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EXECUTIVE SUMMARY

Parsons Brinckerhoff has been commissioned by Basingstoke and Deane Borough Council (BDBC) to undertake a high level Transport Assessment in support of BDBC's emerging Local Plan. The assessment has been undertaken using a spreadsheet model as well as industry standard junction modelling packages which consider growth in traffic flows on the Basingstoke network and the study is the first level of assessment of potential impacts of development. The assessment is aimed at evaluating potential traffic impacts from developments in the emerging Local Plan and exploring mitigation measures to alleviate adverse impacts where necessary. It considers a base year of 2012 and a single forecasting year of 2029, covering both the AM and PM peak hours.

Within the study four Local Plan development scenarios are considered (made up of different combinations of sites) as set out below:

- Scenario 1 – Reference Case developments + Cabinet suggested sites for Local Plan
- Scenario 2 – Reference Case developments + Cabinet agreed sites for Local Plan
- Scenario 3 – Reference Case developments + Local Plan sites with a western focus
- Scenario 4 – Reference Case developments + Local Plan sites with a eastern focus

The above four Local Plan scenarios were constructed on the basis of a Reference Case position at 2029. This reference position is based on the anticipated growth in car use occurring as a result of committed developments in Basingstoke without any additional Local Plan development and traffic impacts from the LDF developments to be brought forward by a number of neighbouring Planning Authorities.

BDBC and Parsons Brinckerhoff have worked with Hampshire County Council (HCC), as the Local Highway Authority, during the preparation of this Transport Assessment, which sets out the following:

- A description of the scope and objectives of the study;
- An overview of the model and the methodology used;
- An analysis of the four development scenarios considered;
- Initial conclusions of the overall impact of the forecasted growth;
- Examination of key junctions in light of the forecasted travel demand increase and identification of mitigation measures and their indicative costs (where appropriate); and
- Assumptions and limitation of this study

<u>Network wide traffic impacts from different Local Plan scenarios</u>

A high level analysis of modelling results from a spreadsheet tool developed as part of this study was undertaken to assess the network wide traffic impacts from different Local Plan scenarios and identify elements of the highway network that are likely to experience exacerbated delays in the future.

The assessment concludes that there is only minor difference as a result of variations in the scale and spatial distribution across all four Local Plan development scenarios. Overall the total traffic growth and modelling results for each of these scenarios is very similar.

From a network wide perspective, although travel demand growth as a result of Local Plan developments generally increases the volume of traffic on most highway links modelling, there were only a few cases where such growth was forecasted to push traffic flows over the capacity of road links. These links mainly include the A30 Winchester Road, A339 Kingsclere Road, and some sections of Churchill Way and Ringway East and North.

It should be acknowledged that the above conclusions were drawn based on unconstrained traffic growth to reflect a worst case scenario. In reality some of the forecasted demand may not materialise in the modelled time periods due to travellers re-routing, re-timing or re-distributing their journeys, or simply delays as a result of congestion elsewhere in the network.

Turning to individual junctions, 17 key junctions were identified to experience exacerbated congestions and delays in the future. Spreadsheet modelling results suggest that the additional Local Plan development traffic is likely to result in at least one entry arm of these junctions being overcapacity. Meanwhile, other entries of many of these overcapacity junctions were also forecasted to work well within capacity.

The high level analysis of junction performance above was used to inform more detailed individual junction assessment as summarised below.

Mitigation of traffic impacts at individual junctions

The study then went on to consider the transport infrastructure opportunities to mitigate the impact of development at 17 identified junctions. This identification of mitigation measures was undertaken using standard junction modelling packages (LinSig and ARCADY) following a principle of achieving the greatest level of congestion relief within existing constraints such as highway boundaries while avoiding any structural work at bridges and viaducts. The measures explored include common improvements such as lane widening and signalisation.

The 17 junctions investigated, the form of junction improvements recommended and their indicative costs and effectiveness in traffic terms are summarised below. Further details of these proposals are presented in the main body of the transport assessment.

Location	No.	Junction Name	Form of Mitigations	Indicative costs	Effectiveness[1] of Mitigation				
					Total num of arms	Arms mitigated			
						AM		PM	
A33 corridor	1	A33 / Bramley Road Roundabout	* Partial signalisation of the roundabout at A33 entries and widening of its circulatory * Flare both A33 entries * Provide exit funnels at both A33 exits	£661,039	3	2	67%	3	100%
	26	A33 / Gaiger Avenue Junction	* Convert roundabout to a signalised intersection	£3,010,811	4	4	100%	4	100%
	20	A33 / Thornhill Way Junction	* New or lengthened flares on A33 entries * Widen Thornhill Way entry to two lanes	£1,054,695	4	3	75%	4	100%
	4	Binfields Roundabout	* Option A - Widen the entries and circulatory to 3 or 4 lanes where appropriate	£1,993,080	5	5	100%	5	100%
			* Option B - A 'through-about'	N/A	5	5	100%	5	100%
	7	Crockford Roundabout	* Signalise the roundabout * Widen Crockford Lane and A33 East entries using flares * An additional lane on the A33 up to the Popley Way junction	£1,909,605	4	3	75%	2	50%
A30 corridor	23	A30 / Wallop Drive Roundabout	* Convert roundabout to a signalised junction	£2,261,703	3	3	100%	0	0%
			* Widen 750m of A30 southbound carriageway up to Kempshott roundabout	£5,488,650					
	13	Kempshott Roundabout	* Signalise the roundabout * Flare widening at all entries * Widen the circulatory	£3,863,026	4	3	75%	3	75%
	6	Brighton Hill Roundabout	* Minor amendments based on a signalised 'Hamburger' design provided by BDBC	£5,464,458	6	5	83%	5	83%
B3400	27	Worting Road / Roman Way Roundabout	* Roundabout enlargement * Flare widening all entries	£2,843,431	3	3	100%	2	67%
	25	B3400 Worting Road Roundabout	* Flare widening 3 arms * Repaint the circulatory to 2 lanes	£219,774	4	3	75%	3	75%
	28	West Ham Roundabout	* Flare widening 3 entries * Widen the southern half of the circulatory	£557,045	6	6	100%	6	100%
A339	19	A339 / Roman Road Roundabout	* Convert roundabout to a signalised intersection * Flare widening all entries	N/A	4	2	50%	2	50%
Ringway and inner urban areas	29	A339 / Ringway West Roundabout	* Full signalisation of the roundabout * Flare widening all entries * Widen the northern half of the circulatory	£1,315,996	3	3	100%	3	100%
	2	Aldermaston Road roundabout	* No cost effective solution[2]	N/A	N/A		N/A		N/A
	11	Hackwood	* Flare widening of all entries and	£1,784,693	4	4	100%	4	100%

Location	No.	Junction Name	Form of Mitigations	Indicative costs	Effectiveness[1] of Mitigation				
					Total num of arms	Arms mitigated			
						AM		PM	
		Road Roundabout	the circulatory carriageway						
	22	Victory Roundabout	* Flare widening of the A3010 West and Alencon entries * Widen the northern section of the circulatory	£693,483	4	3	75%	3	75%
Other	10	Fiveways Junction	* Lengthen flares on 3 entries	£186,832	4	4	100%	4	100%

1. The Effectiveness of Mitigation is measured by the number of arms successfully mitigated as a percentage of the total number of arms at individual junctions. An arm is deemed successfully mitigated if the modelled DoS after mitigation is no greater than 85% or no more than 5% over the DoS in 2029 Reference Case.

2. The limitation in the adopted modelling approach based on the worst case scenario travel demand means that demand reductions due to potential re-routing, re-timing, re-distribution of traffic and the difference between actual and demand flows cannot be objectively estimated with the available tools in this study. Further refinement of the approach will be required to find an acceptable solution at the junction in the future.

It should be noted that the 'mitigation' summarised in the above table is focused on relieving the traffic impacts from the Local Plan development. A junction is deemed mitigated if its Degree of Saturation (DoS) is lower than 85% or is at a similar value to that of the 2029 Reference Case where no Local Plan developments are included.

The above table measures the effectiveness of mitigation by presenting the number of arms mitigated as a percentage of the total number of arms. It is clear that the Local Plan traffic impacts on majority of the assessed junctions can be effectively mitigated with high percentage values reported in most cases. There are only two exceptions. The A30 / Wallop Drive Roundabout is forecasted to operate with worsened performance in the PM peak hour with both Local Plan traffic and the proposed mitigation in place. However, examination of the modelled queuing and delays indicated that the proposed improvements would still bring significant congestion relief to the heavily trafficked A30 and enable the junction operate in a much more balanced way. No cost effective measures have been found for Aldermaston Road Roundabout based on the worst case approach in this study. This approach needs to be further reviewed and improved in further studies as the Local Plan is taken forward.

Whilst these suggested mitigations require further refinement or investigation in close liaison with HCC when developments in the Local Plan come forward in the future, it is considered by Basingstoke and Deane Borough Council that the assessment indicates that the majority of the impacts on the highway network resulting from the Local Plan development scenarios could be accommodated after mitigation.

Assumptions, limitations and further study

Analysis and findings from assessments documented in this report should be interpreted together with an understanding of the key assumptions made in this study and the limitation in the adopted approach.

First of all, all performance assessments adopt a worst case scenario approach and are based on unconstrained traffic growth on the highway network as a whole and at individual junctions. This approach ensures robustness of the assessments on the basis that, if unconstrained demand can be accommodated (along with reasonable mitigation), the Local Plan will be sound on transport grounds. However, this approach also means that benefits from further highway demand reductions as a result of the following considerations are not considered in this study:

- The scope for behavioural changes that may result due to increased congestion at a particular junction. For example, the spreading of journeys to times which are less busy or the scope to divert to alternative routes
- The potential for a modal shift from use of the private car to alternatives, such as public transport, cycling and walking
- Changes to trip frequency, origins, destinations, or journey distance

In addition to the above assumptions, the assessment considers all travel demand (demand flows in traffic modelling terms) that intends to go through individual junctions and assume all these demand can reach the specific junction during the modelled period of time. In reality it is commonly recognised that some of the demand may not materialise in the modelled hours due to congestion elsewhere in the network, which leads to lower actual flows that arrive during a given period of time.

The modelling tool developed in this study is in the form of a spreadsheet model, which reflects the aforementioned assumptions and limitations. It does not undertake any assignment so traffic is not going to re-route as a result of congestion. Also, it does not consider any shifting of traffic between different modes so the potential impacts on highway travel demand from the promotion of smarter choices measures are not directly captured by the model. In light of these limitations, the predicted traffic demand therefore represents a worst case scenario and the mitigation proposals may be more severe than is necessary. In cases where no mitigation solutions were found as a result of high traffic demand, it is likely that a solution may be available if the benefits of various aforementioned demand reductions can be captured in the assessment. It is therefore suggested that the modelling approach may be refined to objectively estimate such reductions in further investigation as the Local Plan is taken forward.

A selection of key junctions were taken into detailed assessment and mitigated after discussion with BDBC. Findings presented in Chapter 3 suggest that there are still other junctions and highway links that would experience increased travel demand and its associated congestion and delays. These could be considered in further studies or if the proposed mitigation measures are reviewed for refinement in the future.

PART A

1 INTRODUCTION

1.1 Background

1.1.1 Basingstoke and Deane Borough Council (BDBC) is currently in the process of producing the Pre Submission Local Plan for the borough. The Council has agreed a housing number of 748 dwellings per annum over the plan period (2011 – 2029) and is currently considering the locations to accommodate this growth.

1.1.2 In order to support the pre-submission Local Plan to be published for public consultation, BDBC commissioned Parsons Brinckerhoff to produce an updated Transport Assessment (TA) to evaluate potential traffic impacts from the Local Plan development and explore mitigation measures to alleviate such impacts where necessary. It was agreed that the TA would make the best use of relevant data (such as the transport related research previously undertaken in relation to the Core Strategy). Also it would consider the up to date information on the levels of development growth to be delivered over the plan period (2011 – 2029) and the spatial distribution options for development in the Borough.

1.2 Objectives

1.2.1 The main objectives of the TA were to:

- Collate information to identify the amounts and locations of development in the Borough in the future reference and development scenarios;
- Estimate the quantum and distribution of vehicular trips resulting from the additional development in the future;
- Assess traffic impacts and junction performance in the defined highway network and identify key junctions requiring mitigations;
- Propose mitigation measures or test existing concept designs and advise on their effectiveness; provide costing and identify phasing for mitigations where appropriate;
- Report findings on the main traffic impacts on the highway network and how these can be managed with the identified mitigation measures.

1.3 Scope

1.3.1 In light of the timescales and the uncertainty on the quantum and distribution of development across the Borough at the commencement of the study, it was decided that the TA should be completed in three phases as set out below:

- Phase 1: Reference case transport model development
- Phase 2: Initial development scenario testing
- Phase 3: Testing of agreed site allocations and reporting

1.3.2 The purpose of Phase 1 was to construct a Reference Case spreadsheet model to assess traffic impacts from different development scenarios with varying quantum and distribution. This model covers a base year of 2012 and a single forecasting year of 2029, covering both the AM (08:00 – 09:00) and PM (17:00 – 18:00) peak hours. This phase ended after the completion of a 2029 Reference Case forecasting, which incorporated all background and committed growth in the Borough, and development in neighbouring authorities to provide a future reference case condition for subsequent tests. The spreadsheet model developed in this phase has a strategic nature. Its sole purpose is to support high level analysis to identify potential congestion 'hotspots' and inform individual junction assessment in subsequent phases of the study. This tool does not consider influence on trip-making due to variations in travel cost so highway traffic is not going to re-route or shift to other modes of transport as a result of congestion. At this stage, it also does not capture potential impacts from the promotion of smarter choices measures so the predicted travel demand is likely to represent a worst case scenario.

1.3.3 Phase 2 of the study started with assessing the traffic impacts from different development scenarios in relation to planned infrastructure changes in the defined network. It was then focused on identifying development impacts on the highway network in comparison to the reference case conditions and assess the scope for mitigation the impacts through junction improvements.

1.3.4 Phase 3 involves detailed analysis of BDBC's agreed Local Plan allocations to demonstrate impacts the development would have upon the highway network and test junction mitigation measures with costings and suggested phasing where appropriate.

1.4 Report Structure

1.4.1 This report covers the assessment of the transport impacts of the development scenarios. It has been divided into two parts: Part A and Part B. Part A gives an overview of the overall study and focuses on the analysis of traffic impacts from the Local Plan developments and the scope for mitigations at individual selected junctions. Part B provides detailed technical information on the methodology and modelling aspects of the study.

Part A

- Section 1 – Introduction
- Section 2 – An overview of the methodology and modelling undertaken
- Section 3 – Initial modelling results and analysis of development impacts prior to any mitigations
- Section 4 – Mitigation of adverse traffic impacts at selected junctions
- Section 5 – A summary of the assessment and conclusions

Part B

- Section 6 – Detailed specification of the model and its key features
- Section 7 – A summary of input data and relevant assumptions
- Section 8 – A detailed summary of the traffic forecasting methodology

2 OVERVIEW OF MODELLING AND METHODOLOGY

2.1 Suitability, Purpose and Study Approach

2.1.1 A bespoke spreadsheet model 'Local Plan Transport Assessment Tool' was developed for and used in this study to evaluate traffic impacts from the development proposals. This model was developed in accordance with the Highways Agency's (HA) suggested ETI (Evaluation of Transport Impact) guidance for constructing a link-based spreadsheet model in relation to Local Development Frameworks (LDF). Comments from Hampshire County Council (HCC) and Basingstoke and Deane Borough Council (BDBC) were also sought during the development of the spreadsheet tool.

2.1.2 A borough wide network, motorway, A and B roads together with the relevant junctions are explicitly covered in the spreadsheet model. The model takes input from the latest traffic counts as the volume of flows on the highway network. It also assesses link and junction capacities[1] and therefore indicates which sections of the highway network are forecasted to experience exacerbated delays in the future. This provides a practical tool that is able to quickly assess traffic impacts from different Local Plan scenarios with varying quantum and spatial distribution.

2.1.3 As spreadsheet modelling uses aggregate descriptions of travel demand and simplified representation of interaction between traffic flow and capacity, the role of the developed model remains at a high level as discussed above. More detailed analysis such as interaction between traffic of conflicting movements, queuing and delays at junctions is handled by individual junction models. These models were constructed using the industry standard software packages such as LinSig and ARCADY for individual junctions that were identified as congestion 'hotspots' by the spreadsheet tool. The combined application of the developed spreadsheet model and detailed junction models provides a suite of tools for the strategic assessment of the traffic impacts from developments in the emerging BDBC Local Plan.

2.2 Study Area

2.2.1 The study area of this assessment was defined by BDBC as shown in Figure 2.1 and Figure 2.2. All results presented in this document are related to traffic impacts incurred on the modelled highway network in Basingstoke and Deane Borough only.

[1] Junction capacity was built into the spreadsheet tool for each entry arm at individual junctions. These values were taken from existing junction models where available or the SATURN traffic model provided by HCC. Fixed values were also adopted as link capacity depending on link classification in accordance with guidance in COBA Manual (DMRB Vol13 Section 1 Part 5). This is considered a suitable approach considering the strategic nature of the spreadsheet tool. Alternative guidance (such as TA79/99 and TA46/97) has been reviewed and deemed to be similar to the adopted guidance.

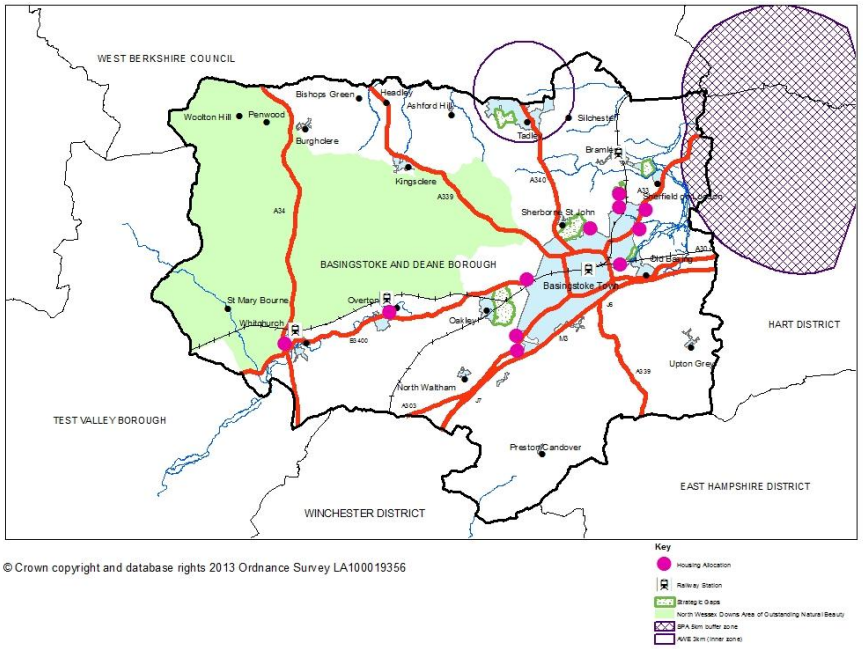


Figure 2.1 Extent of the Borough Wide Network Modelled[2]

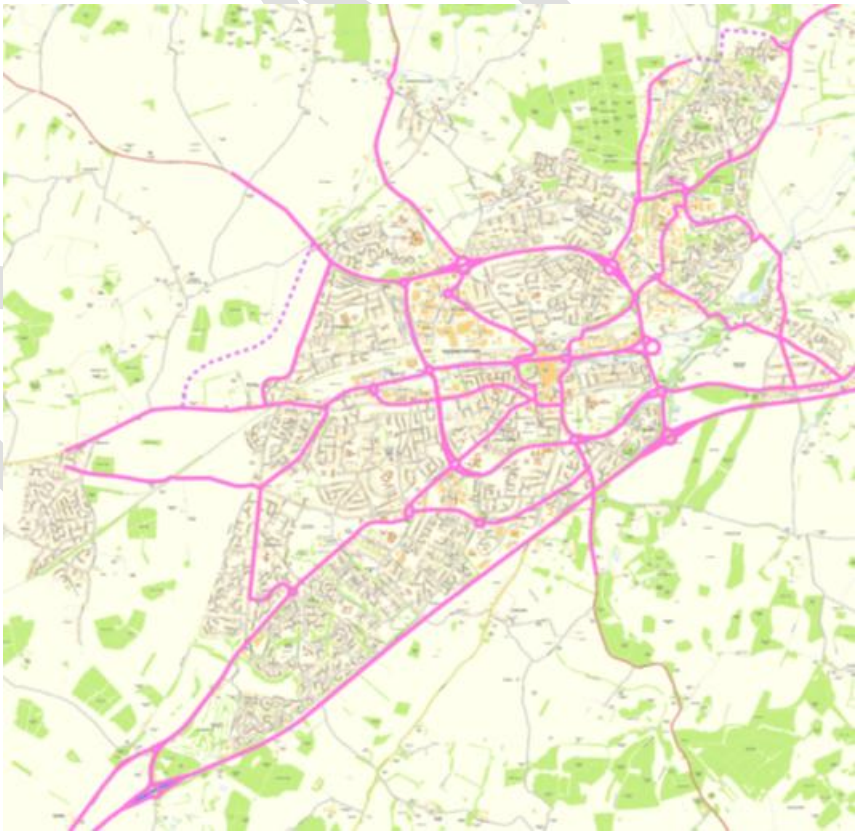


Figure 2.2 Extent of the Urban Network Modelled[3]

[2] This figure is copied from the original tender document issued by BDBC.
[3] This figure is copied from the original tender document issued by BDBC.

