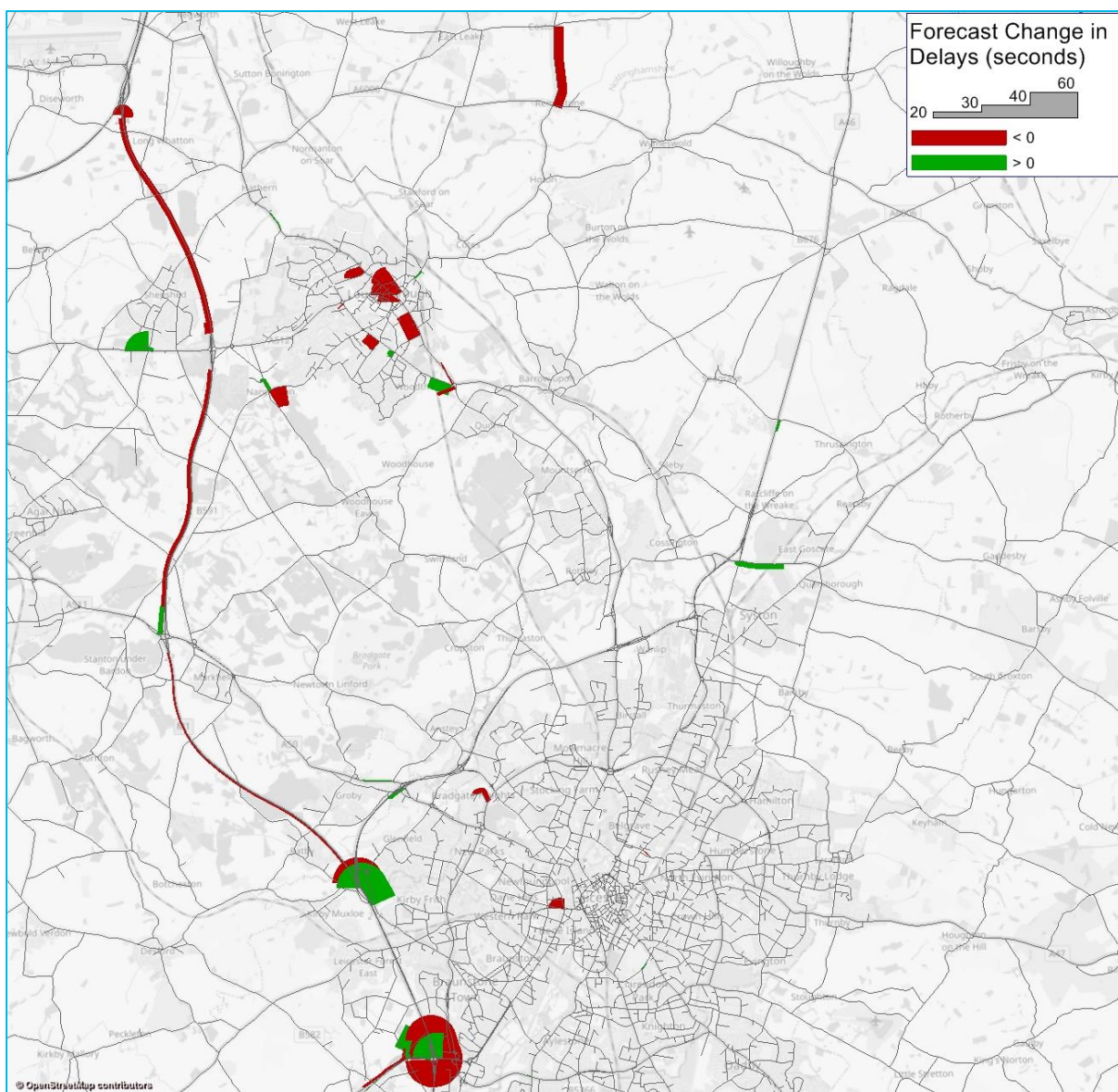


Figure 7.19: Highway Delay Change, Mitigation minus Hybrid Option 3, AM Peak

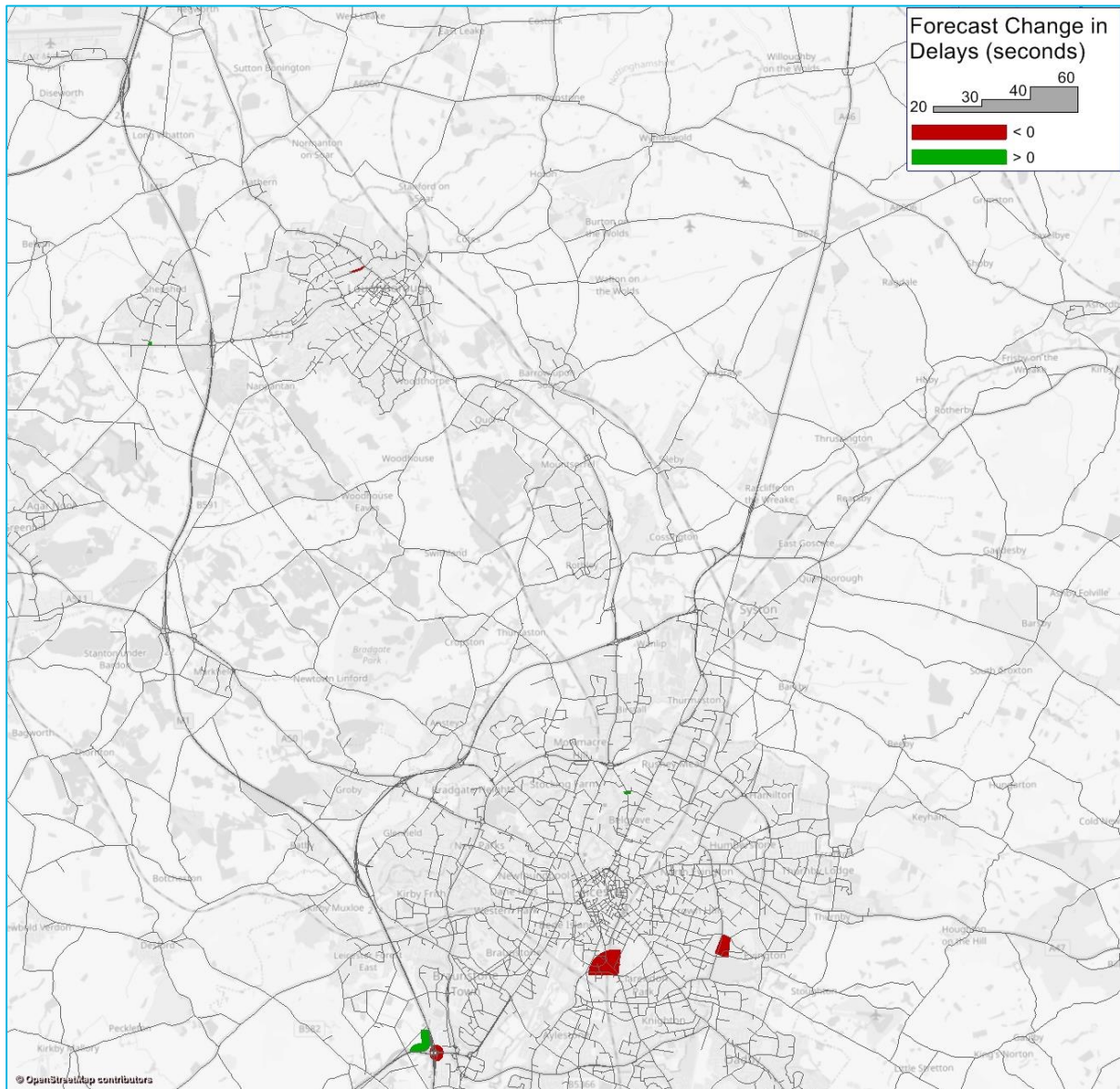


Figure 7.20: Highway Delay Change, Mitigation minus Hybrid Option 3, Interpeak

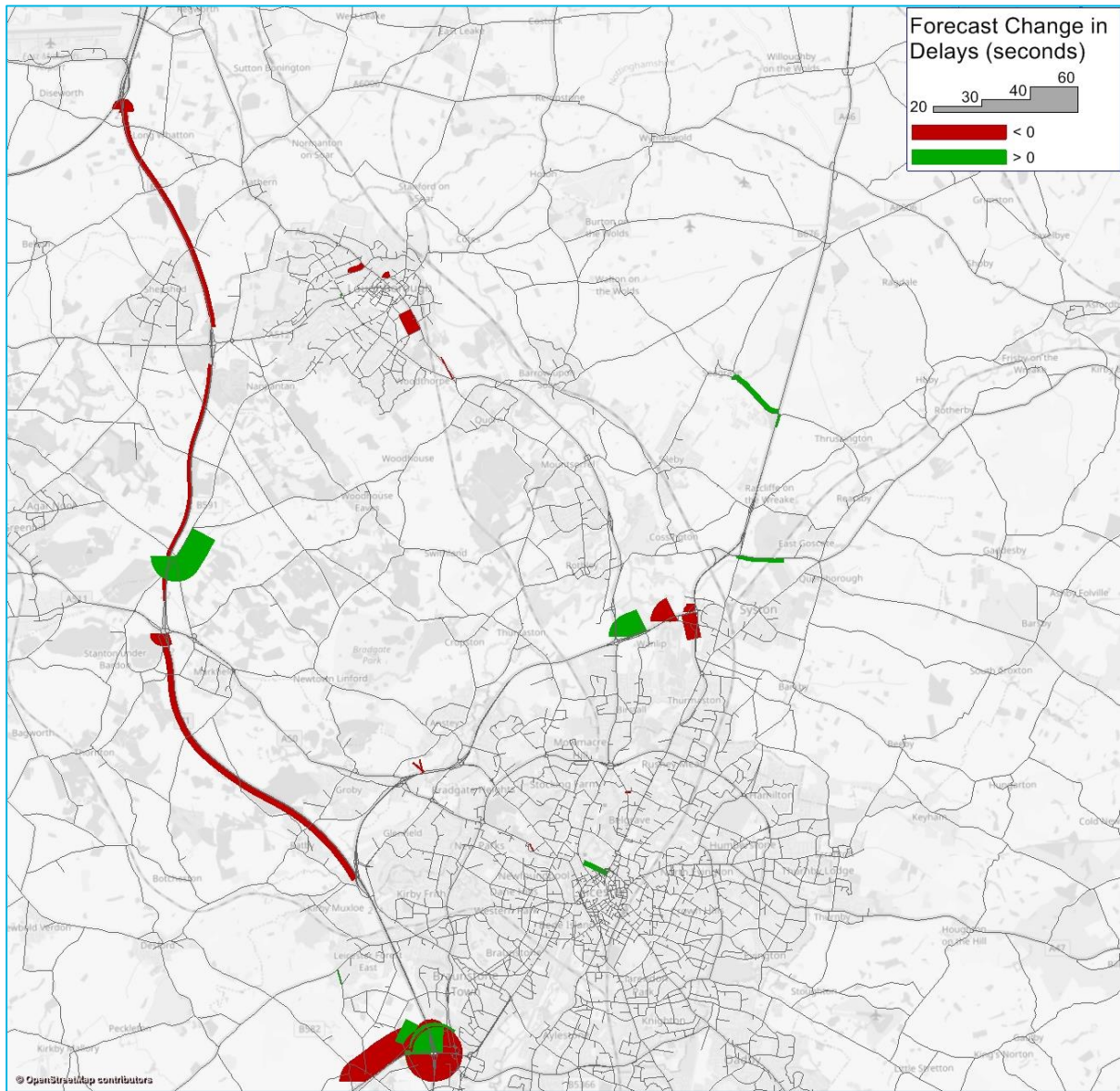


Figure 7.21: Highway Delay Change, Mitigation minus Hybrid Option 3, PM Peak

7.10 Mitigation Results by Broad Area

7.10.1 This section provides a more detailed commentary on the impact of the mitigation package on the broad locations laid out in Section 5.4. As well as providing insights on how the mitigation has improved the issues brought up at specific locations, the below observations also comment on any secondary impacts of the mitigation package, and the potential underlying causes of these, which will require some iteration with the current package of measures.

Anstey

7.10.2 In the AM Peak there is a reduction in traffic using Leicester Road between Anstey and the A46 and on the A46 westbound. This is due to the increase in delay seen on the A46 main carriageway at the A50 junction westbound on-slip, and hence traffic heading towards the M1 southbound is choosing to route down Groby Road and Anstey Lane to access the A46 at the A50 junction to avoid this delay. This demonstrates that the A46 remains heavily congested resulting in unstable routeing patterns.

7.10.3 There are small increases in delay southbound on the A50 at the junction with Anstey Lane. This is due to the introduction of signals allowing a right turn into Anstey Lane from the A50 northbound. In the AM Peak this small increase in delay is causing some southbound A50 traffic to route through Groby to access the A50/A46 roundabout.

7.10.4 There are increases in flow on the A50/A46 roundabout due to the improvement of the slip road access and additional slip road from the A50 to the A46 eastbound (the large reduction in flow is on the existing slip-road). The capacity of the roundabout has therefore increased and the additional flow shows traffic is encouraged to use this as the main junction to enter Leicester, as opposed to finding a more rural route through Charnwood Forest.

Barrow-upon-Soar

7.10.5 The village of Barrow-upon-Soar has a small increase in through traffic across all time periods. This is likely to be due to the increase in east-west traffic routeing across the east of Charnwood to/from Loughborough, as mentioned in §7.8.2, and due to the priority changes at the roundabout of High Street, South Street, and Bridge Street; however, this has not caused any marked increase in delay within the village.