2.3 Forecasting Assumptions

Future land use and traffic growth

2.3.1 In addition to a 2012 Base Year scenario, the transport assessment has considered five different sets of future land use assumptions, as set out below, including the committed and planned residential and employment development in the borough up to 2029. Data concerning these assumptions were received from BDBC.

- Reference Case – committed developments by 2029
- Scenario 1 – Reference Case developments + Cabinet suggested sites for Local Plan
- Scenario 2 – Reference Case developments + Cabinet agreed sites for Local Plan
- Scenario 3 – Reference Case developments + Local Plan sites with a western focus
- Scenario 4 – Reference Case developments + Local Plan sites with a eastern focus

2.3.2 Other factors that may have noticeable impacts on traffic growth in the future include background growth and influence from LDF (or Local Plan) developments in neighbouring areas. The former represents influences from changes in car ownership, income and fuel prices, while the latter captures the cumulative impacts from LDF developments in the following seven Local Planning Authorities:

- West Berkshire Council
- Hart District Council
- East Hampshire District Council
- Winchester City Council
- Test Valley Borough Council
- Reading Borough Council
- Wokingham Borough Council

2.3.3 The number of trips to and from the above development growth considered was quantified following a trip generation process agreed with the BDBC and HCC, based on data extracted from the Trip Rate Information Computer Database (TRICS).

2.3.4 Appendix A illustrates the location of all developments in individual forecasting scenarios. A breakdown of these development and detailed forecasting methodology are described in Part B, Chapter 8.

Network improvements

2.3.5 A number of key highway network improvements that are being considered by BDBC are also captured in the developed spreadsheet model. These include:

1) Black Dam Roundabout improvement[4]
2) Cufaude Lane / Gaiger Avenue link road[5]

[4] Based on design option 8 in the M3 Junction 6 Black Dam Roundabout Improvement Study – Stage 2 Report, May 2012
[5] Based on indicative drawings from BDBC on 08/04/2013

3) Brighton Hill Roundabout improvement [6]

4) A339 / B3400 link road[7]

5) A Western Bypass by extending the above link road in item 4 to the A30 / M3 junction 7[8]

2.3.6 Figure 2.3 illustrates the indicative location of the five network improvements. Five future networks were constructed in the transport assessment with each one including a selection of these network changes as summarised in Table 2.1**.**

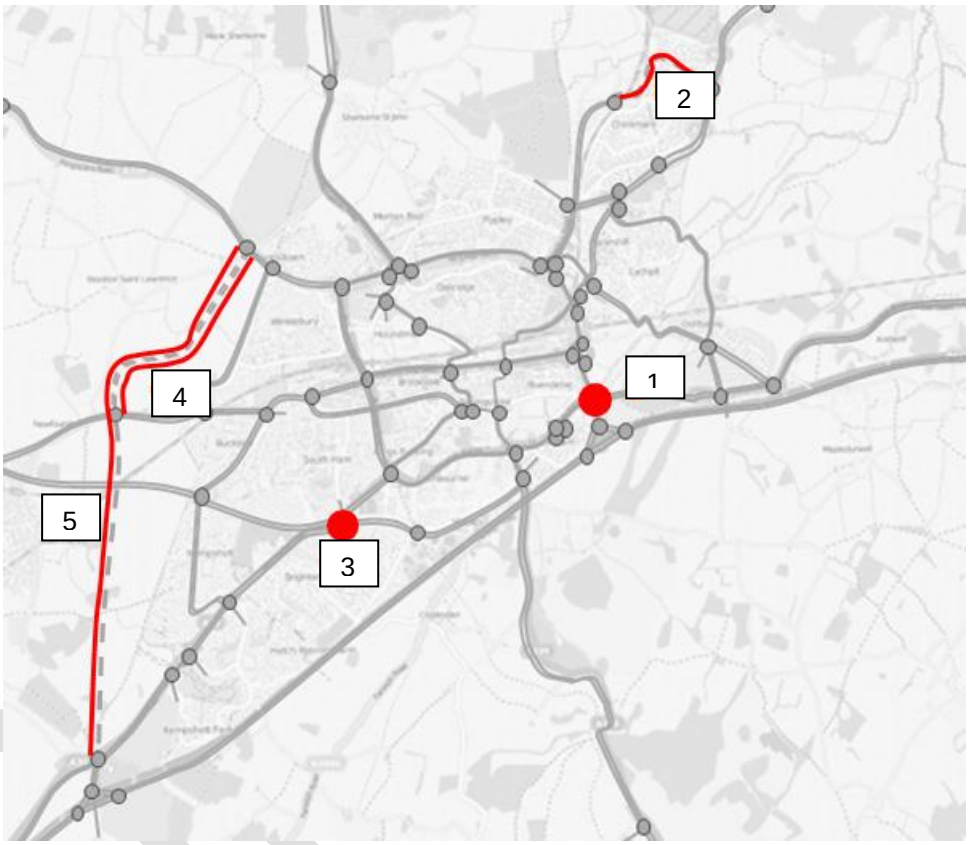


Figure 2.3 An Illustration of Network Changes in the Future

Table 2.1 Network Changes in the Modelled Future Highway Network

Highway improvements \ Networks	Net A	Net B	Net C	Net D	Net E
1) Black Dam Roundabout	Yes	Yes	Yes	Yes	Yes
2) Cufuade Lane / Gaiger Avenue link road		Yes		Yes	
3) Brighton Hill Roundabout improvement			Yes	Yes	
4) A339 / B3400 link road	Yes	Yes	Yes	Yes	
5) A Western Bypass					Yes

[6] Based on indicative drawings from BDBC on 08/04/2013
[7] Based on indicative drawings from BDBC on 09/04/2013
[8] Based on indicative route from BDBC on 20/05/2013

3 INITIAL MODELLING RESULTS AND ANALYSIS

3.1 Introduction

3.1.1 This chapter provides graphical and tabulated findings of the traffic impacts resulting from different Local Plan development scenarios in comparison to a reference case condition in 2029 where only committed developments are implemented. The analysis covers traffic impacts such as additional flow on the modelled network and its subsequent effect on the performance of highway links and junctions.

3.1.2 It should be noted that the comparison reported within this chapter represents traffic impacts predicted to occur as a compounded result of the net increase in development between the 2029 reference case and Local Plan scenarios, the influences from background growth in Basingstoke and Deane Borough and cumulative impacts from LDF developments promoted by neighbouring Local Planning Authorities. No allowance was made for potential variable demand responses such as peak spreading so the reported forecasting results represent a worst case scenario.

3.1.3 Numerous traffic forecasts were undertaken based on combinations of different land use scenarios and future highway networks as set out in Table 3.1 below.

Table 3.1 Traffic Forecasts Undertaken

	Base	Net A	Net B	Net C	Net D	Net E
2029 Reference case	√					
Scenario 1 – Cabinet suggested		√	√	√	√	√
Scenario 2 – Cabinet agreed		√	√	√	√	√
Scenario 3 – Western focus		√	√	√	√	√
Scenario 4 – Eastern focus		√	√	√	√	√

* Definition of networks A through to E is given in Table 2.1

3.1.4 Different land use scenarios (as shown in Table 3.1) lead to different highway travel demand due to variations in the scale and spatial distribution of individual Local Plan development. For traffic forecasts based on the same land use scenarios, travel demand may still be different depending on the significance of network changes implemented. It was assumed that Network B, in comparison to Network A, would change travel demand on the A33 and Ringway East as a result of the Cufuade Lane / Gaiger Avenue link road. On the other hand, impacts from the capacity enhancement on Brighton Hill Roundabout, as included in Networks C and D, is relatively modest in comparison to that from a new link road, so no variation in travel demand was assumed as a result of this improvement. Network E involves the extension of the A339 / B3400 link road further south to create a full western bypass. This is expected to significantly change travellers' route choice. In light of the above analysis, it was assumed that Networks A and C share the same travel demand and so do Networks B and D. Network E would cause the most significant changes in travel demand in the future.

3.1.5 The cross tabulation of demand and network scenarios generates a large number of forecasting runs as summarised in Table 3.1. In order to improve the clarity of the report, Sections 3.2, 3.3 and 3.4 of this chapter presents travel demand growth, network and junction performance, respectively, with a focus on all traffic forecasts using future Networks A / C. Difference in traffic impacts brought by future Networks B, D and E and their subsequent influence on findings from Sections 3.2, 3.3 and 3.4 is discussed in Section 3.5 separately.

3.2 Unconstrained Vehicle Travel Demand Increase

3.2.1 Table 3.2 through to Table 3.5 list the key components of travel demand growth considered in the study and the corresponding increase in the number of trips for different forecasting scenarios.

3.2.2 Certain elements of the growth, namely the background growth and any development sites with less than 40 dwellings or 30 jobs, are represented by area-wide growth factors and hence the exact trip number growth attributed to these contributors is not listed here. A detailed description of this process is available in Chapter 8 in Part B of this report.

3.2.3 It is clear from Table 3.2 through to Table 3.5 that the total level of demand growth is very similar across the four different Local Plan scenarios although the spatial distribution of developments varies.

Table 3.2 Unconstrained Vehicle Travel Demand Growth – AM Trips to Development

Source of Growth		2029 Ref	Local Plan			
			1	2	3	4
Background growth		*	*	*	*	*
Committed	Identified residential and commercial sites (sites >= 40 dwellings or 30 jobs)	1578	1578	1578	1578	1578
	Area wide growth (outstanding small site commitments and sites < 40 dwellings or 30 jobs)	*	*	*	*	*
Trips from Basingstoke to neighbouring areas**		1401	1096	1096	1096	1096
Basingstoke Local Plan allocations	Sites from emerging local plan and unallocated or non-committed sites from existing local plan (sites >= 40 dwellings or 30 jobs)	0	1717	1727	1722	1734
	Area wide growth (windfall and sites < 40 dwellings or 30 jobs)	*	*	*	*	*

* Background and small sites were implemented through area wide growth factors as detailed in Chapter 8, Part B of this report.
** Potential double counting with the same movements estimated based on future development in Basingstoke was removed. The difference in the number of trips between 2029 Reference Case and Local Plan scenarios is due to different amount of double counting identified from the committed and Local Plan developments which were removed.

Table 3.3 Unconstrained Vehicle Travel Demand Growth – AM Trips from Development

Source of Growth		2029 Ref	Local Plan			
			1	2	3	4
Background growth		*	*	*	*	*
Committed	Identified residential and commercial sites (sites >= 40 dwellings or 30 jobs)	1506	1506	1506	1506	1506
	Area wide growth (outstanding small site commitments and sites < 40 dwellings or 30 jobs)	*	*	*	*	*
Trips from neighbouring areas to Basingstoke**		450	362	362	362	362
Basingstoke Local Plan allocations	Sites from emerging local plan and unallocated or non-committed sites from existing local plan (sites >= 40 dwellings or 30 jobs)	0	3599	3637	3619	3662
	Area wide growth (windfall and sites < 40 dwellings or 30 jobs)	*	*	*	*	*

* Background and small sites were implemented through area wide growth factors as detailed in Chapter 8, Part B of this report.
** Potential double counting with the same movements estimated based on future development in Basingstoke was removed. The difference in the number of trips between 2029 Reference Case and Local Plan scenarios is due to different amount of double counting identified from the committed and Local Plan developments which were removed.

Table 3.4 Unconstrained Vehicle Travel Demand Growth – PM Trips to Development

Source of Growth		2029 Ref	Local Plan			
			1	2	3	4
Background growth		*	*	*	*	*
Committed	Identified residential and commercial sites (sites >= 40 dwellings or 30 jobs)	1532	1532	1532	1532	1532
	Area wide growth (outstanding small site commitments and sites < 40 dwellings or 30 jobs)	*	*	*	*	*
Trips from Basingstoke to neighbouring areas**		1202	1089	1089	1089	1089
Basingstoke Local Plan allocations	Sites from emerging local plan and unallocated or non-committed sites from existing local plan (sites >= 40 dwellings or 30 jobs)	0	3677	3718	3700	3743
	Area wide growth (windfall and sites < 40 dwellings or 30 jobs)	*	*	*	*	*

* Background and small sites were implemented through area wide growth factors as detailed in Chapter 8, Part B of this report.
** Potential double counting with the same movements estimated based on future development in Basingstoke was removed. The difference in the number of trips between 2029 Reference Case and Local Plan scenarios is due to different amount of double counting identified from the committed and Local Plan developments which were removed.

Table 3.5 Unconstrained Vehicle Travel Demand Growth – PM Trips from Development

Source of Growth		2029 Ref	Local Plan			
			1	2	3	4
Background growth		*	*	*	*	*
Committed	Identified residential and commercial sites (sites >= 40 dwellings or 30 jobs)	1834	1834	1834	1834	1834
	Area wide growth (outstanding small site commitments and sites < 40 dwellings or 30 jobs)	*	*	*	*	*
Trips from neighbouring areas to Basingstoke**		1078	913	913	913	913
Basingstoke Local Plan allocations	Sites from emerging local plan and unallocated or non-committed sites from existing local plan (sites >= 40 dwellings or 30 jobs)	0	2566	2590	2579	2603
	Area wide growth (windfall and sites < 40 dwellings or 30 jobs)	*	*	*	*	*

* Background and small sites were implemented through area wide growth factors as detailed in Chapter 8, Part B of this report.
** Potential double counting with the same movements estimated based on future development in Basingstoke was removed. The difference in the number of trips between 2029 Reference Case and Local Plan scenarios is due to different amount of double counting identified from the committed and Local Plan developments which were removed.

3.2.4 Table 3.6 through to Table 3.11 illustrate how the forecasted growth in total travel demand is cascaded to key links in the modelled network after going through the trip distribution and assignment processes (Chapter 8, Part B of this report). These links were selected according to the following three rules, as illustrated in Figure 3.1, to give a comprehensive view of changes on highway travel demand in Basingstoke in the future:

- Cordon links that directly feed traffic to the Ringway from all directions
- Selected links on different sections of the Ringway
- Selected links within the urban area enveloped by the Ringway

3.2.5 Table 3.6 through to Table 3.7 detail traffic flows on Cordon Links around the Ringway for different time periods and development scenarios. The variations in traffic volumes in the Local Plan scenarios are also reported as percentages of the link volume in 2029 Reference Case.

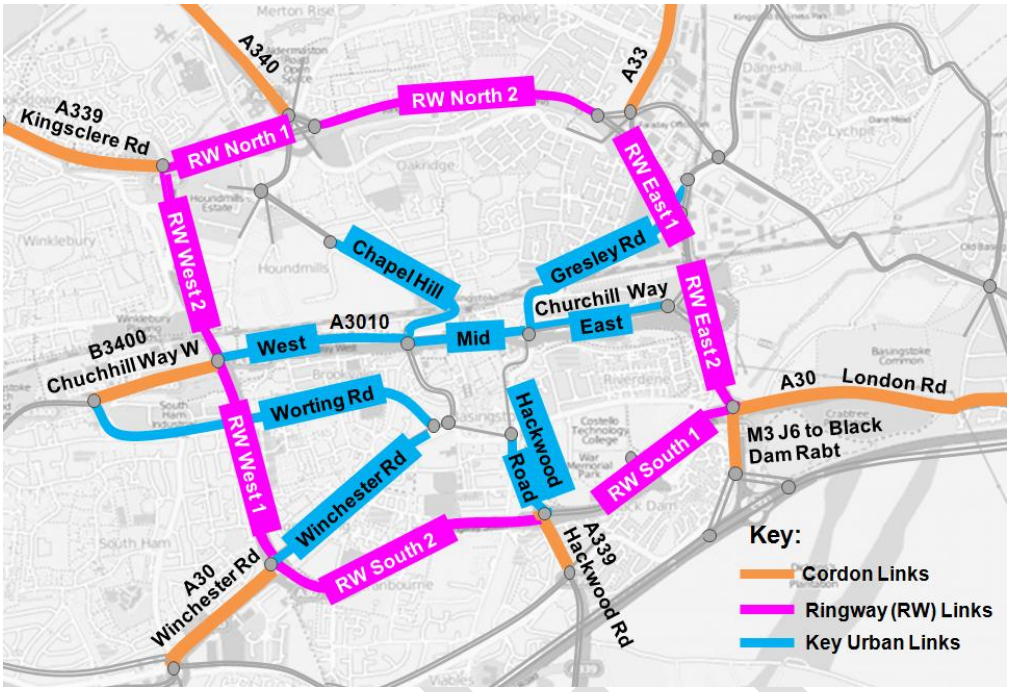


Figure 3.1 Key Highway Links (Cordon, Ringway and Inner Urban Area)

Table 3.6: AM Unconstrained Traffic Demand on Cordon Links in Network A or C (PCUs / Hour)

		2029 Ref	Demand in Local Plan Scenarios* and change in %							
			1		2		3		4	
Inbound	A340	1794	1772	-1%	1773	-1%	1773	-1%	1773	-1%
	A33	2841	3460	22%	3549	25%	3276	15%	3809	34%
	A30 London Rd	1346	1375	2%	1378	2%	1342	0%	1378	2%
	M3 J6 to Black Dam Rbt	4140	4295	4%	4292	4%	4281	3%	4303	4%
	A339 Hackwood Rd	2072	2273	10%	2274	10%	2274	10%	2274	10%
	A30 Winchester Rd	2438	3091	27%	3091	27%	3387	39%	2832	16%
	B3400 Churchill Way W	1867	2322	24%	2313	24%	2315	24%	2313	24%
	A339 Kingsclere Rd	2902	3587	24%	3581	23%	3596	24%	3578	23%
	Subtotal	**19400**	**22175**	**14%**	**22251**	**15%**	**22243**	**15%**	**22260**	**15%**
Outbound	A340	2257	2225	-1%	2223	-2%	2223	-2%	2223	-2%
	A33	3072	3514	14%	3525	15%	3508	14%	3501	14%
	A30 London Rd	1184	1136	-4%	1135	-4%	1135	-4%	1135	-4%
	M3 J6 to Black Dam Rbt	2502	2486	-1%	2484	-1%	2484	-1%	2484	-1%
	A339 Hackwood Rd	1547	1602	4%	1600	3%	1600	3%	1600	3%
	A30 Winchester Rd	1903	2035	7%	2034	7%	2051	8%	2031	7%
	B3400 Churchill Way W	909	1180	30%	1200	32%	1163	28%	1236	36%
	A339 Kingsclere Rd	2299	2604	13%	2628	14%	2625	14%	2634	15%
	Subtotal	**15673**	**16783**	**7%**	**16829**	**7%**	**16790**	**7%**	**16845**	**7%**

* Local Plan Scenarios: 1- Cabinet Suggested; 2 - Cabinet Agreed; 3 – Western focus; 4 – Eastern Focus

Table 3.7: PM Unconstrained Traffic Demand on Cordon Links in Network A or C (PCUs / Hour)

		2029 Ref	Demand in Local Plan Scenarios* and change in %							
			1		2		3		4	
Inbound	A340	1514	1493	-1%	1491	-1%	1491	-1%	1491	-1%
	A33	2615	3169	21%	3194	22%	3171	21%	3201	22%
	A30 London Rd	909	868	-5%	868	-5%	868	-5%	868	-5%
	M3 J6 to Black Dam Rbt	2660	2651	0%	2648	0%	2648	0%	2648	0%
	A339 Hackwood Rd	1597	1694	6%	1692	6%	1692	6%	1692	6%
	A30 Winchester Rd	1621	1810	12%	1809	12%	1841	14%	1803	11%
	B3400 Churchill Way W	1049	1386	32%	1396	33%	1378	31%	1414	35%
	A339 Kingsclere Rd	2098	2536	21%	2568	22%	2546	21%	2592	24%
	Subtotal	**14063**	**15606**	**11%**	**15665**	**11%**	**15634**	**11%**	**15709**	**12%**
Outbound	A340	1962	1957	0%	1959	0%	1959	0%	1959	0%
	A33	2965	3604	22%	3691	25%	3418	15%	3952	33%
	A30 London Rd	900	886	-1%	886	-2%	886	-2%	886	-2%
	M3 J6 to Black Dam Rbt	3109	3230	4%	3230	4%	3208	3%	3251	5%
	A339 Hackwood Rd	2188	2403	10%	2406	10%	2406	10%	2406	10%
	A30 Winchester Rd	2485	3314	33%	3311	33%	3598	45%	3061	23%
	B3400 Churchill Way W	1776	2280	28%	2285	29%	2288	29%	2284	29%
	A339 Kingsclere Rd	2665	2939	10%	2932	10%	2960	11%	2927	10%
	Subtotal	**18049**	**20614**	**14%**	**20700**	**15%**	**20723**	**15%**	**20725**	**15%**

* Local Plan Scenarios: 1- Cabinet Suggested; 2 - Cabinet Agreed; 3 – Western focus; 4 – Eastern Focus

3.2.6 It can be observed from Table 3.6 and Table 3.7 that generally there is clear increase in the volume of traffic in and out of Basingstoke as a result of the Local Plan development. These mainly cover key corridors such as the A33, A30 Winchester Road, B3400 and A339 Kingsclere Road. The difference across the four Local Plan scenarios is very small in terms of total travel demand.

3.2.7 The modelling results also suggest there may even be minor reduction in demand (compared to the 2029 Reference Case) in the Local Plan scenarios. In reality, this can be attributed to different patterns in how travel demand growth is distributed across the highway network as a result of different land use patterns between 2029 Ref Case and Local Plan scenarios

3.2.8 Table 3.8 and Table 3.9 present the volume of traffic on different sections of the Ringway together with their indicative link capacity. The increase in travel demand resulting from Local Plan development is clearly noticeable. The percentage of increase varies widely across different parts of Ringway although the pattern is consistent between different Local Plan scenarios.

Table 3.8 AM Unconstrained Traffic Demand on Ringway Links in Network A or C (PCUs / Hour)

		2029 Ref	Demand in Local Plan Scenarios* and change in %							
			1		2		3		4	
Clockwise	Ringway North 1	2413	2968	23%	2966	23%	3174	32%	2783	15%
	Ringway North 2	2864	3152	10%	3146	10%	3349	17%	2968	4%
	Ringway East 1	4301	5233	22%	5222	21%	5376	25%	5087	18%
	Ringway East 2	3445	3851	12%	3851	12%	3893	13%	3816	11%
	Ringway South 1	3375	3771	12%	3793	12%	3691	9%	3891	15%
	Ringway South 2	3383	3480	3%	3491	3%	3389	0%	3491	3%
	Ringway West 1	2345	2502	7%	2514	7%	2412	3%	2514	7%
	Ringway West 2	1304	1363	5%	1362	4%	1362	4%	1362	4%
Anti-clockwise	Ringway North 1	1937	2079	7%	2077	7%	2094	8%	2074	7%
	Ringway North 2	2262	2331	3%	2349	4%	2322	3%	2387	6%
	Ringway East 1	3209	3520	10%	3564	11%	3470	8%	3654	14%
	Ringway East 2	2774	3420	23%	3484	26%	3314	19%	3647	31%
	Ringway South 1	3258	3560	9%	3567	10%	3509	8%	3578	10%
	Ringway South 2	5295	5670	7%	5676	7%	5617	6%	5697	8%
	Ringway West 1	2381	2569	8%	2571	8%	2560	8%	2582	8%
	Ringway West 2	1569	1712	9%	1713	9%	1801	15%	1637	4%

* Local Plan Scenarios: 1- Cabinet Suggested; 2 - Cabinet Agreed; 3 – Western focus; 4 – Eastern Focus

Table 3.9 PM Unconstrained Traffic Demand on Ringway Links in Network A or C (PCUs / Hour)

		2029 Ref	Demand in Local Plan Scenarios* and change in %							
			1		2		3		4	
Clockwise	Ringway North 1	1749	2074	19%	2072	19%	2104	20%	2067	18%
	Ringway North 2	2085	2260	8%	2270	9%	2275	9%	2287	10%
	Ringway East 1	3354	3903	16%	3945	18%	3851	15%	4035	20%
	Ringway East 2	2420	3270	35%	3333	38%	3162	31%	3495	44%
	Ringway South 1	1684	2229	32%	2239	33%	2264	34%	2201	31%
	Ringway South 2	3760	4217	12%	4224	12%	4249	13%	4206	12%
	Ringway West 1	1781	2132	20%	2138	20%	2184	23%	2099	18%
	Ringway West 2	1010	1651	64%	1654	64%	1799	78%	1528	51%
Anti-clockwise	Ringway North 1	2622	3000	14%	2998	14%	3140	20%	2874	10%
	Ringway North 2	3082	3418	11%	3422	11%	3558	15%	3302	7%
	Ringway East 1	4016	4618	15%	4617	15%	4704	17%	4540	13%
	Ringway East 2	3357	3789	13%	3802	13%	3754	12%	3847	15%
	Ringway South 1	2539	2695	6%	2717	7%	2615	3%	2815	11%
	Ringway South 2	3670	3843	5%	3865	5%	3762	3%	3865	5%
	Ringway West 1	2129	2353	11%	2376	12%	2273	7%	2376	12%
	Ringway West 2	1394	1534	10%	1533	10%	1533	10%	1533	10%

* Local Plan Scenarios: 1- Cabinet Suggested; 2 - Cabinet Agreed; 3 – Western focus; 4 – Eastern Focus

3.2.9 Table 3.10 and Table 3.11 present similar information for selected links in the urban area of Basingstoke bordered by the Ringway. It is forecasted that queuing and delays in the urban area would deteriorate in the future as a result of capacity constraint at entries to individual junctions rather than on the highway links. This is recognised as the most common contributing factor to traffic congestion in urban areas. Further analysis of junction performance is reported in Section 3.4 of this report.

Table 3.10 AM Unconstrained Traffic Demand on Selected Urban Links in Network A or C (PCUs / Hour)

		2029 Ref	Demand in Local Plan Scenarios* and change in %							
			1		2		3		4	
Chapel Hill	NB	1332	1397	5%	1396	5%	1396	5%	1396	5%
	SB	588	766	30%	766	30%	766	30%	766	30%
Gresley Road	WB	648	837	29%	837	29%	837	29%	837	29%
	EB	1090	1097	1%	1096	1%	1096	1%	1096	1%
A3010 Churchill Way East	WB	3016	3418	13%	3426	14%	3426	14%	3524	17%
	EB	833	922	11%	921	11%	921	11%	921	11%
A3010 Churchill Way Mid	WB	1023	1043	2%	1042	2%	1042	2%	1042	2%
	EB	2303	3058	33%	3051	32%	3051	32%	3051	32%
A3010 Churchill Way West	WB	1186	1487	25%	1486	25%	1486	25%	1486	25%
	EB	2090	2772	33%	2765	32%	2765	32%	2765	32%
Worting Road	WB	822	827	1%	826	1%	826	1%	826	1%
	EB	728	732	1%	731	1%	731	1%	731	1%
Winchester Road	WB	787	791	1%	791	0%	791	0%	791	0%
	EB	769	798	4%	797	4%	797	4%	797	4%
Hackwood Road	NB	1114	1357	22%	1371	23%	1367	23%	1284	15%
	SB	834	881	6%	880	6%	880	6%	880	6%

* Local Plan Scenarios: 1- Cabinet Suggested; 2 - Cabinet Agreed; 3 – Western focus; 4 – Eastern Focus

Table 3.11: PM Unconstrained Traffic Demand on Selected Urban Links in Network A or C (PCUs / Hour)

		2029 Ref	Demand in Local Plan Scenarios* and change in %							
			1		2		3		4	
Chapel Hill	NB	906	1082	20%	1081	19%	1081	19%	1081	19%
	SB	1091	1199	10%	1198	10%	1198	10%	1198	10%
Gresley Road	WB	859	864	1%	863	1%	863	1%	863	1%
	EB	552	733	33%	732	33%	732	33%	732	33%
A3010 Churchill Way East	WB	1426	1563	10%	1561	10%	1561	10%	1561	10%
	EB	1703	2058	21%	2056	21%	2056	21%	2154	26%
A3010 Churchill Way Mid	WB	1191	1312	10%	1311	10%	1311	10%	1311	10%
	EB	1369	1710	25%	1708	25%	1708	25%	1806	32%
A3010 Churchill Way West	WB	1870	2242	20%	2240	20%	2240	20%	2240	20%
	EB	743	1050	41%	1049	41%	1049	41%	1049	41%
Worting Road	WB	584	588	1%	588	1%	588	1%	588	1%
	EB	956	962	1%	961	1%	961	1%	961	1%
Winchester Road	WB	935	1086	16%	1081	16%	1081	16%	1081	16%
	EB	645	711	10%	710	10%	710	10%	710	10%
Hackwood Road	NB	750	784	5%	784	5%	784	5%	784	5%
	SB	1266	1446	14%	1444	14%	1444	14%	1444	14%

* Local Plan Scenarios: 1- Cabinet Suggested; 2 - Cabinet Agreed; 3 – Western focus; 4 – Eastern Focus

3.3 Network Performance

3.3.1 This section reports the performance of key highway links in the modelled network in the 2029 Reference case and all Local Plan scenarios with future network A. The performance indicator used in this assessment is the Ratio of Flow over Capacity (RFC). A RFC value over 1 suggests that the highway demand intending to travel through a section of the highway over a given period of time is higher than its capacity for the same time period.

3.3.2 RFC values for key links highlighted in Figure 3.1 are tabulated in Table 3.12 through to Table 3.17. It should be noted that these RFCs values take into account the capacity of individual road links as well as constraints at entries to the downstream junction at the exit of links. This approach is more realistic in reflecting how individual road links may operate in different future scenarios. Links are highlighted in red in the tables below for the following two situations:

- The RFC in 2029 Reference Case is below 1 but the additional traffic from the Local Plan development increases the total demand beyond what the link or the downstream junction can accommodate (RFC > 1) in the modelled hours.
- The RFC is over 1 in both 2029 Reference Case and Local Plan scenarios but the increase in the latter is greater than 10% when compared to the reference conditions.

3.3.3 It can be observed from the following tables that, although traffic growth from Local Plan development generally increases the travel demand and therefore RFC on key links in the study area, there are only a few cases where the growth from Local Plan pushes the RFC values of these links over 1 or increases the RFC by more than 10%, as highlighted in red in the following tables. These links mainly cover Winchester Road, A339 Kingsclere Road, and some sections of Churchill Way and Ringway East and North.

3.3.4 It should be noted that the results presented reflect a worst case as the RFC assessment considers all travel demand (demand flows) that intends to go through individual links. In reality some of this demand may not materialise in the modelled hours due to congestion elsewhere in the network. Therefore the actual congestion in the future network is likely to be less than what was forecasted by the model. Furthermore, the current assessment does not consider impacts from changes in travel behaviours as a result of increasing congestions, nor the potential shifting of highway demand towards other more sustainable modes of transport. Both considerations may further limit the level of congestion that may occur as a result of the Local Plan development in the future.

Table 3.12 AM RFCs on Cordon Links

		Road Type	2029 Ref	Local Plan Scenarios*			
				1	2	3	4
Inbound	A340	S2-Rural-60	1.25	1.23	1.24	1.24	1.24
	A33	D2-Rural-50	0.69	0.84	0.87	0.80	0.93
	A30 London Rd	S1-Rural-60	2.09	2.13	2.14	2.08	2.14
	M3 J6 to Black Dam Rbt	D3-Rural-70	1.49	1.55	1.55	1.54	1.55
	A339 Hackwood Rd	S2-Rural-60	1.44	1.58	1.58	1.58	1.58
	A30 Winchester Rd	D2-Rural-50	0.88	1.11	1.11	1.22	1.02
	B3400 Churchill Way W	S2-Urban-50	1.30	1.62	1.61	1.61	1.61
	A339 Kingsclere Rd	D2-Rural-70	1.23	1.51	1.51	1.52	1.51
Outbound	A340	S2-Rural-60	1.57	1.55	1.55	1.55	1.55
	A33	D2-Rural-50	0.80	0.91	0.92	0.91	0.91
	A30 London Rd	S2-Rural-60	0.84	0.81	0.81	0.81	0.81
	M3 J6 to Black Dam Rbt	D2-Rural-70	0.89	0.89	0.89	0.89	0.89
	A339 Hackwood Rd	S2-Rural-60	1.08	1.12	1.12	1.12	1.12
	A30 Winchester Rd	D2-Rural-50	1.02	1.03	1.03	1.04	1.03
	B3400 Churchill Way W	S2-Urban-50	0.63	0.82	0.84	0.81	0.86
	A339 Kingsclere Rd	D2-Rural-70	0.71	0.79	0.80	0.80	0.81

* Local Plan Scenarios: 1- Cabinet Suggested; 2 - Cabinet Agreed; 3 – Western focus; 4 – Eastern Focus

Table 3.13 PM RFCs on Cordon Links

		Road Type	2029 Ref	Local Plan Scenarios*			
				1	2	3	4
Inbound	A340	S2-Rural-60	1.05	1.04	1.04	1.04	1.04
	A33	D2-Rural-50	0.64	0.77	0.78	0.77	0.78
	A30 London Rd	S1-Rural-60	1.41	1.35	1.35	1.35	1.35
	M3 J6 to Black Dam Rbt	D3-Rural-70	0.96	0.95	0.95	0.95	0.95
	A339 Hackwood Rd	S2-Rural-60	1.11	1.18	1.18	1.18	1.18
	A30 Winchester Rd	D2-Rural-50	0.58	0.65	0.65	0.66	0.65
	B3400 Churchill Way W	S2-Urban-50	0.73	0.97	0.97	0.96	0.99
	A339 Kingsclere Rd	D2-Rural-70	0.89	1.07	1.08	1.08	1.09
Outbound	A340	S2-Rural-60	1.37	1.36	1.37	1.37	1.37
	A33	D2-Rural-50	0.78	0.95	0.98	0.90	1.05
	A30 London Rd	S2-Rural-60	0.63	0.62	0.62	0.62	0.62
	M3 J6 to Black Dam Rbt	D2-Rural-70	1.11	1.15	1.15	1.15	1.16
	A339 Hackwood Rd	S2-Rural-60	1.52	1.67	1.68	1.68	1.68
	A30 Winchester Rd	D2-Rural-50	1.54	2.15	2.15	2.36	1.96
	B3400 Churchill Way W	S2-Urban-50	1.24	1.59	1.59	1.59	1.59
	A339 Kingsclere Rd	D2-Rural-70	1.08	1.21	1.21	1.23	1.21

* Local Plan Scenarios: 1- Cabinet Suggested; 2 - Cabinet Agreed; 3 – Western focus; 4 – Eastern Focus

Table 3.14 AM RFCs on Ringway Links (PCUs / Hour)

		Road Type	2029 Ref	Local Plan Scenarios*			
				1	2	3	4
Clockwise	Ringway North 1	D2-Urban-50	1.24	1.51	1.51	1.55	1.47
	Ringway North 2	D2-Urban-70	0.99	1.11	1.11	1.12	1.10
	Ringway East 1	D2-Urban-70	0.97	1.09	1.09	1.06	1.12
	Ringway East 2	D2-Urban-70	1.44	1.48	1.49	1.45	1.49
	Ringway South 1	D2-Urban-70	0.68	0.72	0.73	0.70	0.73
	Ringway South 2	S2-Urban-60	1.10	1.15	1.15	1.15	1.15
	Ringway West 1	D2-Urban-70	1.33	1.65	1.65	1.76	1.54
	Ringway West 2	D2-Urban-70	1.21	1.39	1.39	1.51	1.27
Anti-clockwise	Ringway North 1	D2-Urban-50	1.05	1.16	1.17	1.14	1.20
	Ringway North 2	D2-Urban-70	0.80	0.99	1.00	0.96	1.05
	Ringway East 1	D2-Urban-70	0.94	1.03	1.03	1.01	1.03
	Ringway East 2	D2-Urban-70	1.53	1.63	1.64	1.62	1.64
	Ringway South 1	D2-Urban-70	1.53	1.65	1.65	1.64	1.66
	Ringway South 2	S2-Urban-60	1.12	1.22	1.22	1.29	1.17
	Ringway West 1	D2-Urban-70	0.78	0.84	0.84	0.84	0.84
	Ringway West 2	D2-Urban-70	0.81	0.83	0.84	0.83	0.85

* Local Plan Scenarios: 1- Cabinet Suggested; 2 - Cabinet Agreed; 3 – Western focus; 4 – Eastern Focus

Table 3.15 PM RFCs on Ringway Links (PCUs / Hour)

		Road Type	2029 Ref	Local Plan Scenarios*			
				1	2	3	4
Clockwise	Ringway North 1	D2-Urban-50	0.97	1.13	1.14	1.11	1.16
	Ringway North 2	D2-Urban-70	0.70	0.94	0.96	0.91	1.01
	Ringway East 1	D2-Urban-70	0.49	0.64	0.65	0.65	0.63
	Ringway East 2	D2-Urban-70	1.60	1.80	1.80	1.81	1.79
	Ringway South 1	D2-Urban-70	0.51	0.62	0.62	0.63	0.61
	Ringway South 2	S2-Urban-60	0.85	1.39	1.40	1.52	1.29
	Ringway West 1	D2-Urban-70	0.92	1.10	1.10	1.12	1.10
	Ringway West 2	D2-Urban-70	1.14	1.24	1.25	1.25	1.26
Anti-clockwise	Ringway North 1	D2-Urban-50	1.28	1.46	1.46	1.49	1.43
	Ringway North 2	D2-Urban-70	0.97	1.09	1.10	1.08	1.11
	Ringway East 1	D2-Urban-70	0.73	0.78	0.78	0.75	0.81
	Ringway East 2	D2-Urban-70	1.06	1.11	1.11	1.08	1.11
	Ringway South 1	D2-Urban-70	1.37	1.51	1.53	1.46	1.53
	Ringway South 2	S2-Urban-60	1.00	1.10	1.09	1.09	1.09
	Ringway West 1	D2-Urban-70	0.98	1.13	1.13	1.19	1.08
	Ringway West 2	D2-Urban-70	1.10	1.22	1.22	1.27	1.18

* Local Plan Scenarios: 1- Cabinet Suggested; 2 - Cabinet Agreed; 3 – Western focus; 4 – Eastern Focus

Table 3.16 AM RFCs on Selected Urban Links (PCUs / Hour)

Road Name	Dir	Road Type	2029 Ref	Local Plan Scenarios*			
				1	2	3	4
Chapel Hill	NB	ChapelHill-Bridge	1.02	1.07	1.07	1.07	1.07
	SB		0.48	0.63	0.63	0.63	0.63
Gresley Road	WB	S2-Urban-30	0.45	0.58	0.58	0.58	0.58
	EB		0.76	0.76	0.76	0.76	0.76
A3010 Churchill Way East	WB	D2-Rural-70	0.83	0.92	0.92	0.92	0.97
	EB		0.21	0.23	0.23	0.23	0.23
A3010 Churchill Way Mid	WB	D2-Urban-30	0.41	0.53	0.53	0.53	0.53
	EB		0.72	0.89	0.89	0.89	0.89
A3010 Churchill Way West	WB	D2-Rural-50	0.55	0.69	0.69	0.69	0.69
	EB		1.01	1.36	1.36	1.36	1.36
Worting Road	WB	S2-Urban-30	0.88	0.89	0.89	0.89	0.89
	EB		0.89	0.90	0.90	0.90	0.90
Winchester Road	WB	S2-Urban-30	1.06	1.07	1.06	1.06	1.06
	EB		0.54	0.56	0.56	0.56	0.56
Hackwood Road	NB	S2-Urban-30	0.78	0.95	0.96	0.95	0.90
	SB		0.58	0.64	0.64	0.64	0.64

* Local Plan Scenarios: 1- Cabinet Suggested; 2 - Cabinet Agreed; 3 – Western focus; 4 – Eastern Focus

Table 3.17 PM RFCs on Selected Urban Links (PCUs / Hour)

Road Name	Dir	Road Type	2029 Ref	Local Plan Scenarios*			
				1	2	3	4
Chapel Hill	NB	ChapelHill-Bridge	0.69	0.83	0.83	0.83	0.83
	SB		0.89	0.98	0.98	0.98	0.98
Gresley Road	WB	S2-Urban-30	0.60	0.60	0.60	0.60	0.60
	EB		0.38	0.51	0.51	0.51	0.51
A3010 Churchill Way East	WB	D2-Rural-70	0.46	0.49	0.49	0.49	0.49
	EB		0.43	0.51	0.51	0.51	0.54
A3010 Churchill Way Mid	WB	D2-Urban-30	0.60	0.67	0.67	0.67	0.67
	EB		0.52	0.59	0.59	0.59	0.62
A3010 Churchill Way West	WB	D2-Rural-50	0.69	0.86	0.86	0.86	0.86
	EB		0.33	0.48	0.48	0.48	0.48
Worting Road	WB	S2-Urban-30	0.63	0.63	0.63	0.63	0.63
	EB		0.89	0.90	0.90	0.90	0.90
Winchester Road	WB	S2-Urban-30	1.26	1.46	1.45	1.45	1.45
	EB		0.45	0.50	0.50	0.50	0.50
Hackwood Road	NB	S2-Urban-30	0.56	0.59	0.59	0.59	0.59
	SB		1.12	1.83	1.86	1.86	1.75

* Local Plan Scenarios: 1- Cabinet Suggested; 2 - Cabinet Agreed; 3 – Western focus; 4 – Eastern Focus

3.4 Junction Performance

3.4.1 In urban areas, traffic delay and congestion is most likely caused by capacity constraint at entries to junctions rather than the capacity of the link. This section is focused on changes in the performance of individual junctions in terms of RFC values in different forecasting scenarios based upon unconstrained travel demand growth. It should be noted that the RFC analysis presented in this section is based on the high level modelling results from the spreadsheet tool rather than detailed junction modelling.