7.10.6 There are negligible increases in delay to the west of Barrow due to a slight increase in flow at the traffic signals on the Soar bridge.

Birstall

7.10.7 The introduction of traffic calming measures along Wanlip Lane to the east of the A6 has caused a significant reduction in traffic along this section of road in the AM and PM Peaks. This, coupled with the increase in capacity introduced at the junction of the A6 and A46, has encouraged traffic to use the more strategic route along the A6 rather than the local alternative.

7.10.8 In the PM Peak there is also a reduction in flow further south on Birstall Road, however this is not reflected in the AM Peak, implying that the A6 in the AM Peak remains congested and keeps Birstall Road as an attractive route into Leicester.

Loughborough

7.10.9 There is a significant reduction in delay within Loughborough which is a result of the junction improvements, improved bus accessibility and scheduling, and the reduction in car travel due to the behavioural change measures. Traffic has been encouraged to use more sensible routes, such as the A6004 Epinal Way as opposed to routeing through the town centre.

7.10.10 The improvements modelled at One Ash roundabout have resulted in a reduction in delay and increase in capacity. This, combined with the other roundabout improvements along Epinal Way, has encouraged routeing along the A6004 but has also incurred a small increase in delay around the access of the Woodthorpe developments⁹, just off the western roundabout arm.

⁹ Specific site access is not included in the scope of this work

7.10.11 There are small changes in delay (a combination of increases and decreases) across all four arms of the Nanpantan crossroad junction. There are also both increases and decreases in flow through Nanpantan, depending on the junction arm, implying traffic is still choosing to route through the village. Generally, the flow increases are seen along the northern approaches, with reductions in flow on the southern approaches to and from Charnwood Forest. This implies the route to and from Loughborough through Nanpantan is still relatively attractive despite the remaining congestion.

Shepshed

7.10.12 There are large decreases in flow along Charley Road in all time periods. This is due to the mitigation scheme restricting certain turns at the junction of Charley Road and the A512. There is a corresponding increase in delay in the AM Peak at the junction of Iveshead Road and the A512 due to traffic choosing to route via Iveshead Road instead of Charley Road. There are corresponding increases in flow on Iveshead Road, implying some traffic is still choosing to travel south towards Leicester via the more rural roads, and not use the M1 from J23; however there is still an overall reduction in traffic routeing through Charnwood Forest.

7.10.13 There are small decreases in delay, and corresponding increases in flow, on the M1 J23 roundabout due to the improvement of the slip road access and widening of the overbridges to allow dedicated lane access to the A512.

7.10.14 The large changes in flow to the east of M1 J23 are due to the inclusion of the proposed new filter lane from the A512 to the M1 southbound. This also relieves capacity on the roundabout encouraging traffic from other approaches to use M1 J23.

Syston and Sileby

7.10.15 There is a large reduction in traffic along Broome Lane, due to the introduction of traffic signals at the bridge over the Wreake, the speed reductions on the section of road just north of East Goscote and the speed reductions on the eastern side of Sileby. There is also a corresponding increase in flow on the Syston Northern Bypass showing that the mitigation measures on Broome Lane are encouraging traffic to use more strategic routes to access the A46. This increase in flow on the bypass is also causing a small increase in delay. The level of increase seen along the bypass is not commensurate with the level of decrease along Broome Lane; this is due to some traffic routeing along the signed route across north-east Charnwood, as mentioned in §7.8.2.

7.10.16 There are small decreases in delay at the junction of Barkby Road and Queniborough Road due to the inclusion of filter lanes as part of the mitigation package, and there are corresponding increases along Barkby Road highlighting the newly available capacity along this route. There is some local rerouteing of traffic, mainly due to the access from the development sites within Syston and the location of the traffic calming measures, but overall there is a reduction in flow within Syston and traffic is choosing to use more appropriate and preferable routes.

7.10.17 There is a reduction in traffic on the A46, between Broome Lane and Syston Northern Bypass, and towards Sileby, on Ratcliffe Road, which is a secondary impact of the increase in traffic to and from Melton Mowbray and Loughborough travelling via more rural routes further north, mentioned in §7.8.2. The underlying cause of this is the mitigation measures introduced at Broome Lane, which has encouraged traffic to disperse to alternative east-west routes.

Strategic Road Network

7.10.18 The large flow and delay changes seen south-west of Leicester are due to improvements introduced at M1 J21. There is a large reduction of flow around the existing roundabout due to traffic travelling between the M1 and M69 now having a free flow link, resulting in a reduction in congestion and delay. From J21a to J23a there is additional capacity on the M1 due to the inclusion of the Smart Motorway scheme, which can be seen to reduce delay along this section of M1. However, due to the increased capacity of J21 and the M1 north of the A46, the section of M1 between junction 21 and 21a has become more congested, as has the A46 Leicester Western Bypass.

7.10.19 The improvements at Hobby Horse roundabout comprising a dedicated southbound slip road between the two sections of the A46 produce a large reduction in flow, and corresponding reduction in delay, around the roundabout. This shows that congestion is reduced and traffic is encouraged to use this route from areas like Cossington and the Northern Syston Bypass to join the A46.

7.10.20 It is worth noting that by introducing significant capacity enhancements at these locations, one unintended impact will be to produce more highway traffic, either through trips shifting from other modes, or existing highway trips increasing in distance. The model does represent such effects and this will therefore have a potential detrimental impact on congestion in the wider area.

7.11 Forecast Impact of Mitigation Measures at Identified Junctions

7.11.1 This section outlines the effects of the mitigation package on the junctions that were previously highlighted as outstanding issues, summarised in Table 5.1 to Table 5.3. Table 7.10 to Table 7.12 show the same junctions and summarise the result of the mitigation interventions at each.

7.11.2 The colouring of the mitigation responses is as follows:

- **green** – conditions have improved through the introduction of the package of mitigations;
- **amber** – the package of mitigations has resulted in a notable secondary impact; or
- **none** – no significant change due to the introduction of the package of mitigations.