3.4.2 Figure 3.2 illustrates the location of junctions that would experience significant deterioration in performance in the Local Plan Scenario 2 in comparison to the 2029 Reference conditions. In this context, 'significant deterioration' is mainly defined by the following two rules:

- Junctions that operate with the maximum RFC on individual entries no more than 1 in 2029 Reference but over 1 in Local Plan scenarios
- Junctions that operate with the maximum RFC on individual entries over 1 in both 2029 Reference and Local Plan scenarios but the latter would lead to an maximum RFC at least 10% higher than the former

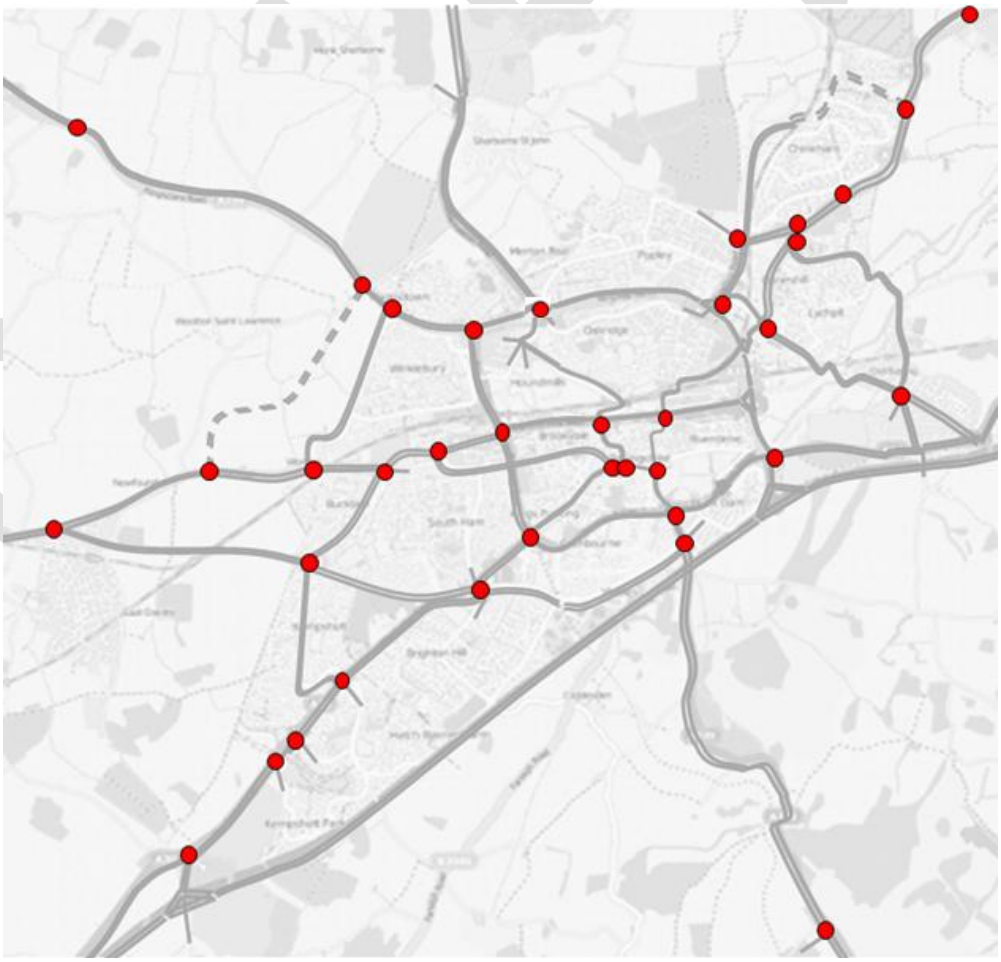


Figure 3.2 Junctions to Experience Significant Performance Deterioration in Local Plan Scenario 2

3.4.3 The junctions highlighted in Figure 3.2 were proposed as an initial list of congestion 'hotspots' for further assessment and screening. After discussion with BDBC, 17 junctions in and around Basingstoke were selected for further detailed assessment to take account of the fact that more detailed junction assessments and proposed improvements have been developed outside of this study for a number of the junctions identified in Figure 3.2. It is for this reason that this study does not assess and screen the following junctions where proposals are at a more advanced stage; Black Dam, Eastrop Roundabout, Winchester Road Roundabout and Thorneycroft Roundabout. It is important to note that junctions outside of this area on the strategic highway network (such as those in Whitchurch and Overton) will operate within capacity in 2029 with Local Plan development. Location of the 17 selected junctions that are subject to detailed assessment is shown in Figure 3.3.

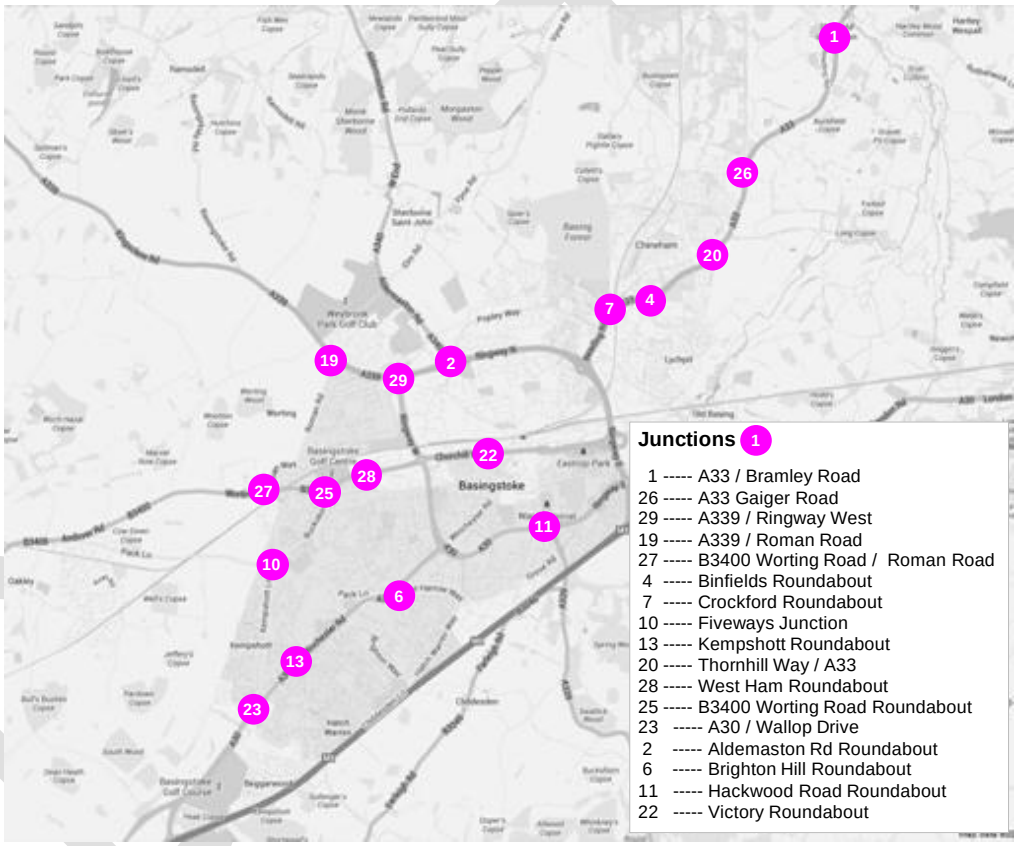


Figure 3.3 Key Junctions Selected for Mitigation

3.4.4

3.4.5 Table 3.18 and Table 3.19 present RFC values forecasted for the 17 selected junctions. They demonstrate the changes in junction performance in 2029 with and without Local Plan developments. Both maximum and average RFCs are provided so the performance of junctions can be judged by either the worst performing entry or an average of all entry arms at individual junctions.

Table 3.18 An Overview of Junction Max RFC's in the AM Peak

no	Junction Names	Max 2029 Ref	Max RFC's in Local Plan Scenarios*				Ave 2029 Ref	Ave RFC's in Local Plan Scenarios*			
			1	2	3	4		1	2	3	4
1	A33 / Bramley Rd	1.06	1.44	1.45	1.42	1.48	0.78	1.02	1.05	1.04	1.07
26	A33 / Gaiger Ave	0.96	1.16	1.19	1.17	1.21	0.49	0.67	0.69	0.68	0.70
29	A339 / Ringway West	1.23	1.51	1.51	1.52	1.51	1.16	1.35	1.36	1.39	1.33
19	A339 / Roman Rd	1.06	1.47	1.47	1.48	1.47	0.68	0.80	0.81	0.81	0.81
27	B3400 Worting Rd / Roman Rd	1.32	1.88	1.86	1.86	1.86	0.87	1.17	1.17	1.16	1.18
4	Binfields Rdbt	2.16	2.65	2.74	2.48	2.77	0.88	1.03	1.05	1.00	1.07
7	Crockford Rdbt	0.98	1.25	1.25	1.25	1.25	0.71	0.86	0.87	0.84	0.89
10	Fiveways Junction	1.74	2.04	2.01	2.10	1.94	1.32	1.58	1.57	1.59	1.55
13	Kempshott Rdbt	1.42	2.29	2.28	2.62	1.98	0.85	1.09	1.08	1.18	1.00
20	Thornhill Way / A33	1.14	1.44	1.49	1.34	1.51	0.77	0.94	0.95	0.91	0.96
28	West Ham Rdbt	0.88	0.89	0.89	0.89	0.89	0.38	0.44	0.44	0.44	0.44
25	B3400 Worting Road Rdbt	0.77	1.12	1.11	1.11	1.11	0.43	0.60	0.60	0.60	0.60
23	A30 / Wallop Drive	0.85	1.17	1.16	1.34	1.00	0.62	0.77	0.76	0.84	0.71
2	Aldermaston Rd Rdbt	1.20	1.20	1.20	1.20	1.20	0.88	0.95	0.95	0.94	0.95
6	Brighton Hill Rdbt	1.25	1.72	1.72	1.92	1.55	0.92	1.02	1.01	1.05	0.99
11	Hackwood Rd Rdbt	1.12	1.22	1.22	1.29	1.17	0.90	0.98	0.98	0.99	0.97
22	Victory Rdbt	1.01	1.36	1.36	1.36	1.36	0.61	0.77	0.76	0.76	0.76

* Local Plan Scenarios: 1- Cabinet Suggested; 2 - Cabinet Agreed; 3 – Western focus; 4 – Eastern Focus

Note: these RFC's values are for future Network A only; under Network C there will be an improvement at Brighton Hill Roundabout but the max RFC is still over 1 in Local Plan scenarios.

Table 3.19 An Overview of Junction Max RFC's in the PM Peak

no	Junction Names	Max 2029 Ref	Max RFC's in Local Plan Scenarios*				Ave 2029 Ref	Ave RFC's in Local Plan Scenarios*			
			1	2	3	4		1	2	3	4
1	A33 / Bramley Rd	1.13	1.61	1.62	1.60	1.65	0.76	1.06	1.10	1.07	1.12
26	A33 / Gaiger Ave	0.99	1.33	1.34	1.32	1.37	0.63	0.87	0.89	0.87	0.91
29	A339 / Ringway West	1.28	1.46	1.46	1.49	1.43	1.10	1.26	1.26	1.27	1.26
19	A339 / Roman Rd	1.08	1.27	1.29	1.27	1.31	0.67	0.79	0.79	0.79	0.80
27	B3400 Worting Rd / Roman Rd	1.00	1.47	1.49	1.46	1.51	0.82	1.17	1.18	1.17	1.19
4	Binfields Rdbt	1.94	2.64	2.67	2.58	2.71	1.00	1.20	1.22	1.17	1.26
7	Crockford Rdbt	0.86	1.03	1.04	1.03	1.05	0.65	0.79	0.80	0.78	0.81
10	Fiveways Junction	2.24	2.68	2.67	2.67	2.67	1.58	2.00	1.98	2.02	1.95
13	Kempshott Rdbt	1.36	1.65	1.65	1.87	1.46	0.83	1.05	1.05	1.13	0.99
20	Thornhill Way / A33	1.30	1.71	1.76	1.61	1.79	0.88	1.09	1.10	1.05	1.12
28	West Ham Rdbt	0.92	1.23	1.23	1.23	1.23	0.43	0.51	0.51	0.51	0.51
25	B3400 Worting Road Rdbt	0.74	1.02	1.02	1.03	1.02	0.42	0.60	0.61	0.60	0.61
23	A30 / Wallop Drive	1.00	1.60	1.59	1.82	1.38	0.72	0.94	0.93	1.03	0.86
2	Aldermaston Rd Rdbt	1.88	2.50	2.52	2.53	2.51	0.90	1.01	1.01	1.01	1.01
6	Brighton Hill Rdbt	1.54	2.15	2.15	2.36	1.96	0.98	1.10	1.10	1.15	1.06
11	Hackwood Rd Rdbt	1.12	1.83	1.86	1.86	1.75	0.88	1.14	1.15	1.16	1.12
22	Victory Rdbt	0.89	0.98	0.98	0.98	0.98	0.61	0.73	0.73	0.73	0.74

* Local Plan Scenarios: 1- Cabinet Suggested; 2 - Cabinet Agreed; 3 – Western focus; 4 – Eastern Focus

Note: these RFC's values are for future Network A only; under Network C there will be an improvement at Brighton Hill Roundabout but the max RFC is still over 1 in Local Plan scenarios.

3.4.6 Based on the average RFC's, only three of the analysed junctions have RFC values over 1 in 2029 Reference Case. These are A339 / Ringway West, Binfields Roundabout and Fiveways junction.

3.4.7 The additional Local Plan development traffic is forecasted to result in at least one entry arm of most assessed junctions having insufficient capacity to accommodate the traffic demand in one modelled hour. However, some entries of these overcapacity junctions would still work well within capacity considering some low average RFC values reported.

3.4.8 Table 3.20 below summarise the modelled performance of the selected junctions in the AM and PM peak hours to outline the reasons why they have been selected for mitigation investigations. It should be noted that observations presented in Table 3.20 are based on an analysis of the high level modelling results from the spreadsheet model. The sole purpose of this exercise is to inform the individual junction assessment, where individual junctions are modelled separately with their performance reported for each entry arm in Chapter 4 of this report.

Table 3.20 An Overview of Junction Performance based on Spreadsheet Modelling Results

No	Names	Control	Observations
1	A33 / Bramley Rd	Priority rdbt	A33 northbound and southbound arms are forecasted to have large demand increases in all Local Plan scenarios. The forecasted delays/queuing are deemed to require mitigation to improve the flow on the A33.
26	A33 / Gaiger Ave	Priority rdbt	This junction is forecasted to operate well in the 2029 Reference Case, but the additional demand in the Local Plan scenarios is more than the junction can currently accommodate. Of particular concern are the A33 northbound and southbound movements which are predicted to be overcapacity in all Local Plan scenarios. This again demonstrates the requirement for investigation into appropriate mitigation measures to improve flow on the A33 strategic route.
29	A339 / Ringway West Roundabout	Priority rdbt	This junction is forecasted to operate over capacity in the 2012 Base and 2029 Reference scenarios. Modelling results suggest that improvements are required to accommodate any further demand increase from Local Plan development in Basingstoke.
19	A339 / Roman Rd	Priority rdbt	The A339 Kingsclere Road arms are predicted to be over capacity in the 2029 Reference scenario, eastbound in the AM and westbound in the PM. These two arms were forecasted to worsen in all Local Plan scenarios. Investigation into appropriate mitigation is required considering the A339 is a key strategic route into Basingstoke.
27	B3400 Worting Rd / Roman Rd	Mini rdbt	The B3400 Worting Road eastbound arm is forecasted to be over capacity in the PM peak 2012 base and its performance deteriorates in the 2029 Base and Local Plan scenarios. The Local Plan demand is too large for the B3400 Worting Road eastbound and westbound to accommodate in both peaks. This junction is on a key route in/out of Basingstoke and therefore requires further work to determine appropriate mitigation.
4	Binfields Rdbt	Priority rdbt	There are two movements that are concerning at this junction; the A33 northbound and southbound. In the 2012 base scenario the A33 southbound arm is modelled as over capacity and the increase in traffic to the 2029 Base leads to significant rise in RFC. The forecasted delays/queuing are deemed to require mitigation to improve the flow on the A33 strategic route.

No	Names	Control	Observations
7	Crockford Rdbt	Priority rdbt	This junction experiences significant queuing and delay in 2012 PM and this is forecasted to worsen in 2029 Reference Case. Without improvement, further demand growth resulting from the Local Plan development traffic is forecasted to exacerbate the congestion and restrict access into Basingstoke along the A33 and access from residential areas in Popley, onto a key strategic route in/out of Basingstoke.
10	Fiveways Junction	Signal	Three arms of this junction, Kempshott Lane, Buckskin Lane and Pack Lane westbound, are modelled to be overcapacity in both the 2012 and 2029 Base scenarios. Traffic from the Local Plan development, without mitigation, is forecasted to exacerbate the congestion on Kempshott Lane in the AM and Buckskin Lane and Pack Lane in the PM.
13	Kempshott Rdbt	Priority rdbt	The A30 northbound and southbound arms are predicted to be well over capacity in the 2029 Base scenario and the addition of the Local Plan development causes further rise in the RFC for A30 northbound in the AM peak.
20	Thornhill Way / A33	Signal	Modelling results suggest that, in the 2029 Base scenario, the A33 southbound arm in the AM peak and northbound in the PM peak are not able to cope with the traffic demand. This situation is worsened by the local Plan development and all arms at this junction are forecasted to be over capacity in one peak or the other.
28	West Ham Rdbt	Priority rdbt	This junction is forecasted to operate within capacity in the AM peak for all scenarios. However, it has been identified for mitigation due to its performance in the PM peak in which the B3400 Worting Road westbound cannot accommodate the required demand.
25	B3400 Worting Road Rdbt	Priority rdbt	This junction is predicted to operate within capacity in the 2012 and 2029 Base scenarios. The Local Plan development traffic is too large for the B3400 Worting Road eastbound and westbound arms to accommodate it and hence the junction requires mitigation.
15	M3 Junction 7	Priority rdbt	The modelling results suggest that this junction does not require any mitigation. However, given the strategic importance of this junction to Basingstoke, at the request of BDBC it has been included in Tranche 2 for further analysis.
23	A30 / Wallop Drive	Priority rdbt	This junction operates well in the 2012 Base scenarios. However with the addition of Local Plan development traffic the A30 northbound and southbound arms are forecasted to be over capacity.
2	Aldermaston Rd Rdbt	Priority rdbt	In the 2012 base the A340 Aldermaston Rd arm is already over capacity. In the 2029 base scenario and the Local Plan scenarios the modelling results suggest that both the A340 Aldermaston Rd and Popley Way are unable to accommodate the required demand.
6	Brighton Hill Rdbt	Priority rdbt	Brighton Hill roundabout operates within capacity in the 2012 Base, but without any improvements cannot accommodate the demand in the Local Plan scenarios as shown in the modelling results. Network C tests an upgrade to this roundabout to a signalised Hamburger roundabout but despite this Harrow Way, Brighton Way, A30 southbound and the A30 northbound remain over capacity in at least one peak so further investigation into mitigation is required.
11	Hackwood Rd Rdbt	Priority rdbt	Modelling results suggest that the 2029 Base demand cannot be accommodated by this junction on the Ringway arms in both directions or by the Hackwood Road entry. The inclusion of Local Plan demand traffic also results in the A339 operating over capacity and the junction therefore requires mitigating to improve the capacity of all arms.
22	Victory Rdbt	Priority rdbt	This is a key junction within the centre of Basingstoke and the A3010 Churchill Way west approach to the junction cannot accommodate the demand required in the 2029 Base and all Local Plan scenarios in the AM peak. The junction therefore requires mitigation.

3.5 Difference in Traffic Impacts from Future Networks B, D and E

3.5.1 Sections 3.2, 3.3 and 3.4 of this chapter present travel demand growth, network and junction performance. As described at the end of Section 3.1, the aforementioned sections are focused on future Networks A / C, which share the same travel demand, in order to improve the clarity of the report. This section discusses difference in traffic impacts brought by future Networks B, D and E.

3.5.2 It was discussed in Paragraph 3.1.4 that Networks B and D would share the same travel demand, while Network E is expected to cause significant re-routing of traffic by introducing a full western bypass in Basingstoke.

Networks B and D (Cufuade Lane / Gaiger Avenue link road)

3.5.3 In comparison to Networks A and C, the inclusion of the Cufuade Lane / Gaiger Avenue link road is expected to change travel demand on the A33 and Ringway.

3.5.4 In the AM peak, the new link road allows for individuals travelling to / from the existing and proposed developments to access / egress via the A33 / Gaiger Avenue Junction rather than Crockford Lane. As a result, there is a reduction of flow travelling on the A33 to / from east of the new link road. To the west there is some re-routing onto Wade Road, off of the A33.

3.5.5 A similar impact is noted in the PM peak hour, with flow changing routes between the A33 and Crockford lane around the link road. However, due to the change in demand pattern some eastbound routes also switch from using the Ringway in a clockwise direction to using and Churchill Way and Wade Road.

3.5.6 The observed flow changes are less than 125 trips in total. Overall, major roads, such as A33 and Ringway, generally experience a flow reduction as demand shift onto minor roads. Therefore, the flows presented on the relevant major links in Section 3.3 are all reduced. Increase in demand is forecasted to occur on Churchill Way Eastbound and Wade Road Northbound mainly in the PM peak. These variations in traffic volumes on links are deemed insignificant and their impacts are expected to be immaterial.

Network E (Full Western Bypass)

3.5.7 In comparison to any other future networks, Network E features a full Western Bypass that connects the A339 and M3 as illustrated in Figure 2.3. The full traffic impacts of this new link road has been assessed using the existing SATURN model to understand the routes which traffic may be attracted from, and how much flow is likely to re-route. Findings from this assessment are presented in Appendix B of this report.

3.5.8 Overall, the new bypass can divert some east / west through traffic that used to use Ringway to M3 / new link road corridor, which leads to some relief of the key junctions on the Ringway as listed in Table 3.20. On a local basis, it also carries north / south traffic and leads to relief to junctions on the A30, Kempshott Lane, Buckskin Lane, B3400 Worting Road and even the A339.

3.5.9 Table 3.21 summarises the estimated variations in the total travel demand at key junctions that are likely to be directly affected by re-routing caused by Western Bypass.

Table 3.21: Variations in Total Travel Demand in PCU's at Selected Junctions as a Result of the Western Bypass

No.	Junction Names	AM			PM		
		Before	After	Reduction in %	Before	After	Reduction in %
2	Aldermaston Road roundabout	8303	7470	-10%	7592	7036	-7%
19	A339 / Roman Road Roundabout	5115	4883	-5%	5276	5161	-2%
29	A339 / Ringway West Roundabout	9357	9026	-4%	9005	8907	-1%
23	A30 / Wallop Drive Roundabout	3979	3879	-3%	4618	4118	-11%
13	Kempshott Roundabout	5050	4950	-2%	5387	4887	-9%
10	Fiveways Junction	3059	3017	-1%	3877	3619	-7%
25	B3400 Worting Road Roundabout	3106	3131	1%	3457	3247	-6%
27	Worting Road / Roman Way Roundabout	3013	2980	-1%	3175	3207	1%

3.5.10 It can be observed from the above table that most junctions are forecasted to receive a small amount of congestion relief demonstrated in reduction in travel demand going through the junctions. The highest reductions are forecasted to occur on:

- Aldermaston Road Roundabout in both peak hours
- Kempshott Roundabout in PM peak hour
- A30 / Wallop Drive Roundabout in PM peak

3.5.11 For the above three junctions, it is expected that the clear reduction in demand may bring some marginal reduction in the scale of mitigation in comparison to what is recommend in the next chapter to mitigate development traffic impacts under Local Plan Scenario 2. However, the potential savings are unlikely to be in proportion to the cost for delivering the entire bypass.

3.5.12 For other junctions listed in Table 3.21, the variations in highway demand as a result of the implementation of the Western Bypass are insignificant and deemed immaterial in terms of their potential in scaling down the highway mitigations recommended in this study.

4 MITIGATION ASSESSMENT

4.1 General

4.1.1 Chapter 3 gives a high level assessment of the traffic impacts from the forecasted Local Plan land use scenarios. Based on findings from the modelling results and discussion with BDBC, 17 junctions were taken into detailed assessment reported in this chapter. Assessment has been undertaken to consider opportunities for improving transport infrastructure to mitigate adverse traffic impacts of Local Plan development. This involves detailed modelling of the selected junctions using LinSig and ARCADY models.

4.1.2 The study went on to consider the transport infrastructure opportunities to mitigate the impact of development at 17 identified junctions. This identification of mitigation measures was undertaken using standard junction modelling packages (LinSig and ARCADY) following a principle of achieving the greatest level of congestion relief within existing constraints (such as highway boundaries) while avoiding any structural work at bridges and viaducts where possible. The measures recommended include common improvements such as lane widening and signalisation. Further details of the proposed improvements for individual junctions are presented in the rest of this chapter

4.1.3 It is acknowledged that any mitigation proposal presented in this chapter as well as findings in other parts of this report should be interpreted with an understanding of the key assumptions made in this study and the limitation of the adopted worst case scenario approach.

4.1.4 First of all, all future travel demand was forecasted based on a worst case scenario approach using unconstrained traffic growth on the highway network. This approach ensures robustness of the assessments on the basis that, if unconstrained demand can be accommodated (along with reasonable mitigation), the Local Plan will be sound on transport grounds. However, this approach also means that benefits from further highway demand reductions as a result of the following considerations are not considered in this study:

- The scope for behavioural changes that may result due to increased congestion at a particular junction. For example, the spreading of journeys to times which are less busy or the scope to divert to alternative routes
- The potential for a modal shift from use of the private car to alternatives, such as public transport, cycling and walking
- Changes to trip frequency, origins, destinations, or journey distance

4.1.5 In addition to the above assumptions, the forecasted traffic flows consider all highway demand (demand flows in traffic modelling terms) that intends to go through individual junctions and assume all these can reach the specific junction during the modelled period of time. In reality it is commonly recognised that some of the demand may not materialise in the modelled hours due to congestion elsewhere in the network, which leads to lower actual flows that arrive during a given period of time.

4.1.6 It is important that the above considerations are taken into account in any further study as the Local Plan is taken forward. This will be for the purpose of either achieving better value for money for the proposed mitigation schemes (if the forecasted travel demand could be lower) or further exploring highway improvements (where no satisfactory mitigation has been found in this study).

4.2 A33 / Bramley Road Roundabout

4.2.1 This is a four arm roundabout, located in northeast Basingstoke. The junction connects the A33 and Bramley Road. Figure 4.1 shows Reference Case and the Local Plan demand on each entry arm, whilst Table 4.1 and Table 4.2 show the full turning movements. The major movements at this junction are between Arm A (A33 North) and Arm B (A33 South). These movements are significantly increased as a result of the Local Plan development, thus resulting in large queues and delays.

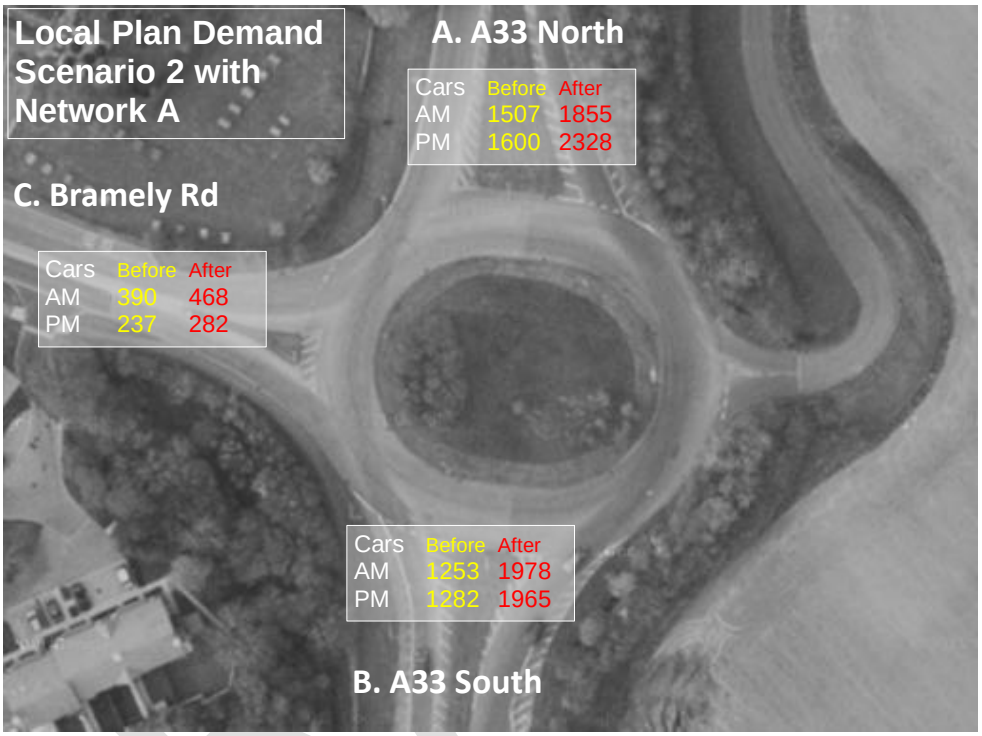


Figure 4.1 Demand at A33 / Bramley Road Roundabout with and without Local Plan Developments

Table 4.1 AM Demand at A33 / Bramley Road Roundabout

	From / To	Arm A	Arm B	Arm C	Total
2029 Reference Case	Arm A – A33 North	0	1436	71	1507
	Arm B – A33 South	1162	0	91	1253
	Arm C – Bramley Rd	154	236	0	390
	Total	1316	1672	162	3150
	From / To	**Arm A**	**Arm B**	**Arm C**	**Total**
Local Plan Scenario 2 Network A	Arm A – A33 North	0	1773	82	1855
	Arm B – A33 South	1853	17	108	1978
	Arm C – Bramley Rd	176	292	0	468
	Total	2029	2082	190	4301

Table 4.2 PM Demand at A33 / Bramley Road Roundabout

	From / To	Arm A	Arm B	Arm C	Total
2029 Reference Case	Arm A – A33 North	0	1372	228	1600
	Arm B – A33 South	1195	0	87	1282
	Arm C – Bramley Rd	110	127	0	237
	Total	1305	1499	315	3119
	From / To	**Arm A**	**Arm B**	**Arm C**	**Total**
Local Plan Scenario 2 Network A	Arm A – A33 North	0	2078	250	2328
	Arm B – A33 South	1774	52	139	1965
	Arm C – Bramley Rd	127	155	0	282
	Total	1901	2285	389	4575

4.2.2 In order to mitigate the roundabout, it is proposed to:

- Partially signalise the roundabout at both A33 entries to provide guaranteed green time for the A33 mainline movements;
- Convert approximately 3/4 of the circulatory carriageway to two lanes
- Flare both A33 entries to create two lanes at the stopline to increase discharge rates; and
- Provide exit funnels at both A33 exits

4.2.3 An illustrative diagram of the proposal is shown in Figure 4.2.

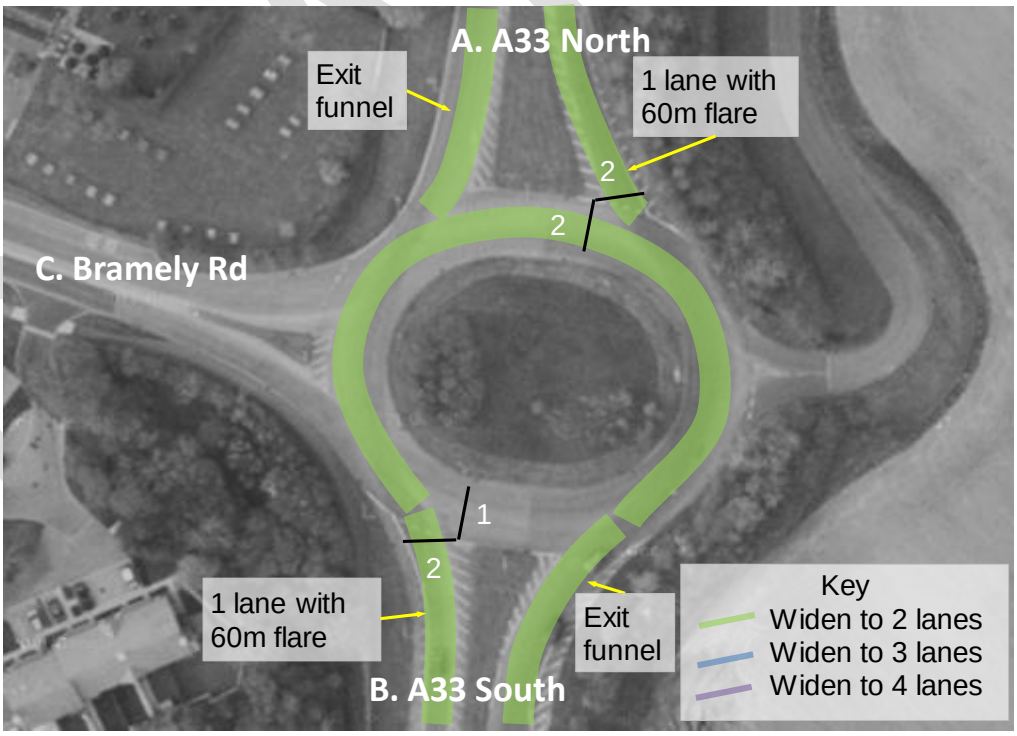


Figure 4.2 An Illustration of the Proposed Mitigation at A33 / Bramley Road Roundabout

4.2.4 The current circulatory carriageway width is approximately 9m which is sufficient for two lanes. The A33 North and A33 South entries will require a 60m flare. Both A33 approaches are not flared presently but the approach road are wide (varying between approximately 6.5 to 9m) so the widening required to provide the flares is modest. Two lane exit funnel will also be required for both A33 exits in order to accommodate two lanes of exiting flow. The entry from Bramley Road remains give-way controlled so the heavy A33 northbound flow can go through the junction with minimal delay.

4.2.5 A visual check has been undertaken, which confirmed that all proposed improvements can be accommodated within existing highway boundaries.

4.2.6 Table 4.3 below shows variations in the Degree of Saturation (DoS) resulting from different travel demand and the proposed mitigation measures. Modelling results suggest that the proposed highway improvements significantly reduce traffic congestion. The mitigated junction operates in a more balanced way. Both A33 arms achieve a similar level of DoS with much reduced queuing and delay in comparison to the Reference Case conditions.

Table 4.3 Modelled Degree of Saturation at Each Entry for A33 / Bramley Road Roundabout

Time	Arms	2029 Reference Case (%)	Local Plan without mitigation (%)	Local Plan with mitigation (%)
AM	Arm A – A33 North	108.0	138.0	91.3
	Arm B – A33 South	89.0	141.0	97.3
	Arm C - Bramley Road	44.0	60.0	79.4
PM	Arm A – A33 North	110.0	164.0	114.5
	Arm B – A33 South	97.0	146.0	96.7
	Arm C - Bramley Road	27.0	34.0	47.5

4.2.7 Table 4.4 shows the cost estimates for the proposed improvements to the A33 / Bramley Road Roundabout. The estimates have been rounded and contain a contingency to take account of uncertainty at the concept design stage.

Table 4.4 Indicative Improvement Costs for A33 / Bramley Road Roundabout

A33 / Bramley Road Roundabout	Costs (£)

Site Clearance	11,073
Fencing	0
Pedestrian Guardrail etc	4,578
Drainage	45,683
Earthworks	39,753
Pavement	82,139
Kerbs & Footways	17,406
Signs & Markings (Inc Work to Traffic Lights)	16,438
Road Lighting Columns	16,740
Traffic Signals	123,750
Sub – Total	**357,560**
Preliminaries 7.5%	26,817
Traffic Management 20%	71,512
Sub – Total	**455,889**
Contingency / Risk 45%	205,150
Total £	**661,039**

4.3 A33 / Gaiger Avenue Junction

4.3.1 This is presently a three-arm priority roundabout located on the A33. Its entry flows are shown in Figure 4.3, with and without the influence from the Local Plan developments. Table 4.5 and Table 4.6 also present detailed turning movements at this junction for the 2029 Reference Case and Local Plan Scenario 2 with Network A.

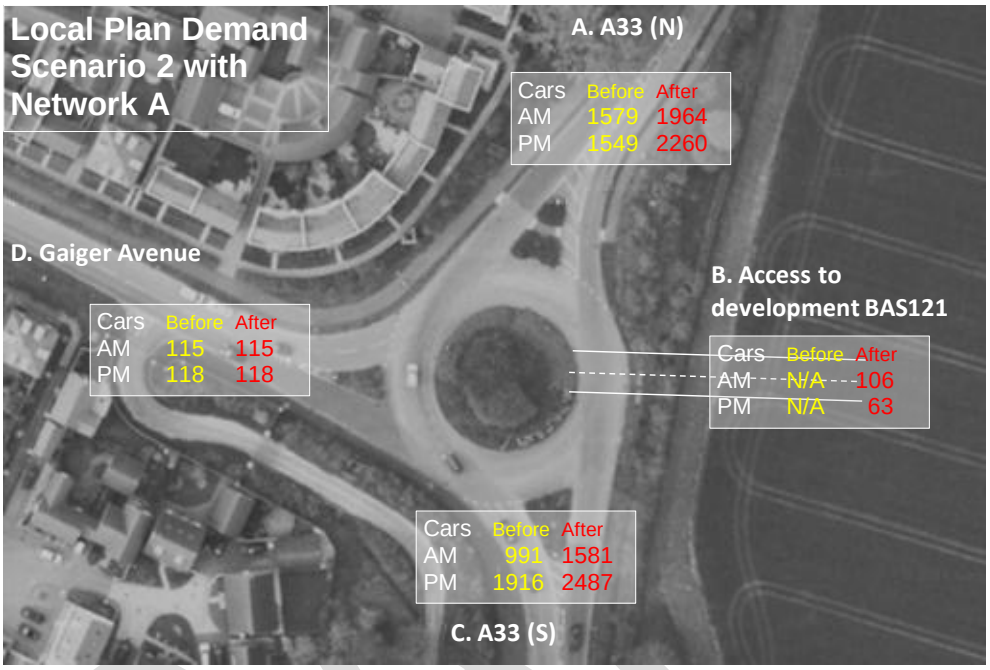


Figure 4.3 Demand at A33 / Gaiger Avenue Junction with and without Local Plan Developments

4.3.2 Following discussion with the BDBC and HCC, it was agreed that the 4th arm should be added to the roundabout in the Local Plan scenario to represent the approach road from Development Redlands (SOL002) and Land East of Basingstoke (BAS121). This is illustrated in Figure 4.3 above. It can be seen from Table 4.5 and Table 4.6 that the current key movements at this junction are between Arm A (A33 North) and Arm C (A33 South) in both the AM and PM peak. Similarly, the demand increases as a result of the Local Plan developments are primarily focused on movements between Arms A and C.

Table 4.5 AM Demand at A33 / Gaiger Avenue Junction in the AM Peak

	From / To	Arm A	Arm B	Arm C	Arm D	Total
2029 Reference Case	Arm A – A33 North	0	N/A	1543	36	1579
	Arm B – Access Road	N/A	N/A	N/A	N/A	N/A
	Arm C – A33 South	991	N/A	0	0	991
	Arm D – Gaiger Avenue	113	N/A	2	0	115
	Total	1104	N/A	1545	36	2685
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Total**
Local Plan Scenario 2 Network A	Arm A – A33 North	0	33	1895	36	1964
	Arm B – Access Road	106	0	0	0	106
	Arm C – A33 South	1581	0	0	0	1581
	Arm D – Gaiger Avenue	113	0	2	0	115
	Total	1800	33	1897	36	3766

Table 4.6 Demand at A33 / Gaiger Avenue Junction in the PM Peak

	From / To	Arm A	Arm B	Arm C	Arm D	Total
2029 Reference Case	Arm A – A33 North	0	N/A	1457	92	1549
	Arm B – Access Road	N/A	N/A	N/A	N/A	N/A
	Arm C – A33 South	1916	N/A	0	0	1916
	Arm D – Gaiger Avenue	118	N/A	0	0	118
	Total	2034	N/A	1457	92	3583
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Total**
Local Plan Scenario 2 Network A	Arm A – A33 North	0	106	2062	92	2260
	Arm B – Access Road	63	0	0	0	63
	Arm C – A33 South	2487	0	0	0	2487
	Arm D – Gaiger Avenue	118	0	0	0	118
	Total	2668	106	2062	92	4928

4.3.3 With the predicted level of travel demand growth, the junction is forecasted to experience significant congestion on Arm A in the AM peak hour and Arm C in both peak hours even in the 2029 Reference Case Scenario, particularly on both A33 entries. It is considered that the current form of the junction, a priority-controlled roundabout, does not suit its imbalanced traffic flow pattern in the future. In order to improve the operation of the junction it is proposed to convert it into a signalised intersection.

4.3.4 To accommodate the heavy traffic flow arrived at the A33 mainline approaches, both Arm A (A33 North) and Arm C (A33 South) would require a 60m flare in addition to the existing full lane so there are two lanes at each stopline to discharge queuing traffic when the light is green. Consequently the exits on Arms A and C need to be widened to two lanes with a funnel to one lane downstream of the junction. These proposed highway improvements are illustrated in Figure 4.4.

4.3.5 The approaches from Arms B (Development Access Road) and D (Gaiger Avenue) would be one lane entry considering the volume of traffic that they carry is light.

4.3.6 A visual check has been undertaken, which confirmed that all proposed improvements can be accommodated within existing highway boundaries.