Table 7.10: Mitigation Response to Baseline Issues

Junction	Mitigation Response
Traffic from Shepshed using Charnwood Forest routes rather than M1 to travel southbound	Reduction in flow across Charnwood Forest from Shepshed and A512, corresponding increase in flow southbound on the M1
Traffic from Shepshed using Hathern route rather than A512 to access Loughborough north	Increase in traffic joining A512 from Shepshed and increase on A512 between J23 and Loughborough, however no significant impact on Hathern routeing
Traffic from Thurstaston towards Loughborough choosing to route through Mountsorrel to join A6 at Sibley Road/Granite Way junctions (not at Rothley/Mountsorrel dumbbell junction)	Small reduction in flow approaching Granite Way junction, and across the area north of Thurstaston. Increase in Thurstaston traffic heading south towards A46
Traffic from Syston using Broome Lane rather than A607 bypass	Significant reduction in traffic along Broome Lane, and corresponding increase along Syston Northern Bypass
Traffic from Syston to A46 routeing along Wanlip Road rather than through Hobby Horse junction	Small reduction in traffic along Wanlip Lane, no significant change
Traffic between A607 Melton and A6 using Broome Lane rather than A607 Syston bypass	Significant reduction in traffic along Broome Lane, and increase along Syston Northern Bypass
Charley Road carrying significant strategic traffic	Significant reduction in traffic along Charley Road due to banned turning movements, small resulting increases in delay and flow seen at Iveshead Road, but overall traffic reduction through Charnwood Forest
Cotes Road carrying significant strategic traffic	Increase in flow along Cotes Road, likely due to rerouteing brought about by the reduced attractiveness of Broome Lane
Beaumont Leys Lane traffic south of A563 routeing along Strasbourg Drive to access A563 at Orwell Drive	Small increase in traffic taking this route, due to increased traffic from Anstey/A46 to the A563
Significant traffic using Birstall Road southbound towards Redhill Circle rather than A6	Significant reduction in traffic avoiding A6 due to traffic calming measures and A46/A6 junction improvements
Westbound traffic on A563 to Ashton Green area using A6 rather than A563	No significant change
Parker Drive carrying significant non-local levels of traffic	No significant change

Table 7.11: Mitigation Response to Development Issues, AM Peak

Junction	Mitigation Response
Junction of Fosse Way and Syston High Street, Syston, Charnwood	No significant change
Junction of the A47 Hinckley Road and Holmfield Avenue West, Leicester	No significant change
Junction of Whitwick Road and Copt Oak Road, Coalville, North West Leicestershire	Small improvements in VoC
Junction of Ling Road and Woodthorpe Road, Loughborough, Charnwood	Increase in flow but no increase in delay, no significant change in VoC

Junction	Mitigation Response
Junction of Woodgate and Leicester Road/Loughborough High Street, Loughborough, Charnwood	Reduction in delay and flow in Loughborough town centre, due to the junction improvements and behavioural change measures implemented for the town, significant VoC decrease
Junction of Iveshead Road/Charnwood Road and the A512 Ashby Road Central, Shepshed, Charnwood	Increase in delay and flow due to the banned turns at Charley Road
Junction of Leicester Road and A512 Ashby Road Central, Shepshed, Charnwood	Increase in flow but no increase in delay
Junction of Leicester Road and Shelthorpe Road, Loughborough, Charnwood	Reduction in delay and flow in Loughborough town centre, due to the junction improvements and behavioural change measures implemented for the town
One Ash roundabout, Loughborough, Charnwood	Large increase in flow with small change in delay due to roundabout improvement and therefore additional capacity and routing up A6004; significant reduction in VoC
Junction of Nanpantan Road and Woodhouse Lane, Nanpantan, Charnwood	Small increases in flow and delay
Junction of Wanlip Road and Melton Road, Syston, Charnwood	Small increase in delay due to traffic calming measures through Syston, general decrease in Syston through traffic, no significant change to VoC
Junction of Station Road and the A47 Uppingham Road, Thurnby, Harborough	No significant change
Various Loughborough town centre locations	Reduction in delay and flow in Loughborough town centre, due to the junction improvements and behavioural change measures implemented for the town
Junction of the A47 Uppingham Road and Humberstone Drive, Leicester	No significant change
Junction of Spencefield Lane and Goodwood Road/Marydene Drive, Leicester	No significant change
Junction of the A512 and Snell's Nook Lane, Nanpantan, Charnwood	Increase in flow but no increase in delay, no significant change to VoC
Junction of Catherine Street and Brandon Street, Leicester	Reduction in delay, VoC reduced in AM Peak
Junction of Arthur Street and Frederick Street, Loughborough, Charnwood	Reduction in delay and flow in Loughborough town centre, due to the junction improvements and behavioural change measures implemented for the town, small decrease in VoC
Junction of Nottingham Road and Clarence Street, Loughborough, Charnwood	No significant change
Access from the Wanlip Sewage Treatment Works onto the A46, Leicester	A46 still highly congested, VoC unstable in the AM and PM Peaks
Junction between Ashby Road Central and Ashby Road East, Shepshed, Charnwood	Increase in flow but no increase in delay, no significant change in VoC
Junction of Queniborough Road and Barkby Road, Syston, Charnwood	Reduction in delay and increase in flow due to junction improvements

Table 7.12: Mitigation Response to Development Issues, PM Peak

Junction	Mitigation Response
Junction of Burleys Way/Vaughan Way and St. Margaret's Way, Leicester	No significant change
Junction of School Lane and the A6 Loughborough Road, Leicester	Increase in flow on A6 due to junction improvements and traffic calming through Birstall, small increase in delay along School Lane, helps to discourage through traffic on unsuitable roads, significant reduction in VoC in PM Peak
Junction of Melton Road and Fosse Way, Syston, Charnwood	Increase in flow but no increase in delay, no significant change in VoC
Junction of Melton Road and Barkby Lane, Syston, Charnwood	Reduction in flow due to traffic calming measures, significant decrease in VoC
Junction of Melton Road and Goodes Lane, Syston, Charnwood	Small increase in delay due to traffic calming measures through Syston, general decrease in Syston through traffic, no significant change in VoC

Junction	Mitigation Response
Exit of the M1 Junction 23 to the A512 Ashby Road East, Shepshed, Charnwood	Increase in flow due to added capacity at J23 and M1, increase in VoC in PM Peak
Junction of the access to the Woodthorpe Development south of Loughborough and the A6004, Loughborough, Charnwood	Increase in congestion due to increased capacity, and therefore flow, along A6004 due to roundabout improvements along Epinal Way
Junction of the B5330 and Beacon Road, Beacon Hill, Charnwood	Decrease in delay and flow through Charnwood Forest, no significant change in VoC
Approach to the M1 Junction 23 from the A512 Ashby Road East, Shepshed, Charnwood	Increase in flow due to additional capacity at J23 and on M1, increase in VoC in PM Peak
Exit of One Ash Roundabout to Terry Yardley Way northbound, Quorn, Charnwood	Decrease in delay due to additional capacity at roundabout, no significant change in VoC
Approach to Ingleberry Road junction on the A512 Ashby Road East, Shepshed, Charnwood	Increase in flow but no increase in delay, increase in VoC in PM Peak
Junction of Wanlip Road and Melton Road, Syston, Charnwood	Small increase in delay due to traffic calming measures through Syston, general decrease in Syston through traffic, no significant change to VoC
Junction of the A512 and Snell's Nook Lane, Nanpantan, Charnwood	Increase in flow but no increase in delay, no significant change to VoC
Junction of Nanpantan Road and Woodhouse Lane, Nanpantan, Charnwood	Small increases in flow and delay
Junction of Loughborough Road and Woodhouse Road/Farley Way, Quorn, Charnwood	General decrease in flow and delay, but no significant change to VoC
A46 eastbound merge from A5630 roundabout, Anstey, Charnwood	Small decrease in delay, still highly congested
Junction of Queniborough Road and Barkby Road, Syston, Charnwood	Reduction in delay and increase in flow due to junction improvements
Junction of Somerville Road and Narborough Road, Leicester	No significant change
Junction of Glenfrith Way and Hallgate Drive, Leicester	Small reduction in VoC
Junction between Ashby Road Central and Ashby Road East, Shepshed, Charnwood	Increase in flow but no increase in delay, small reduction in VoC
Junction of Iveshead Road/Charnwood Road and the A512 Ashby Road Central, Shepshed, Charnwood	Increase in delay and flow due to the banned turns at Charley Road