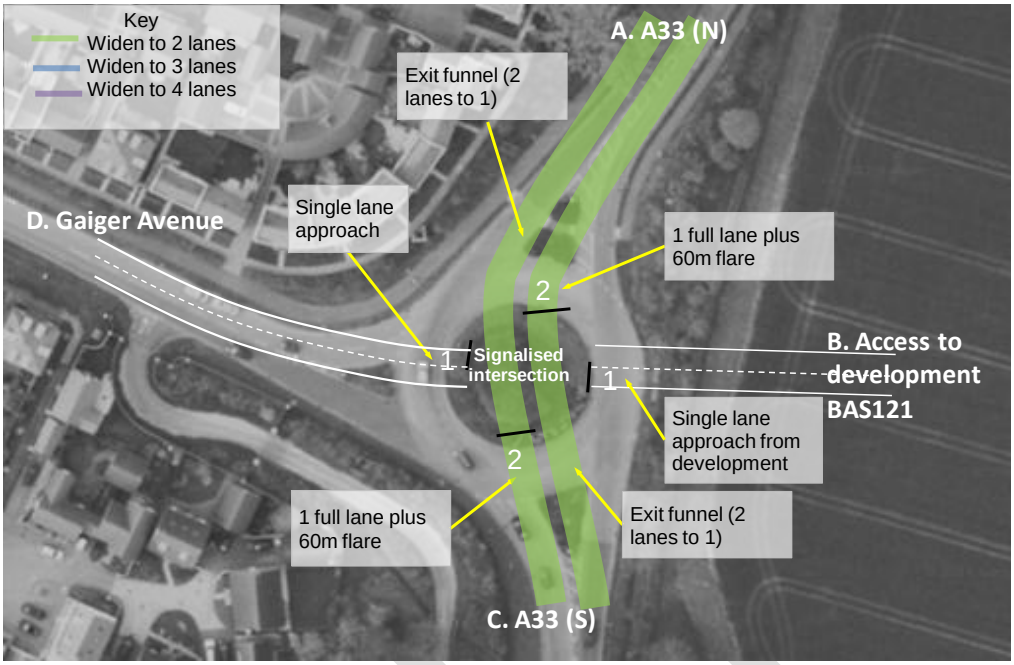


Figure 4.4 An Illustration of the Proposed Mitigation at A33 / Gaiger Avenue Roundabout

4.3.7 Table 4.7 below shows variations in the Degree of Saturation (DoS) resulting from different travel demand scenarios and the proposed mitigation measures.

Table 4.7 Modelled Degree of Saturation at Each Entry of A33 / Gaiger Avenue

Time	Arms	2029 Reference Case (%)	Local Plan without mitigation (%)	Local Plan with mitigation (%)
AM	Arm A – A33 North	135	168	97
	Arm B – Access Road	N/A	15	31
	Arm C – A33 South	59	98	78
	Arm D – Gaiger Ave	12	20	31
PM	Arm A – A33 North	132	193	111
	Arm B – Access Road	N/A	8	19
	Arm C – A33 South	117	154	122
	Arm D – Gaiger Ave	20	21	32

4.3.8 It can be seen from the model results that the operation of the A33 in both directions is significantly improved by the proposed mitigation measures in the AM peak hour. As a result, Gaiger Avenue would experience higher level of delay and queuing with the mitigation proposal than without. However, it is still operating well within capacity. In the PM peak, the mitigated junction still operates at a similar level of performance in comparison to the Reference Case conditions.

4.3.9 It should be noted that the modelled arrival flows at the A33 North and South arms exceeds the capacity of a single lane so some link capacity issues might be expected. An ideal solution is to widen the A33 to two lanes but this is not explored in this study for the following reasons:

- The proposed improvements are already effective in mitigating traffic impacts from the Local Plan developments; modelling results suggest that a performance that is better than the Reference Case conditions in the AM peak hour and no worse in the PM peak hour can be achieved;
- The study considers a worst case scenario so it does not take into account of potential congestion relief from re-routing or re-distribution of traffic due to congestion or any decrease in highway travel demand as a result of promoting sustainable travel measures; and
- The expected high cost of full widening for the A33 mainline

4.3.10 It is recommended that the operation of this junction to be closely monitored as the Local Plan moves forward and a more detailed assessment of the exact form of highway improvements is undertaken when the relevant developments, Redlands (SOL002) and Land East of Basingstoke (BAS121), come forward. It should also be noted that the final design of this junction will be influenced by factors such as the access to the aforementioned developments, implementation of Gaiger Avenue Link Road, the opening of the link to Cufaude Lane from Rockbourne (south western corner of the site). The exact proposal will depend on which of these elements come forward.

4.3.11 Table 4.8 shows the cost estimates for the proposed improvements to A33 / Gaiger Avenue Junction. The estimates have been rounded and contain a contingency to take account of uncertainty at the concept design stage. Please note that the cost associated with the new Arm B is not included in the estimate due to the uncertainty on the exact form and length of the access road.

Table 4.8 Indicative Improvement Costs for A33 / Gaiger Avenue Junction

A33 / Gaiger Avenue Junction	Costs (£)
Site Clearance	67,769
Fencing	0
Pedestrian Guardrail etc	28,021
Drainage	279,594
Earthworks	385,842
Pavement	386,400
Kerbs & Footways	106,530
Signs & Markings (Inc Work to Traffic Lights)	100,604
Road Lighting Columns	102,456
Traffic Signals	113,850
Accommodation Works	57,500
Sub – Total	**1,628,566**
Preliminaries 7.5%	122,142
Traffic Management 20%	325,713
Sub – Total	**2,076,422**
Contingency / Risk 45%	934,390
Total £	**3,010,811**

4.4 Thornhill Way / A33 Junction

4.4.1 This is a four-arm signalised junction at the present. Its entry flows with and without the influence from the Local Plan developments are shown in Figure 4.5.

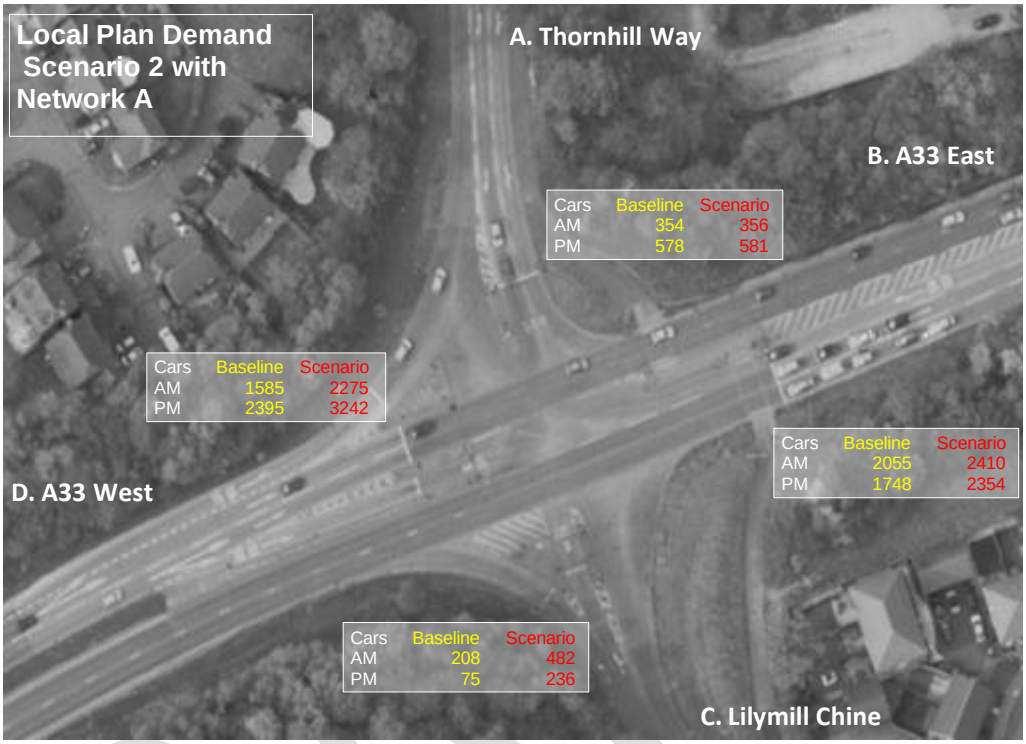


Figure 4.5 Demand at Thornhill Way / A33 Junction with and without Local Plan Developments

4.4.2 Table 4.9 and Table 4.10 present detailed turning movements at this junction for the 2029 Reference Case scenario and the Local Plan Scenario with Network A. It is clear from these two tables that the major movements at this junction are the mainline traffic on the A33 in both directions. Figure 4.5 also shows the most significant increase in travel demand occurs on the A33 in both directions in the Local Plan scenario.

Table 4.9 AM Demand at Thornhill Way / A33 Junction by Turns

	From / To	Arm A	Arm B	Arm C	Arm D	Total
2029 Reference Case	Arm A – Thornhill Way	0	151	12	191	354
	Arm B – A33 East	230	9	4	1812	2055
	Arm C – Lilymill Chine	34	24	0	151	208
	Arm D – A33 West	91	1470	24	0	1585
	Total	355	1654	40	2154	4203
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Total**
Local Plan Scenario 2 Network A	Arm A – Thornhill Way	0	152	12	192	356
	Arm B – A33 East	231	9	4	2166	2410
	Arm C – Lilymill Chine	34	24	0	424	482
	Arm D – A33 West	91	2076	109	0	2275
	Total	356	2261	125	2782	5524

Table 4.10 PM Demand at Thornhill Way / A33 Junction by Turns

	From / To	Arm A	Arm B	Arm C	Arm D	Total
2029 Reference Case	Arm A – Thornhill Way	0	215	25	338	578
	Arm B – A33 East	138	0	15	1595	1748
	Arm C – Lilymill Chine	14	3	0	58	75
	Arm D – A33 West	399	1865	130	0	2395
	Total	551	2084	170	1991	4796
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Total**
Local Plan Scenario 2 Network A	Arm A – Thornhill Way	0	216	25	340	581
	Arm B – A33 East	139	0	15	2201	2354
	Arm C – Lilymill Chine	14	3	0	218	236
	Arm D – A33 West	402	2436	404	0	3242
	Total	554	2656	444	2759	6413

4.4.3 The significant increase in travel demand on A33 mainline requires highway improvements on entries from both directions. For Arm D (A33 West), the existing offside right-turn flare needs to be extended from approximately 36m to 150m in length and will carry right-turning traffic only. One extra flare needs to be added to the nearside for ahead traffic only so there are three lanes at the stopline for traffic from A33 West to A33 East. Accordingly a funnel (narrow down from three lanes to two) is required on A33 East exit to accommodate the eastbound traffic. Overall, Five lanes at the stopline of the A33 West approach are required with three for the ahead movement and the other two for left and right-turning traffic, respectively.

4.4.4 For Arm B (A33 East entry), an extra 120m flare is required on the nearside. This creates four lanes at the stopline. Traffic will be able to move westbound on lane 1 to lane 3 so accordingly an exit funnel is needed on A33 West exit. Overall, there are four lanes at the stopline of Arm B entry with lane 1 for ahead and left-turning traffic, lanes 2 and 3 for ahead movement, and lane 4 for right-turning traffic only.

4.4.5 Although the volume of traffic from Arm A (Thornhill Way) is hardly affected by Local Plan developments, some improvement is required to compensate the loss of green time for this arm as a result of increased traffic on the A33 mainline. This involves the extension of its current 60m flare by another 50m up to the upstream Thornhill Way / Reading Road roundabout so there are two full lanes (110m in length) approaching the stopline on Thornhill Way. With the proposed mitigation in place, the Thornhill Way / Reading Road roundabout would have a single lane circulatory feeding into 2 lanes on Thornhill Way. It is recommended that this should be looked at in detail with any future design to ensure it is safe for the road users and compliant with relevant design guidance. A visual inspection of the highway boundary confirms the recommended improvements unlikely to require any land take beyond the boundaries of the existing highway.

4.4.6 All the aforementioned highway improvements are illustrated in Figure 4.6.

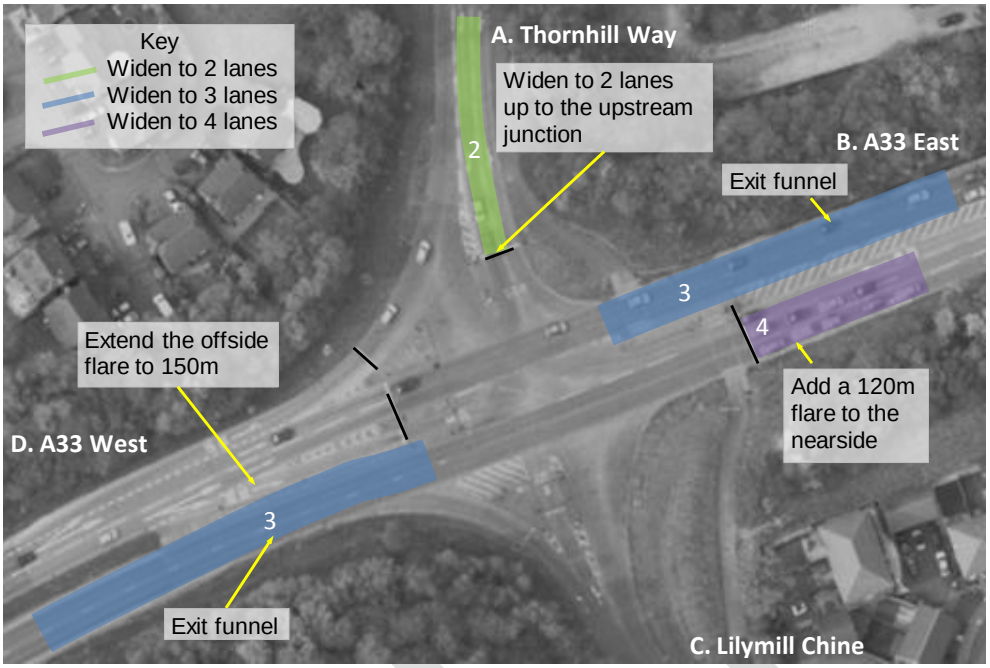


Figure 4.6 An Illustration of the Proposed Mitigation at Thornhill Way / A33 Junction

4.4.7 Table 4.11 below tabulates variations in the Degree of Saturation (DoS) resulting from different travel demand and the proposed mitigation measures. It is clear that the proposed highway improvements can significantly reduce traffic congestion on both A33 approaches. Many arms of the mitigated junction are forecasted to perform better in comparison to the Reference Case scenario. The only exception is Arm C Lilymill Chine, which was penalised due to loss of green time to accommodate the significant increase in travel demand on the A33 mainline. The DoS of Arm C is forecasted to worsen and can reach 90% in the AM. This is deemed acceptable in light of the significant congestion relief achieved for the entire junction as a whole.

Table 4.11 Degree of Saturation at Each Entry for Thornhill Way / A33 Junction

Time	Arms	2029 Reference Case (%)	Local Plan without mitigation (%)	Local Plan with mitigation (%)
AM	Arm A – Thornhill Way	85	101	85
	Arm B – A33 East	119	106	90
	Arm C – Lilymill Chine	35	109	90
	Arm D - A33 West	95	100	78
PM	Arm A – Thornhill Way	115	181	95
	Arm B – A33 East	89	106	93
	Arm C – Lilymill Chine	16	52	52
	Arm D - A33 West	113	155	96

4.4.8 Table 4.12 shows the cost estimates for the proposed improvements to Thornhill Way / A33 Junction. The estimates have been rounded and contain a contingency to take account of uncertainty at the concept design stage.

Table 4.12 Indicative Improvement Costs for Thornhill Way / A33 Junction

Thornhill Way / A33 Junction	Costs (£)
Site Clearance	23,821
Fencing	0
Pedestrian Guardrail etc	9,849
Drainage	98,276
Earthworks	85,520
Pavement	158,205
Kerbs & Footways	37,445
Signs & Markings (Inc Work to Traffic Lights)	35,362
Road Lighting Columns	36,013
Traffic Signals	86,000
Accommodation Works	0
Sub – Total	**570,491**
Preliminaries 7.5%	42,787
Traffic Management 20%	114,098
Sub – Total	**727,376**
Contingency / Risk 45%	327,319
Total £	**1,054,695**

4.5 Binfields Roundabout

4.5.1 This is presently a five-arm priority roundabout located on the A33. The traffic demand is shown in Figure 4.7, with and without the influence from the Local Plan developments. Table 4.13 and Table 4.14 also present detailed turning movements for the 2029 Reference Case and Local Plan Scenario 2 with Network A.

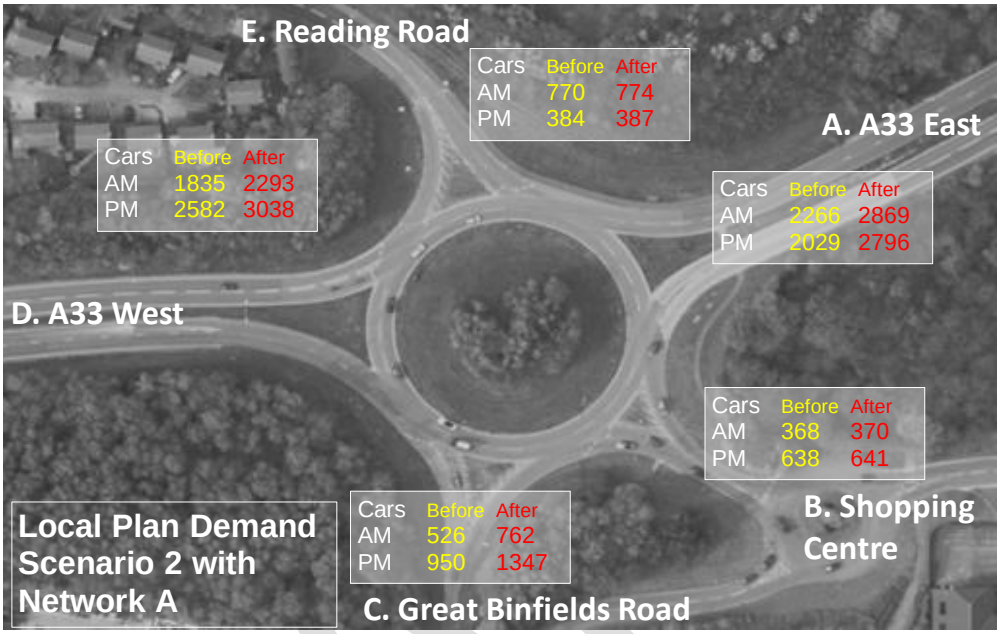


Figure 4.7 Demand at Binfields Roundabout with and without Local Plan Developments

4.5.2 It can be seen from Table 4.13 and Table 4.14 that the current key movements at this junction are between Arm A (A33 East) and Arm D (A33 West) in both the AM and PM peak hours. Similarly, the demand increases as a result of the Local Plan developments are primarily focused on the movements between Arms A and D.

Table 4.13 AM Demand at Binfields Roundabout in the AM Peak

	From / To	Arm A	Arm B	Arm C	Arm D	Arm E	Total
2029 Reference Case	Arm A – A33 East	0	66	450	1689	61	2266
	Arm B – Chineham District Centre	134	0	61	123	50	368
	Arm C – Great Binfields Road	190	51	0	225	60	526
	Arm D – A33 West	1329	195	184	0	127	1835
	Arm E – Reading Road	19	65	257	429	0	770
	Total	1672	377	952	2466	298	5765
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Arm E**	**Total**
Local Plan Scenario 2 Network A	Arm A – A33 East	0	67	674	2067	61	2869
	Arm B – Chineham District Centre	135	0	61	124	50	370
	Arm C – Great Binfields Road	425	51	0	226	60	762
	Arm D – A33 West	1784	196	185	0	128	2293
	Arm E – Reading Road	19	65	259	431	0	774
	Total	2363	379	1179	2848	299	7068

Table 4.14 PM Demand at Binfields Roundabout in the PM Peak

	From / To	Arm A	Arm B	Arm C	Arm D	Arm E	Total
2029 Reference Case	Arm A – A33 East	0	138	300	1539	52	2029
	Arm B – Chineham District Centre	302	0	35	250	51	638
	Arm C – Great Binfields Road	450	198	0	129	173	950
	Arm D – A33 West	1609	148	683	0	142	2582
	Arm E – Reading Road	8	52	154	170	0	384
	Total	2369	536	1172	2088	418	6583
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Arm E**	**Total**
Local Plan Scenario 2 Network A	Arm A – A33 East	0	139	599	2006	52	2796
	Arm B – Chineham District Centre	303	0	35	252	51	641
	Arm C – Great Binfields Road	844	200	0	129	174	1347
	Arm D – A33 West	2060	148	687	0	143	3038
	Arm E – Reading Road	8	53	155	171	0	387
	Total	3215	540	1476	2558	420	8209

4.5.3 With the predicted level of demand growth, the junction is forecasted to experience significant congestion even in the 2029 Reference Case Scenario, particularly on both A33 entries. It is considered that the current form of the junction, a priority-controlled roundabout, will not be able to cope with the forecasted traffic volumes in the future. In order to improve the operation of the junction it is proposed to install traffic signal control on all entries.

4.5.4 Two options for providing additional capacity at Binfields roundabout have been explored to address the forecasted traffic growth. The two options are:

- Option A - Retain the existing roundabout layout, widening the entry and circulatory carriageway to three or four lanes where appropriate.
- Option B - Separate the A33 traffic from other movements using a 'through-about' to provide dedicated capacity for east and westbound vehicles using the A33.

4.5.5 Signalising the existing roundabout layout (Option A) is expected to be less expensive to implement, but will not fully accommodate the anticipated traffic under the forecasted demand increase as a result of the Local Plan. The modelling results presented below and in Appendix C suggest that the 'through-about' (Option B) should provide sufficient capacity and is more effective in reducing queuing and delays, although a higher cost is expected.

4.5.6 The provision of additional capacity from the 'through-about' option would only be meaningful if the forecasted travel demand from the upstream junction on the A33 mainline can arrive during the modelled hour and the downstream junction on the A33 can accommodate the higher demand released from Binfields Roundabout. This assumption is only true if a coordinated strategy for the A33 is developed to address any bottlenecks at all junctions along the A33. One obstacle to this corridor approach is likely to be the proximity of the abutments for the railway viaduct to the edge of the carriageway immediately east of Crockford Lane Roundabout. This roundabout is the next junction on the A33 to the south of Binfields Roundabout and will be discussed in detail in the next section.