7.11.3 Given that only one iteration of mitigation scheme development and testing was carried out as part of the Hybrid Option 3 assessment, there were some secondary adverse impacts on VoC in some locations due to the inclusion of the mitigation schemes. Table 7.13 lists the locations that have now been flagged as having VoC issues, using the same criteria previously laid out in Section 3.8.

Table 7.13: New VoC Issues

Time period	Junction	Mitigation result
All	Sections of the M1 between M69 and A46	Increased traffic from M69 link road, causing increase in VoCs (90-100%) along the M1
AM Peak	Junction of Terry Yardley Way and Ling Road, Loughborough, Charnwood	Junction improvements along Epinal Way causing increased flow along A6004
AM Peak	M1 southbound merge from A46 at J21A, Hinckley and Bosworth	Increased traffic from M69 link road, causing increase in VoCs along the M1
PM Peak	Junction of A6 Loughborough Road and Birstall Park-and-Ride, Leicester	Traffic calming measures along Wanlip Lane and improvements of the A6/A46 junction means increased flow along A6
PM Peak	A46 slip road leaving eastbound to Leicester Road, Anstey, Charnwood	Roundabout improvements encouraging traffic to route via more strategic junctions, A46 remains highly congested
PM Peak	Junction of Ling Road/Epinal Way and Park Road, Loughborough, Charnwood	Junction improvements along Epinal Way causing increased flow along A6004
PM Peak	Junction of Copt Oak Road and Warren Hills Road, Copt Oak, North West Leicestershire	Increase in delay blocking back along Copt Oak Road

Time period	Junction	Mitigation result
PM Peak	Approach to the M1 Junction 23 from the A512 Ashby Road East, Shepshed, Charnwood	Increase in traffic due to banned movements at Charley Road and junction improvements at J23, encouraging more strategic routeing via the M1 and A512
PM Peak	Junction of Johnson Road and the A6 Loughborough Road, Birstall, Leicester	Traffic calming measures along Wanlip Lane and improvements of the A6/A46 junction means increased flow along A6
PM Peak	Approach to Ingleberry Road junction on the A512 Ashby Road East, Shepshed, Charnwood	Increase in traffic due to banned movements at Charley Road

Section 8 – Summary and Conclusions

- 8.1.1 This report has set out the work undertaken to assess the proposed Charnwood Local Plan development. Analysis from the assessment of the first two Local Plan options allowed CBC to develop and finalise Hybrid Option 3. In parallel with this, analysis of Local Plan Option 1 was used in the development of the initial mitigation package. Hybrid Option 3 was then tested and compared against the Local Plan Option 1 findings to feed into and refine the work that had already been undertaken on the mitigation package. The final package of mitigations was then tested to assess the extent to which it alleviated the impacts of the Hybrid Option 3 developments.
- 8.1.2 The final package of mitigations features a mix of schemes designed to address congestion caused by the proposed developments, and also alleviate existing routeing issues where more strategic traffic was observed to be using local routes as a result of congestion on the SRN in and around Charnwood. Overall, the mitigation schemes proposed have had a positive impact on the issues they were designed to address. In particular, the schemes at Broome Lane and the A6 at Birstall have had noticeable impacts on routeing of traffic, as have schemes to reduce routeing through Charnwood Forest. The combination of behavioural change, public transport, and junction improvement schemes in Loughborough and the surrounding area have also alleviated delays in the town and encouraged more appropriate routeing.
- 8.1.3 Some issues still remain, in particular delay on the A46 continues to produce instability in route choice and flows around the key junctions north of Leicester. Given the strategic nature of the model it was not possible to assess the benefits of introducing flow management on the A46 and further local modelling may be required to understand how this scheme could improve traffic flow on this route.
- 8.1.4 Testing all the mitigation schemes in combination has led to a wide range of impacts across a large geographical area which this report has sought to summarise. In some cases, the mitigation measures have produced secondary impacts, some of which may need to be addressed through further refinement of the package. It is also worth noting that capacity improvements on the SRN (and elsewhere) will tend to generate additional highway traffic and therefore potentially undermine some of the gains brought about by the package of mitigations as a whole. Phased additional testing of the Local Plan specific mitigations, in isolation from the SRN improvements, would provide more clarity in this regard, and allow CBC to work with stakeholders to develop measures which address issues across Leicestershire.
- 8.1.5 Given the complexity around patterns of congestion introduced by the proposed development, and existing traffic issues within Charnwood and the wider area, further work could be undertaken to separate strategic and local issues. This may assist with building a better understanding of the effectiveness of the package of mitigations and any secondary impacts, allowing the mitigations to be refined. However, this would provide an artificial output and given the scale of growth to be accommodated in Charnwood, it is inevitable that the development traffic will continue to result in some additional congestion.

Section 9 – Stakeholder Responses and Comments

- 9.1.1 Following the issuing of a previous version of this report, a number of comments and requests for further analysis, modelling and information were received from CBC, LCC, Leicester City and Highways England. These have been reviewed and grouped into themes as set out in Table 9.1.

Table 9.1: Client and Stakeholder Response Themes

Theme	Action to be undertaken
Reporting clarification	Addressed in latest version of this report
Content of mitigation package	To be considered as part of review and refinement of the mitigation package
Mitigation package impacts	Further analysis on existing model runs and refinement of mitigation package to be undertaken where appropriate
Strategic/local traffic and scheme interaction	Further analysis on existing model runs to be undertaken where appropriate
Request for additional analysis	Further analysis to be undertaken and reported where appropriate
Baseline growth assumptions	To be clarified by CBC
Allocation of Local Plan growth	Rationale provided in separate reporting

- 9.1.2 Further work is now underway to address these comments where appropriate. This includes additional analysis of existing models, a review of the mitigation package and potential refinement (with particular attention given to M1 Junction 23) and an additional model run to test the refined mitigation package. This further work and outcomes of the modelling and analysis will be detailed in a report including a rationale for the approach taken, response to comments from stakeholders and identification of any remaining limitations.