4.5.7 In light of the above analysis, only Option A (signalised roundabout) is explored and costed in this study. Modelling results for Option B are reported for comparison purpose only.

4.5.8 The proposed scheme to signalise the roundabout requires the following changes to the existing infrastructure:

- A33 East; Provide two additional lanes on the entry (70m flare increasing from 2 to 4) and an exit funnel (3 lanes to 2 lanes).
- Chineham District Centre; Extend existing flare to 35m.
- Great Binfields Road; An additional lane (70m flare) on the entry and an exit funnel (2 lanes to 1 lane).
- A33 West; Two additional lanes (90m flare) on the A33 West entry (increasing from 2 to 4) and an exit funnel (3 lanes to 2 lanes).
- Reading Road; An additional lane (40m flare) on the entry.
- Circulatory carriageway; An extra lane on the circulatory at the A33 West entry; Two extra lanes on the circulatory at Reading Road entry to accommodate the increased right-turn volume from Great Binfields Road to A33 East in the evening peak.

4.5.9 A visual inspection of the highway boundary confirms the recommended improvements unlikely to require any land take beyond the boundaries of the existing highway. These proposed highway improvements are illustrated in Figure 4.8.

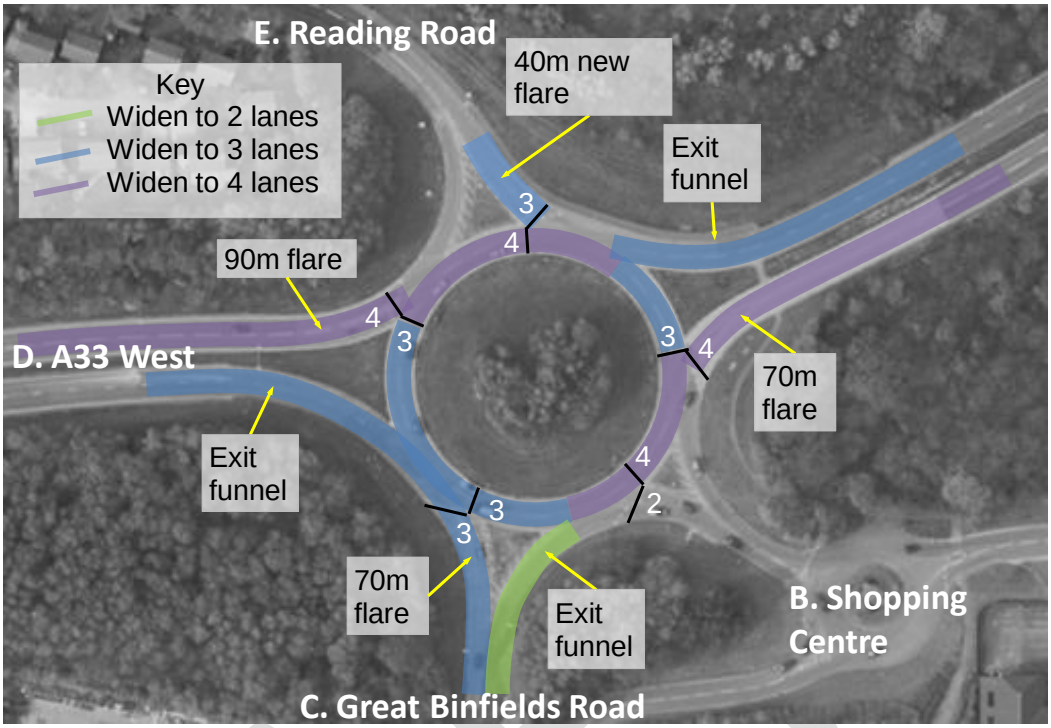


Figure 4.8 An Illustration of the Proposed Mitigation at Binfields Roundabout (Option A)

4.5.10 Table 4.15 below shows variations in the Degree of Saturation (DoS) resulting from different travel demand scenarios and the first proposed mitigation option to convert the roundabout to traffic signal control.

Table 4.15 Modelled Degree of Saturation at Each Entry at Binfields Roundabout – Option A

Time	Arms	2029 Reference Case (%)	Local Plan without mitigation (%)	Local Plan with mitigation (%)
AM	Arm A – A33 East	121	139	80
	Arm B – Chineham District Centre	110	119	50
	Arm C – Great Binfields Road	78	108	82
	Arm D – A33 West	97	122	96
	Arm E – Reading Road	94	116	71
PM	Arm A – A33 East	129	158	104
	Arm B – Chineham District Centre	162	191	91
	Arm C – Great Binfields Road	128	169	93
	Arm D – A33 West	124	145	101
	Arm E – Reading Road	59	64	59

4.5.11 Table 4.16 below shows variations in the Degree of Saturation (DoS) resulting from different travel demand scenarios and the second proposed mitigation option to alter the roundabout to incorporate a 'Through-about' layout in addition to full traffic signal control (Option B).

Table 4.16 Modelled Degree of Saturation at Each Entry at Binfields Roundabout – Option B

Time	Arms	2029 Reference Case (%)	Local Plan without mitigation (%)	Local Plan with 'through-about' Option (%)
AM	Arm A – A33 East	121	139	83
	Arm B – Chineham District Centre	110	119	59
	Arm C – Great Binfields Road	78	108	59
	Arm D – A33 West	97	122	78
	Arm E – Reading Road	94	116	53
PM	Arm A – A33 East	129	158	87
	Arm B – Chineham District Centre	162	191	77
	Arm C – Great Binfields Road	128	169	71
	Arm D – A33 West	124	145	98
	Arm E – Reading Road	59	64	78

4.5.12 Table 4.17 shows the cost estimates for the proposed improvements this junction. The estimates have been rounded and contain a contingency to take account of uncertainty at the concept design stage.

Table 4.17 Indicative Improvement Costs for Binfields Roundabout – Signalised Roundabout Option A

Binfields Roundabout	Costs (£)
Site Clearance	38,436
Fencing	0
Pedestrian Guardrail etc	15,892
Drainage	158,575
Earthworks	137,992
Pavement	304,087
Kerbs & Footways	60,419
Signs & Markings (Inc Work to Traffic Lights)	57,059
Road Lighting Columns	58,109
Traffic Signals	247,500
Sub – Total	**1,078,069**
Preliminaries 7.5%	80,855
Traffic Management 20%	215,614
Sub – Total	**1,374,538**
Contingency / Risk 45%	618,542
Total £	**1,993,080**

4.6 Crockford Roundabout

4.6.1 This is currently a four-arm priority roundabout located on the A33. The traffic demand is shown in Figure 4.9, with and without the influence from the Local Plan developments. Table 4.18 and Table 4.19 also present detailed turning movements at this junction for the 2029 Reference Case and Local Plan Scenario 2 with Network A.

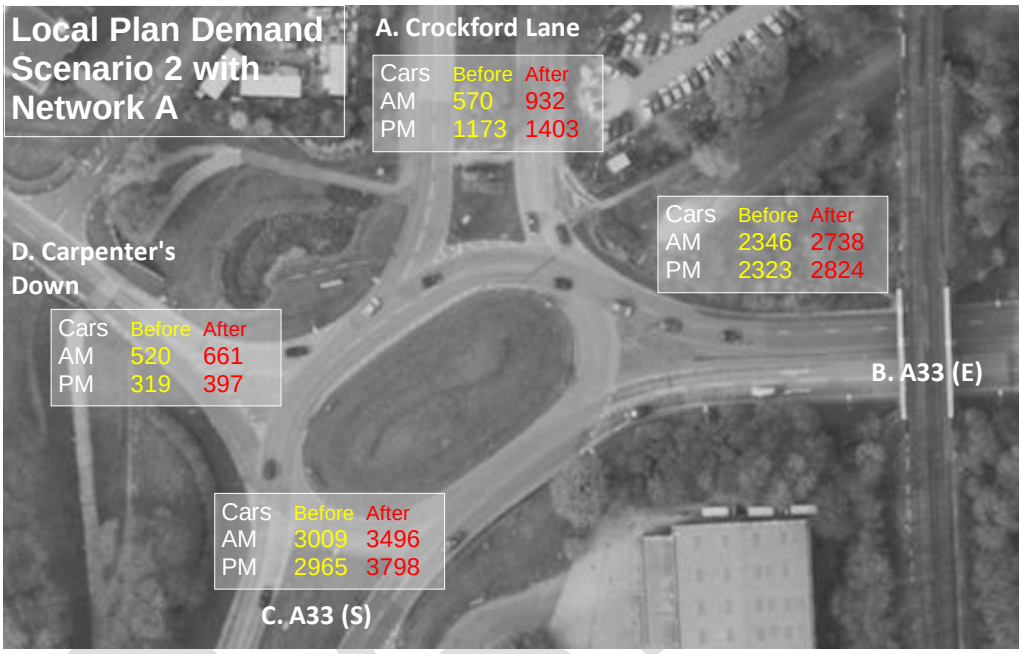


Figure 4.9 Demand at Crockford Roundabout with and without Local Plan Developments

4.6.2 It can be seen from Table 4.13 and Table 4.14 that the current key movements at this junction are between Arm B (A33 East) and Arm C (A33 South) in both the AM and PM peak. Similarly, the demand increases as a result of the Local Plan developments are primarily focused on the movements between Arms B and C.

Table 4.18 AM Demand at Crockford Roundabout by Turns

	From / To	Arm A	Arm B	Arm C	Arm D	Total
2029 Reference Case	Arm A – Crockford Lane	0	74	430	66	570
	Arm B – A33 East	269	0	835	1242	2346
	Arm C – A33 South	1236	1710	0	63	3009
	Arm D – Carpenter's Down	93	152	275	0	520
	Total	1598	1936	1540	1371	6445
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Total**
Local Plan Scenario 2 Network A	Arm A – Crockford Lane	0	176	689	66	932
	Arm B – A33 East	304	0	1177	1258	2738
	Arm C – A33 South	1329	2035	34	98	3496
	Arm D – Carpenter's Down	94	182	385	0	661
	Total	1726	2394	2285	1422	7827

Table 4.19 PM Demand at Crockford Roundabout by Turns

	From / To	Arm A	Arm B	Arm C	Arm D	Total
2029 Reference Case	Arm A – Crockford Lane	0	137	945	90	1173
	Arm B – A33 East	333	0	547	1443	2323
	Arm C – A33 South	318	2436	0	211	2965
	Arm D – Carpenter's Down	31	134	154	0	319
	Total	682	2706	1647	1744	6779
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Total**
Local Plan Scenario 2 Network A	Arm A – Crockford Lane	0	194	1118	91	1403
	Arm B – A33 East	428	0	916	1480	2824
	Arm C – A33 South	555	2818	106	318	3798
	Arm D – Carpenter's Down	31	152	215	0	397
	Total	1014	3164	2355	1889	8422

4.6.3 The significant increase in travel demand on A33 mainline requires highway improvements on entries from both directions.

4.6.4 For Arm B (A33 East), a third lane is required at the stop line to accommodate the forecast traffic volume for both peak periods of the Local Plan Scenario 2. The provision of this third lane beyond a 35m flare is obstructed by the proximity of the south abutment for the adjacent railway viaduct to the existing carriageway. This inhibits the provision of sufficient capacity on the A33 East approach in either tested peak period.

4.6.5 The proposed scheme to signalise the roundabout requires the following changes to the existing infrastructure:

- Crockford Lane – provide an additional lane at the stop line via a 230m flare (increasing from two lanes to three lanes).
- A33 East – provide an additional lane at the stop line via a 35m flare (increasing from two lanes to three lanes).
- A33 South – widen 330m of the A33 northbound carriageway from two lanes to three, providing an additional lane from the preceding junction with Popley Way.
- Carpenter's Down – provide an exit funnel from two lanes down to one.

4.6.6 A visual inspection of the highway boundary confirms the recommended improvements unlikely to require any land take beyond the boundaries of the existing highway. These proposed highway improvements are illustrated in Figure 4.10.

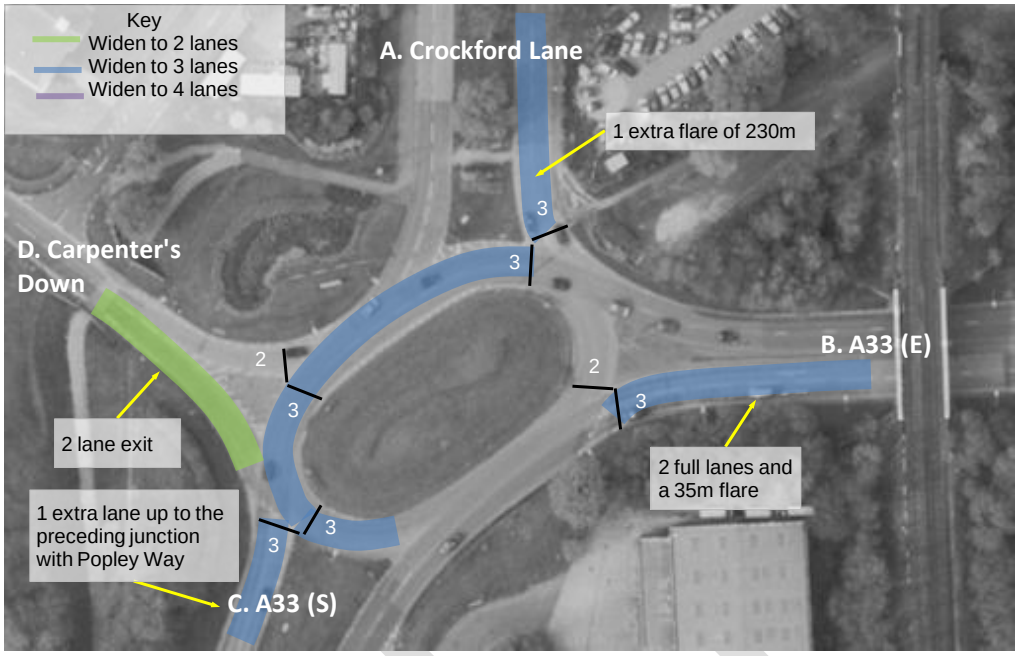


Figure 4.10 An Illustration of the Proposed Mitigation at Crockford Roundabout

4.6.7 Table 4.20 below shows variations in the Degree of Saturation (DoS) resulting from different travel demand scenarios and the first proposed mitigation option to convert the roundabout to traffic signal control.

Table 4.20 Modelled Degree of Saturation at Each Entry at Crockford Roundabout

Time	Arms	2029 Reference Case (%)	Local Plan without mitigation (%)	Local Plan with mitigation (%)
AM	Arm A – Crockford Lane	40	74	81
	Arm B – A33 East	147	204	129
	Arm C – A33 South	248	248	112
	Arm D – Carpenter's Down	78	116	94
PM	Arm A – Crockford Lane	92	118	126
	Arm B – A33 East	182	234	125
	Arm C – A33 South	240	278	132
	Arm D – Carpenter's Down	46	64	96

4.6.8 Table 4.21 shows the cost estimates for the proposed improvements this junction. The estimates have been rounded and contain a contingency to take account of uncertainty at the concept design stage.

Table 4.21 Indicative Improvement Costs for Crockford Roundabout

Crockford Roundabout	Costs (£)
Site Clearance	37,058
Fencing	0
Pedestrian Guardrail etc	15,323
Drainage	152,888
Earthworks	199,897
Pavement	260,460
Kerbs & Footways	58,253
Signs & Markings (Inc Work to Traffic Lights)	55,013
Road Lighting Columns	56,025
Traffic Signals	198,000
Sub – Total	**1,032,917**
Preliminaries 7.5%	77,469
Traffic Management 20%	206,583
Sub – Total	**1,316,969**
Contingency / Risk 45%	592,636
Total £	**1,909,605**

4.7 A30 / Wallop Drive Roundabout

This is a three arm give-way roundabout located on the A30 to the south-west of Basingstoke. Figure 4.11 shows Reference Case and Local Plan demand (Scenario 2 Network A) on each entry arm, whilst

4.7.1 Table 4.22 and Table 4.23 show the full turning demand at the junction.

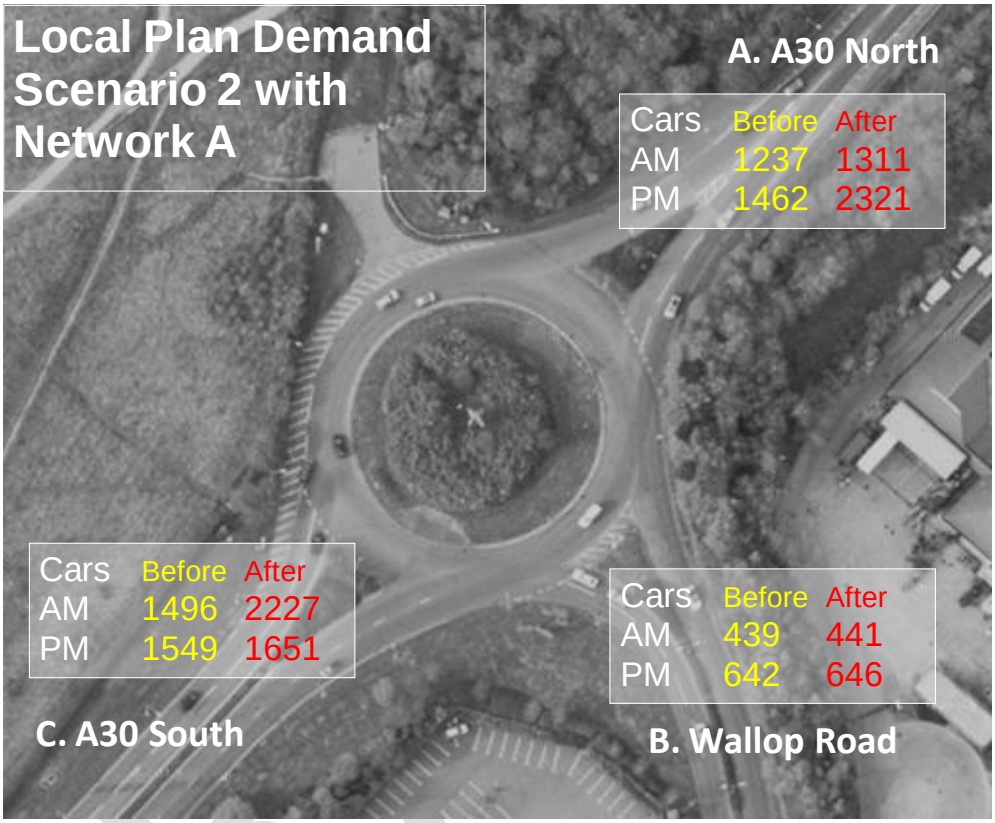


Figure 4.11: Demand at A30 / Wallop Drive Roundabout with and without Local Plan Developments

Table 4.22 AM Demand at A30 / Wallop Drive Roundabout by Turns

	From / To	Arm A	Arm B	Arm C	Total
2029 Reference Case	Arm A - A30 E	2	173	1062	1237
	Arm B - Wallop Drive	80	2	357	439
	Arm C - A30 W	1238	209	49	1496
	Total	1320	384	1468	3172
	From / To	**Arm A**	**Arm B**	**Arm C**	**Total**
Local Plan Scenario 2 Network A	Arm A - A30 E	2	174	1135	1311
	Arm B - Wallop Drive	80	2	359	441
	Arm C - A30 W	1967	211	49	2227
	Total	2049	387	1543	3653

Table 4.23 PM Demand at A30 / Wallop Drive Roundabout by Turns

	From / To	Arm A	Arm B	Arm C	Total
2029 Reference Case	Arm A - A30 E	2	324	1136	1462
	Arm B - Wallop Drive	286	50	306	642
	Arm C - A30 W	1095	413	41	1549
	Total	1383	787	1483	3979
	From / To	**Arm A**	**Arm B**	**Arm C**	**Total**
Local Plan Scenario 2 Network A	Arm A - A30 E	2	326	1993	2321
	Arm B - Wallop Drive	288	50	308	646
	Arm C - A30 W	1195	415	41	1651
	Total	1485	791	2342	4618

It is clear from

4.7.2 Table 4.22 and Table 4.23 that the major movement through the junction is the mainline traffic on the A30. This movement is also where the most significant increase in travel demand is forecasted to occur in the Local Plan scenario.

4.7.3 Modelling results suggest that the demand increase on both A30 arms would lead to significant queuing and congestion on Arm C A30 West in the AM peak hour and Arm A A30 East in the PM peak hour in the Local Plan scenario. In order to mitigate the adverse traffic impacts, the following junction improvements are proposed. A visual check has been undertaken, which confirmed that all proposed improvements can be accommodated within existing highway boundaries.

- Convert the roundabout to a signalised T-junction that is more suitable to handle imbalanced flows during the modelled peak hours
- Widen the A30 southbound carriageway only between Kempshott roundabout and Wallop Drive (approximately 750m) to include two southbound lanes. The existing highway currently is hashed out along both sides of the carriageway so there may be sufficient space within the existing carriageway width without physical widening. This is required in order to accommodate the southbound PM peak hour flow of 2321 PCU.
- A 86m flare on the A30 North entry arm to create three lanes at the stopline
- A two lane exit funnel on the A30 North exit arm in order to accommodate two lanes of exiting flow from the A30 south

4.7.4 No changes are proposed for the A30 south and Wallop Drive arms except the work relating to the conversion of the roundabout to a signalised T-junction. A diagram of this proposal is shown in Figure 4.12.