Appendix A Local Plan Option Data

Table A.1: Hybrid Option 3 Development Sites

Site reference	Site Name	Location	Homes (dwellings)	Employment (hectares)	Schooling (pupils)
PSH069	Land South East of Syston	LUA	960	-	420
PSH070	Barkby Road, Syston	LUA	270	-	-
PSH441	Land north of Barkby Road Syston	LUA	195	-	-
PSH144	Land at Gynsill Lane & Anstey Lane, Glenfield	LUA	260	-	-
PSH460	Park View Nursery Site off Gynsill Lane, Glenfield	LUA	30	-	210
PSH463	Land off Cliffe Road/Hensson Close, Birstall	LUA	143	-	-
PSH189	Land off Barkby Thorpe Lane, Thurmaston	LUA	105	-	-
PSH287	Queniborough Lodge	LUA	132	-	-
PSH124	Land at Melton Road, Syston	LUA	31	-	-
PSH476	Woodgate Nurseries, Barkby Lane	LUA	39	-	-
SH163	Rear of Manor Medical Centre, Melton Road, Thurmaston	LUA	20	-	-
PSH191	Works opposite 46 Brook Street, Thurmaston	LUA	7	-	-
PSH192	Works adjacent 46 Brook Street, Thurmaston	LUA	5	-	-
PSH411	Land off Birstall Meadow Road/Long Meadow Way	LUA	15	-	-
SH141	Brook Street, Syston	LUA	15	-	-
PSH021	Extend Park Grange Farm, Loughborough	Loughborough	422	-	-
PSH106	Nanpantan Grange, Land south west of Loughborough.	Loughborough	205	-	-
PSH255	Land south of Loughborough	Loughborough	650	-	420
PSH133	Land to r/o Snells Nook Lane, Loughborough	Loughborough	120	-	-
PSH245	Carillon Court Shopping Centre Derby Square	Loughborough	43	-	-
SH084	Part of Baxter Gate Opportunity Site, Loughborough	Loughborough	210	-	-
PSH267	Land off Beacon Road	Loughborough	52	-	-
PSH447	Land off Leconfield Road	Loughborough	25	-	-
PSH313	Park Grange Farm, Newstead Way	Loughborough	15	-	-
SH034	138-144 Kighthorpe Road, Loughborough	Loughborough	13	-	-
SH056	Former Petrol Station, Pinfold Gate, Loughborough	Loughborough	26	-	-
SH060	Former Main Post Office, Sparrow Hill, Loughborough	Loughborough	16	-	-

Site reference	Site Name	Location	Homes (dwellings)	Employment (hectares)	Schooling (pupils)
SH102	Southfields Road Car Park, Loughborough	Loughborough	33	-	-
PSH488	Market Street	Loughborough	72	-	-
PSH489	Southfields Council Offices, Southfield Road	Loughborough	163	-	-
SH048	Former Limehurst Depot	Loughborough	138	-	-
PSH487	Devonshire Square	Loughborough	39	-	-
PSH412	Land off Melton Road, East Goscote	Other Settlements	223	-	-
PSH260	Land to rear of Derry's Garden Centre, Cossington	Other Settlements	124	-	105
PSH042	Land at Threeways Farm, Queniborough	Other Settlements	100	-	-
PSH305	Land to the rear of 89 Loughborough Road, Hathern	Other Settlements	29	-	-
PSH413	Land off Zouch Road, Hathern	Other Settlements	50	-	-
PSH446	Land off Melton Road, Queniborough	Other Settlements	55	-	-
PSH100	Land off Gaddesby Lane, Rearsby	Other Settlements	47	-	-
PSH376	Land off Old Gate Road, Thruslington	Other Settlements	60	-	-
PSH047	The former Rectory & Land at Thurcaston	Other Settlements	31	-	-
PSH479	Land at Lovrin Equine Stables, Wymeswold	Other Settlements	66	-	-
SH033	The Leys, Hathern	Other Settlements	6	-	-
PSH482	Fairhaven Farm, Anstey	Service Centres	47	-	-
PSH388	High Leys Farm / Manor Farm, Anstey II	Service Centres	124	-	210
PSH387	High Leys Farm / Manor Farm, Anstey I	Service Centres	110	-	-
PSH389	Land off Groby Road, Anstey	Service Centres	364	-	-
PSH391	Land to south of Melton Road, Barrow	Service Centres	130	-	-
PSH392	Land off Melton Road, Barrow	Service Centres	120	-	-
PSH461	Land off Willow Road, Barrow	Service Centres	225	-	-
PSH484	Land off Cotes Road, Barrow	Service Centres	207	-	210
PSH439	Land off Barnards Drive, Sileby	Service Centres	228	-	-
PSH053	Land south of Rothley	Service Centres	40	-	-
PSH477	Rothley Meadow development	Service Centres	39	-	-
PSH242	Land adjoining 84 Melton Road, Barrow	Service Centres	18	-	-
PSH353	Rear of the The Maltings site High Street, Sileby	Service Centres	13	-	-
SH129	36 Charles Street, Sileby	Service Centres	11	-	-
SH132	9 King Street, Sileby	Service Centres	14	-	-

Site reference	Site Name	Location	Homes (dwellings)	Employment (hectares)	Schooling (pupils)
PSH492	971 Loughborough Road, Rothley	Service Centres	9	-	-
PSH343	East of Loughborough Road, Quorn	Service Centres	105	-	-
PSH291	Land at Tickow Lane (Phase 2), Shepshed LE12 9LY	Shepshed	394	-	-
PSH293	Land North of Hallamford Road and West of Shepshed	Shepshed	250	-	-
PSH404	Land west of Tickow Lane	Shepshed	300	-	630
PSH405	Land to the west of the B591/Ingleberry Rd & north of Iveshead Lane	Shepshed	174	-	-
PSH062	Land at Tickow Lane, Shepshed	Shepshed	210	-	-
PSH174	Land at Oakley Road, Shepshed	Shepshed	133	-	-
PSH024	Land off Fairway Road	Shepshed	228	5	-
PSH138	Land fronting Ashby Road & Ingleberry Road, Shepshed	Shepshed	151	-	-
PSH483	Land south of Ashby Road Central	Shepshed	49	-	-
PSH149	20 Moscow Lane, Shepshed	Shepshed	49	-	-
PSH322	Land rear of 62 Iveshead Road	Shepshed	76	-	-
PSH352	21 Garendon Road, LE12 9NU	Shepshed	7	-	-
SH121	32 Charnwood Road, Shepshed	Shepshed	15	-	-
PSH348	Land to rear of 54 Iveshead Road,	Shepshed	5	-	-
Total	All	All	9,105	5	2,205

Appendix B Proposed Mitigation Schemes

Table B.1: List of Mitigation Schemes

ID	Junction	Broad Location	Description	Type	Modelled?
AN1	A46/Leicester Road/A5630 Anstey Lane junction	Anstey	<ul style="list-style-type: none"> Extend 2-lane flare on Leicester Road (Anstey) approach by 30m Amend east-facing merge and diverge to incorporate an auxiliary lane layout to aid the efficient merging and diverging of traffic. 	Highway	Yes
AN2	A46/A50	Anstey	<ul style="list-style-type: none"> Introduce signal-control on eastbound off slip and opposing circulatory; Introduce a segregated left turn (bypass) lane from the A50 onto the A46 eastbound on slip; Introduce third lane flare on eastbound off slip (nearside for left-turn only, middle and offside lanes for right turn towards Leicester). 	Highway	Yes
AN3	A50/Anstey Lane	Anstey	<ul style="list-style-type: none"> Introduce signal-controlled right turn from A50 into Anstey Lane including auxiliary diverge lane on the offside of existing north-westbound carriageway. 	Highway	Yes
AN5	Anstey southern cycle route (and link to Beaumont Leys)	Anstey	<ul style="list-style-type: none"> Creation of a high-quality cycle bypass route linking the proposed developments around Anstey, avoiding the centre of Anstey, linking across to Leicester Road (including a new signal-controlled crossing), improvements to the existing route under the A46 and improved links into Beaumont Leys. 	Active	Cannot be modelled realistically in strategic model
AN7	Anstey to Glenfield cycle route	Anstey	<ul style="list-style-type: none"> Upgrade of existing rights of way between Groby Road (Anstey), beneath the A46 (existing subway) and onto Gynsill Lane via Ginshill Gate development. 	Active	Cannot be modelled realistically in strategic model
BA1	Barrow upon Soar	Barrow upon Soar	<ul style="list-style-type: none"> Footway improvements to the station from key development site(s). These may comprise additional or improved wayfinding signage. Beveridge Street, Warner St, Grove Lane, Church Street, Melton Road and Cotes Road a priority. 	Active	Cannot be modelled realistically in strategic model

ID	Junction	Broad Location	Description	Type	Modelled?
BA2	Barrow upon Soar	Barrow upon Soar	<ul style="list-style-type: none"> Cycle route improvements to the station from key development site(s). These may comprise a combination of additional or improved wayfinding signage, newly designated sections of cycle routes on or off road (with road markings) and reduced speed limits to 20mph to facilitate safer on-road cycling where off-road shared use cycle lanes or on-road cycle lanes are not feasible. If feasible, designate urban quiet ways which avoid the more heavily trafficked routes. Beveridge Street, Warner St, Grove Lane, Church Street, Melton Road and Cotes Road a priority. 	Active	Cannot be modelled realistically in strategic model
BA4	Barrow upon Soar	Barrow upon Soar	<ul style="list-style-type: none"> Cycle parking facilities at station. 	Active	Cannot be modelled realistically in strategic model
BA5	High Street-South Street-Bridge Street	Barrow upon Soar	<ul style="list-style-type: none"> Introduce give-ways on roundabout circulatory so that Bridge St-High Street movements have priority through the junction. Retain roundabout island. 	Highway	Yes
BI1	A46/A6 Loughborough Road Interchange	Birstall	<ul style="list-style-type: none"> Extend flares and marked lanes on westbound off slip approach; Provide two lanes left turn onto A6 (Leicester); Widen A6 southbound on exit from the junction to provide third lane for access into Park-and-Ride. 	Highway	Yes
AN6/BI2	Leicester Park-and-Ride Sites	Birstall and Anstey	<ul style="list-style-type: none"> Extend Park-and-Ride bus services out to nearby small satellite settlements. Enhance facilities (if required) to facilitate bus-to-bus interchange and potential for additional buses to stop at Park-and-Rides; Extend to Rothley and Mountsorrel for the Birstall P&R; Anstey for the proposed P&R near Beaumont Leys (part of TCF2). 	Bus	Yes
BI3	New Bus Lane on A6	Birstall	<ul style="list-style-type: none"> A new bus lane on the A6 heading southbound towards the Red Hill Circle junction. 	Bus	Already included in the Baseline
BI4	Wanlip Lane	Birstall	<ul style="list-style-type: none"> Introduce additional traffic calming features and a revised 20mph speed limit to discourage through-traffic (between Myrtle Ave and Sibson Road); 	Highway	Yes

ID	Junction	Broad Location	Description	Type	Modelled?
LO1	A6/A6004 One Ash Roundabout	Loughborough	<ul style="list-style-type: none"> Introduce partial signalisation on the junction, including A6 South and A6004 arms; Introduce bus gating signals on Loughborough Road (Quorn) approach; Extend 2-lane taper exit onto A6004. 	Highway	Yes
LO2	Loughborough Town Wide	Loughborough	<ul style="list-style-type: none"> Loughborough Smarter Choices - personalised travel planning - developing app. 	Behavioural	Yes
LO3	Loughborough Town Wide	Loughborough	<ul style="list-style-type: none"> Loughborough Smarter Choices - increased bus frequencies, incentives to use the bus, real time information, bus stop upgrades. Aligns with schemes PT.01 and PT.09 of the Charnwood Sustainable Transport Study. 	Bus	Yes
LO4	Loughborough Town Wide	Loughborough	<ul style="list-style-type: none"> Loughborough Smarter Choices - cycle hire schemes. Aligns with scheme WC.20 of the Charnwood Sustainable Transport Study. 	Active	Yes
LO5/SH1	Loughborough-Shepshed	Loughborough	<ul style="list-style-type: none"> Divert existing bus service from Shepshed to Loughborough via the hospital, Belton Road (industrial estates), railway station and town centre. 	Bus	Yes
LO6	A6004 Epinal Way-Beacon Road	Loughborough	<ul style="list-style-type: none"> Extend 2 lane flares by 30m on both A6004 arms. 	Highway	Yes
LO7	A6004 Epinal Way-Beacon Road	Loughborough	<ul style="list-style-type: none"> Introduce traffic signals on roundabout. 	Highway	Yes
LO8	Epinal Way-Warwick Way-Sandringham Drive-Maxwell Drive	Loughborough	<ul style="list-style-type: none"> Extend 2 lane flares on Epinal Way and Warwick Way arms by 30m each. 	Highway	Yes
LO9	Epinal Way-Alan Moss Rd	Loughborough	<ul style="list-style-type: none"> Introduce traffic signals and extend 2-lane flare on Epinal Way northern arm by 30m. 	Highway	Yes
SH1/LO5	Shepshed-Loughborough	Shepshed	<ul style="list-style-type: none"> Divert existing bus service from Shepshed to Loughborough via the hospital, Belton Road (industrial estates), railway station and town centre. 	Bus	Yes

ID	Junction	Broad Location	Description	Type	Modelled?
SH2	A512 Charley Road/Tickow Lane	Shepshed	<ul style="list-style-type: none"> Junction improvement to help facilitate development. Upgrade to a roundabout, signal-controlled crossroads or potentially an upgraded non-signalised crossroads which bans the straight ahead movements. Consider some form of gating/traffic calming on Charley Road to discourage through movements (although this is a rural route and may not be appropriate); Effectively banning straight ahead movement from Tickow Lane onto Charley Road and right turn from A512 onto Charley Road. Retain priority control. 	Highway	Yes
SH3	Shepshed-Loughborough	Shepshed	<ul style="list-style-type: none"> Upgrade existing cycle route between the A512 west of Loughborough and Loughborough Hospital, including improved surfacing, lighting, wayfinding, improved crossings where the route intercepts key roads. 	Active	Yes
SH4	Nanpantan	Shepshed	<ul style="list-style-type: none"> New off-road cycle route (shared use) along Nanpantan Road between Nanpantan and Loughborough. 	Active	Cannot be modelled realistically in strategic model
SH5	Nanpantan	Shepshed	<ul style="list-style-type: none"> Increase bus frequencies through Nanpantan, especially during peak times; Increase 129X to 30min frequency during AM and PM Peaks. 	Bus	Yes
SY3	Syston Eastern developments	Syston	<ul style="list-style-type: none"> Queniborough Road-Barkby Road traffic signal junction improvement, incorporating additional lane on Barkby Road approach (nearside lane for left/ahead and offside lane for right turning traffic) and widen the southbound approach to incorporate a right turn filter. 	Highway	Yes
SY4	Broome Lane (Sileby-East Goscote)	Syston	<ul style="list-style-type: none"> Localised restrictions to make the route less attractive, e.g. signal-control single lane sections (shuttle working) over River Wreake; Single-way shuttle working signals over the river (bridge at Barrow would be a local example). 	Highway	Yes
SY5	Syston - Melton Road	Syston	<ul style="list-style-type: none"> Streetscape, semi-pedestrianised, enhance high street, 20mph max speed limit, raised speed tables, shared space. 	Highway	Yes

ID	Junction	Broad Location	Description	Type	Modelled?
SY6	Sileby	System	<ul style="list-style-type: none"> Footway route improvements to the station from key development site(s). These may comprise additional or improved wayfinding and signage. 	Active	Cannot be modelled realistically in strategic model
SY7	Sileby	System	<ul style="list-style-type: none"> Cycle route improvements to the station from key development site(s). These may comprise a combination of additional or improved wayfinding, signage, newly designated sections of cycle routes on or off road (with road markings) and reduced speed limits to 20mph to facilitate safer on-road cycling where off-road shared use cycle lanes or on-road cycle lanes are not feasible. If feasible, designate urban quiet ways which avoid the more heavily trafficked routes. Additional cycle parking at stations may also be required. 	Active	Cannot be modelled realistically in strategic model
SY9	Sileby	System	<ul style="list-style-type: none"> Cycle parking facilities at station. 	Active	Cannot be modelled realistically in strategic model
SY10	Swan Street-Highgate Road-Ratcliffe Road-The Banks	Sileby	<ul style="list-style-type: none"> Junction improvement including raised speed table and pedestrian crossing improvements. 	Highway	Cannot be modelled realistically in strategic model
SY11	Ratcliffe Road	Sileby	<ul style="list-style-type: none"> Introduce additional traffic calming features between Cemetery Road and Peashill Close. Incorporate formalised parking bays to reduce occurrence of parking on footways (creating chicanes to manage traffic flow and speeds). 	Highway	Yes
SY12	Brook Street-High Street-Cossington Road	Sileby	<ul style="list-style-type: none"> Convert to mini roundabout. 	Highway	Yes
SY13	Barkley Road, Queniborough	System	<ul style="list-style-type: none"> Introduce additional traffic calming features and a revised 20mph speed limit to discourage through-traffic (south of System Road/Queniborough Road junction). 	Highway	Yes
SY14	Broome Lane, north of East Goscote	System	<ul style="list-style-type: none"> Introduce additional traffic calming features and a revised 30mph speed limit to discourage through-traffic on section on northern edge of East Goscote. 	Highway	Yes
STRAT1	A46/A607 Hobby Horse Roundabout	STRATEGIC LONG-TERM	<p>Large Scale Improvements:</p> <ul style="list-style-type: none"> Grade separation of the junction. 	Highway	Yes
STRAT3	M1 Junction 21 - M1/M69/A5460	STRATEGIC LONG-TERM	<ul style="list-style-type: none"> Free flow interchange links between M1 and M69. 	Highway	Yes

ID	Junction	Broad Location	Description	Type	Modelled?
STRAT4	M1 Leicester Western Access	STRATEGIC LONG-TERM	<ul style="list-style-type: none"> Smart Motorway scheme J21-J21a. 	Highway	Yes
STRAT5	M1 North Leicestershire Extra Capacity	STRATEGIC LONG-TERM	<ul style="list-style-type: none"> Smart Motorway Scheme J21a-J23. 	Highway	Yes
STRAT6	A46	North west of Leicester	<ul style="list-style-type: none"> Smart technology including variable speed limits to manage build-up of traffic flows on A46 between M1 J21a and north of the Hobby Horse roundabout. 	Highway	Cannot be modelled realistically in strategic model
STRAT7	M1 Junction 23	Shepshed	<p>Lower Cost; Additional improvements:</p> <ul style="list-style-type: none"> Permitting the left turn movement from lanes 1 and 2 of the northbound off slip (once widened) (whilst maintaining the straight-ahead movement); Extending the lane 1 flare by 60m; Extending the A512 westbound lane 1 nearside flare by 60m; Widen the southbound circulatory to 3 lanes at the stop line, with lanes 1 and 2 permitting the straight-ahead movement (towards the M1 S) and lanes 2 and 3 permitting the right turn movement (towards Shepshed). 	Highway	Yes
STRAT8	M1 Junction 23	Shepshed	<p>Higher Cost (Additional to Lower Cost):</p> <ul style="list-style-type: none"> Widen eastbound and westbound circulatory overbridges to 3 lanes each, with lanes 1 and 2 permitting the straight-ahead movement onto the A512 and lanes 2 and 3 permitting the right turn movement around the circulatory towards the M1; Provide a segregated left turn bypass lane from the A512 westbound to the M1 S. 	Highway	Yes
STRAT10	M1 Junction 21 - M1/M69/A5460	External	<p>Interim Intervention:</p> <ul style="list-style-type: none"> Extend the offside flare on the southbound off slip by approximately 20-30 m; Introduce a fourth lane on the eastbound circulatory; Introduce signal control with increased flare on M69 approach. 	Highway	Yes
STRAT11	A46/Wanlip Road slip road	Syston	<ul style="list-style-type: none"> Amend the merge layout to provide an auxiliary lane merge. Would need to tie in downstream prior to where cycle lane converges with A46 and River Soar bridge. 	Highway	Yes