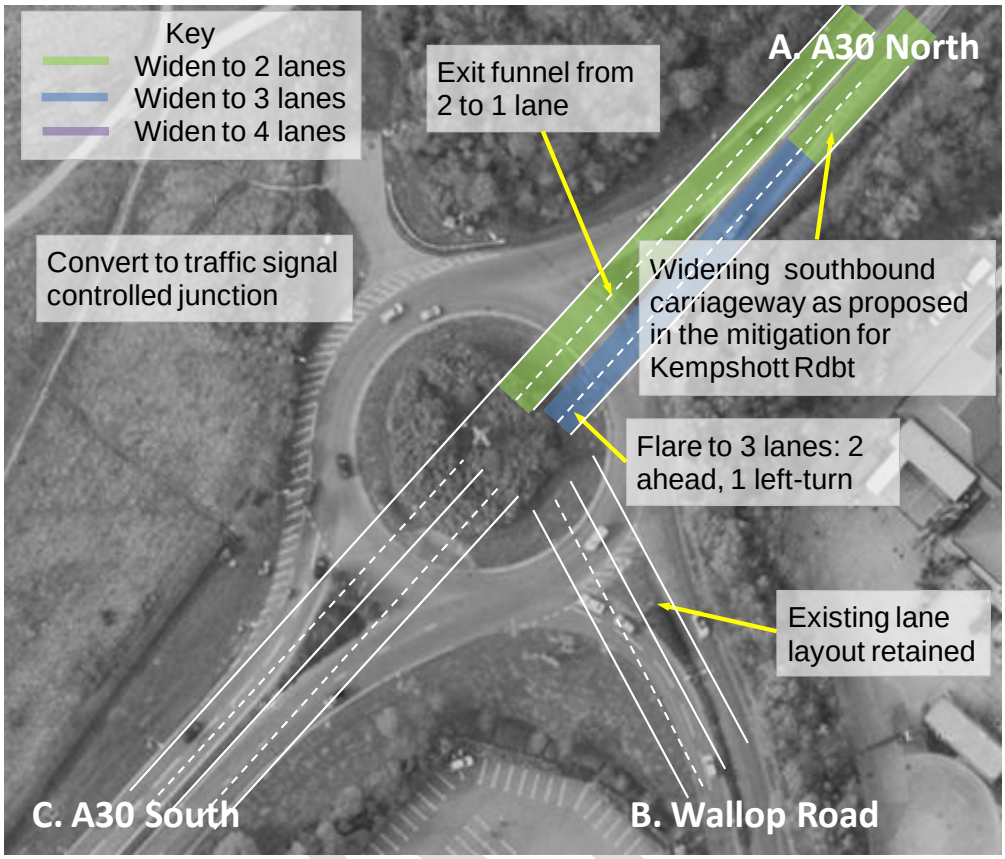


Figure 4.12 An Illustration of the Proposed Mitigation at A30 / Wallop Drive Roundabout

4.7.5 Table 4.24 below shows the variations in Degree of Saturation (DoS) resulting from different travel demand and the proposed mitigation measures. The Local Plan developments produce a large increase in traffic using the A30 (A30 west entry in the AM peak and A30 East entry in the PM peak) compared to the Reference Case. The mitigation proposals have achieved a more balanced performance for the junction as a whole. Clear improvements on both A30 arms, where the heaviest traffic movements occur, in terms of the reduction of queuing and delay are also observed in the modelling results presented in Appendix C.

Table 4.24 Degree of Saturation at Each Entry for A30 / Wallop Drive Roundabout

Time	Arm	2029 Ref Case (%)	Local Plan without mitigation (%)	Local Plan with mitigation (%)
AM	Arm A - A30 E	65.0	68.2	69.5
	Arm B - Wallop Drive	35.4	36.7	61.3
	Arm C - A30 W	75.1	111.8	84.1
PM	Arm A - A30 E	83.6	132.8	99.8
	Arm B - Wallop Drive	53.4	64.9	103.6
	Arm C - A30 W	84.6	90.2	100.0

4.7.6 Table 4.25 shows the cost estimates for the proposed improvements to the A30 / Wallop Drive Roundabout. The estimates have been rounded and contain a contingency to take account of uncertainty at the concept design stage. It should be noted that the estimated cost for widening the southbound carriageway of the A30 between Kempshott Roundabout and this junction is summarised separately in Table 4.26.

Table 4.25 Indicative Improvement Costs for A30 / Wallop Drive Roundabout

A30 / Wallop Drive Roundabout	Costs (£)
Site Clearance	50,873
Fencing	0
Pedestrian Guardrail etc	21,035
Drainage	209,884
Earthworks	253,345
Pavement	319,431
Kerbs & Footways	79,969
Signs & Markings (Inc Work to Traffic Lights)	75,521
Road Lighting Columns	76,911
Traffic Signals	108,900
Planting etc.	27,500
Sub – Total	**1,223,369**
Preliminaries 7.5%	91,753
Traffic Management 20%	244,674
Sub – Total	**1,559,795**
Contingency / Risk 45%	701,908
Total £	**2,261,703**

4.7.7 The purpose of the aforementioned proposal is solely to demonstrate that traffic impacts from the Local Plan development can be mitigated within the highway boundary at reasonable costs. It should be noted that the exact form of these improvements should be investigated in further detail in any future design. Particular consideration should be given to the sufficiency of access to existing business via Wallop Drive, especially during the time periods that are not explicitly investigated in this study. The estimates have been rounded and contain a contingency to take account of uncertainty at the preliminary design stage.

Table 4.26 Indicative Improvement Costs for Widening the A30 Southbound Carriageway between Kempshott Roundabout and Wallop Drive Roundabout

A30 Widening	Costs (£)
Site Clearance	128,085
Fencing	37,000
Pedestrian Guardrail/Safety Fence	119,561
Drainage	637,743
Earthworks	678,222
Pavement	733,099
Kerbs & Footways	201,344
Signs & Markings (Inc Work to Traffic Lights)	190,145
Road Lighting Columns	193,645
Traffic Signals	0
Accommodation Works/Planting	50,000
Sub – Total	**2,968,844**
Preliminaries 7.5%	222,663
Traffic Management 20%	593,769
Sub – Total	**3,785,276**
Contingency / Risk 45%	1,703,374
Total £	**5,488,650**

4.8 Kempshott Roundabout

4.8.1 This is a four arm priority roundabout located on the A30, a key strategic route in and out of Basingstoke. It is less than 800m upstream of the A30 / Wallop Drive junction discussed in the previous section of this report. Figure 4.13 shows the Reference Case and Local Plan demand on each entry arm whilst Table 4.27 and Table 4.28 show the full turning demand.

Figure 4.13 Demand at Kempshott Roundabout with and without Local Plan Developments

Table 4.27 AM Demand at Kempshott Roundabout by Turns

	From / To	Arm A	Arm B	Arm C	Arm D	Total
2029 Reference Case	Arm A – A30 North	3	104	751	63	921
	Arm B – Woodbury Rd	503	0	112	337	952
	Arm C –A30 South	1206	9	1	241	1457
	Arm D – Heather Way	216	154	391	4	765
	Total	1928	267	1255	645	4095
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Total**
Local Plan Scenario 2 Network A	Arm A – A30 North	3	104	795	63	965
	Arm B – Woodbury Rd	506	0	113	339	958
	Arm C –A30 South	1902	9	1	418	2330
	Arm D – Heather Way	217	154	421	4	796
	Total	2628	267	1330	824	5049

Table 4.28 PM Demand at Kempshott Roundabout by Turns

	From / To	Arm A	Arm B	Arm C	Arm D	Total
2029 Reference Case	Arm A – A30 North	4	337	1312	139	1792
	Arm B – Woodbury Rd	183	0	25	160	368
	Arm C –A30 South	836	55	2	498	1391
	Arm D – Heather Way	101	215	325	0	641
	Total	1124	607	1664	797	4192
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Total**
Local Plan Scenario 2 Network A	Arm A – A30 North	4	339	2066	140	2549
	Arm B – Woodbury Rd	184	0	25	161	370
	Arm C –A30 South	892	55	2	541	1490
	Arm D – Heather Way	102	216	661	0	979
	Total	1182	610	2754	842	5388

4.8.2 It is clear from Table 4.27 and Table 4.28 that the major movement through the junction is the mainline traffic on the A30 between Arms A and C. This movement is also where the most significant increase in travel demand is forecasted to occur in the Local Plan scenario. In order to mitigate the junction it is proposed to:

- Fully signalise the roundabout
- Widen the circulatory carriageway from 2 lanes to 3, except between A30 South and Heather Way entry which requires widening from 1 to 2
- Extend the flares on the A30 North, Woodbury Road and Heather Way entry arms
- Add a flare to the A30 south entry arm
- Widen a 750m stretch of the A30 southbound carriageway from one to two lanes between this junction and the downstream Wallop Drive Roundabout to accommodate the PM peak hourly traffic of 2754 PCUs (this is already proposed as part of the mitigation for the A30 / Wallop Drive Roundabout. The estimated cost for this element of improvement is already summarised in Table 4.26.)

4.8.3 A visual check has been undertaken, which confirmed that all proposed improvements can be accommodated within existing highway boundaries. A diagram of this proposal is shown in Figure 4.14.

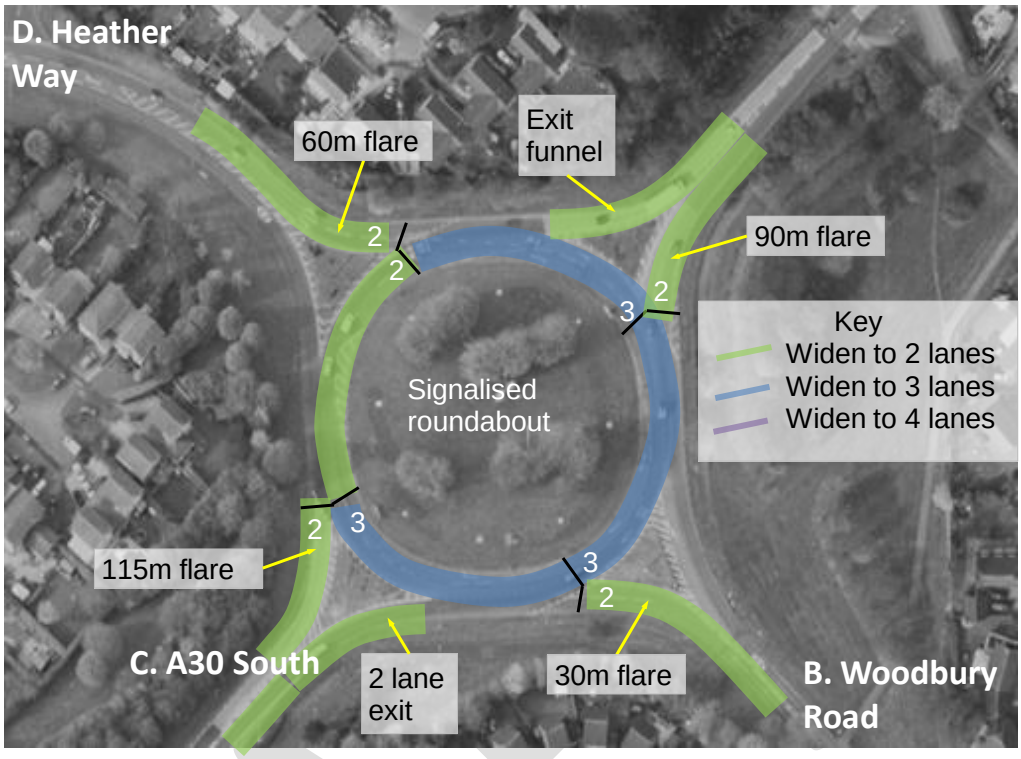


Figure 4.14 An Illustration of the Proposed Mitigation at Kempshott Roundabout

4.8.4 Table 4.29 below shows the variations in Degree of Saturation (DoS) resulting from different travel demand and the proposed mitigation measures. In the AM peak, although the A30 South remains over capacity with a DoS value of 111%, the proposed mitigation is forecasted to reduce the DoS on all entry arms to below the levels in the Reference Case. In the PM peak the proposed mitigation improves performance considerably and the junction is forecasted to operate at a similar level of performance to that in the Reference Case. The most noticeable improvements are on the A30 North and A30 South entry arms.

Table 4.29 Degree of Saturation at Each Entry for Kempshott Roundabout

Time	Arm	2029 Ref Case (%)	Local Plan without mitigation (%)	Local Plan with mitigation (%)
AM	Arm A – A30 North	60.3	63.7	47.3
	Arm B – Woodbury Rd	84.0	87.1	80.4
	Arm C –A30 South	158.3	253.7	110.6
	Arm D – Heather Way	67.3	69.7	88.5
PM	Arm A – A30 North	118.3	187.4	125.3
	Arm B – Woodbury Rd	37.6	43.6	54.6
	Arm C –A30 South	126.5	133.5	71.1
	Arm D – Heather Way	48.8	74.7	82.3

4.8.5 Table 4.4 shows the cost estimates for the proposed improvements to the Kempshott Roundabout. The estimates have been rounded and contain a contingency to take account of uncertainty at the concept design stage. Please note that the estimated cost for the aforementioned widening a stretch of the A30 is not included and has been reported in Table 4.26.

Table 4.30 Indicative Improvement Costs for Kempshott Roundabout

Kempshott Roundabout	Costs (£)
Site Clearance	100,789
Fencing	0
Pedestrian Guardrail/Safety Fence	41,674
Drainage	415,825
Earthworks	361,851
Pavement	543,957
Kerbs & Footways	158,436
Signs & Markings (Inc Work to Traffic Lights)	149,624
Road Lighting Columns	152,378
Traffic Signals	165,000
Accommodation Works/Planting	0
Sub – Total	**2,089,534**
Preliminaries 7.5%	156,715
Traffic Management 20%	417,907
Sub – Total	**2,664,156**
Contingency / Risk 45%	1,198,870
Total £	**3,863,026**

4.9 Brighton Hill Roundabout

4.9.1 This is a six arm priority controlled roundabout in the south-west of Basingstoke. Figure 4.15 shows reference case and Local Plan demand on each entry arm, whilst Table 4.31 and Table 4.32 show the full turning demand.

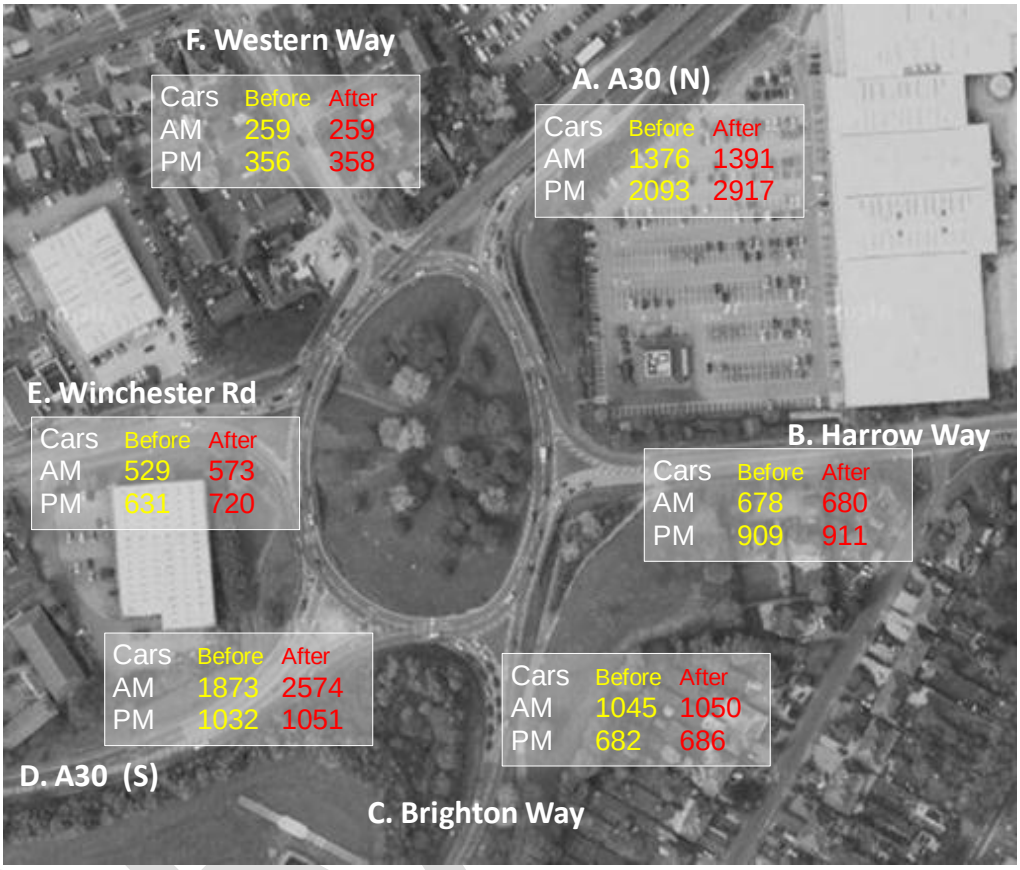


Figure 4.15 Demand at Brighton Hill Roundabout with and without Local Plan Developments

Table 4.31 AM Demand at Brighton Hill Roundabout by Turns

	From / To	Arm A	Arm B	Arm C	Arm D	Arm E	Arm F	Total
2029 Reference Case	Arm A – A30 North	0	304	347	402	191	132	1376
	Arm B –Harrow Way	393	2	50	113	80	40	678
	Arm C – Brighton Way	478	174	0	130	147	116	1045
	Arm D – A30 South	1071	411	190	0	35	166	1873
	Arm E – Winchester Rd	223	142	64	87	0	13	529
	Arm F – Western Way	57	66	48	53	35	0	259
	Total	2222	1099	699	785	488	467	5760
	From / To	**Arm A**	**Arm B**	**Arm C**			**Arm D**	**Total**
Local Plan Scenario 2 Network A	Arm A – A30 North	0	305	349	413	192	132	1391
	Arm B –Harrow Way	394	2	50	114	80	40	680
	Arm C – Brighton Way	480	175	0	130	148	117	1050
	Arm D – A30 South	1686	418	191	0	112	167	2574
	Arm E – Winchester Rd	257	142	65	96	0	13	573
	Arm F – Western Way	57	66	48	53	35	0	259
	Total	2874	1108	703	806	567	469	6527

Table 4.32 PM Demand at Brighton Hill Roundabout by Turns

	From / To	Arm A	Arm B	Arm C	Arm D	Arm E	Arm F	Total
2029 Reference Case	Arm A – A30 North	0	338	439	1004	257	55	2093
	Arm B –Harrow Way	289	0	51	405	129	35	909
	Arm C – Brighton Way	286	71	0	89	162	74	682
	Arm D – A30 South	543	118	152	0	91	128	1032
	Arm E – Winchester Rd	244	103	93	161	0	30	631
	Arm F – Western Way	45	61	70	133	47	0	356
	Total	1407	691	805	1792	686	322	5703
	From / To	**Arm A**	**Arm B**	**Arm C**			**Arm D**	**Total**
Local Plan Scenario 2 Network A	Arm A – A30 North	0	338	441	1672	410	56	2917
	Arm B –Harrow Way	289	0	51	406	130	35	911
	Arm C – Brighton Way	288	71	0	90	163	74	686
	Arm D – A30 South	559	119	153	0	91	129	1051
	Arm E – Winchester Rd	246	103	94	247	0	30	720
	Arm F – Western Way	45	61	71	134	47	0	358
	Total	1427	692	810	2549	841	324	6643

4.9.2 The key movements through Brighton Hill roundabout are between the A30 North (Arm A) and the A30 South (Arm D). This movement is large in the northbound direction in the AM peak and in the southbound direction in the PM peak. A large proportion of the growth in traffic resulting from the Local Plan developments uses these movements too.

4.9.3 With the predicted level of growth, the junction is forecasted to experience significant congestion, even in the 2029 Reference Case, on a number of different arms in the AM and PM peak hours, respectively. Following a concept design provided by BDBC in April 2013, it is proposed to improve the operation of the junction by converting it to a signalised 'Hamburger' junction, with a segregated movement for traffic on the A30 northbound and southbound through the centre of the roundabout. A few minor amendments to the design received from BDBC were made in order to accommodate the forecasted traffic patterns and volume of traffic as a result of the Local Plan development.

4.9.4 To enable this junction to work efficiently the circulatory carriageway would require widening from 2 lanes to 3, except between the Winchester Rd (Arm E) and Western Way (Arm F) entries which will require an additional flare widening the stopline at Western Way entry to four lanes. One of the three lanes on the circulatory at the Harrow Way (Arm B) and Brighton Way (Arm C) entries is a also a flare.

4.9.5 The Western Way entry arm (Arm F) would require widening to two full lanes from the upstream junction with Buckland Avenue which is approximately 110m of carriageway.

4.9.6 A visual check has been undertaken, which confirmed that all proposed improvements can be accommodated within existing highway boundaries.

4.9.7 An illustration of this proposed mitigation is shown in Figure 4.16.

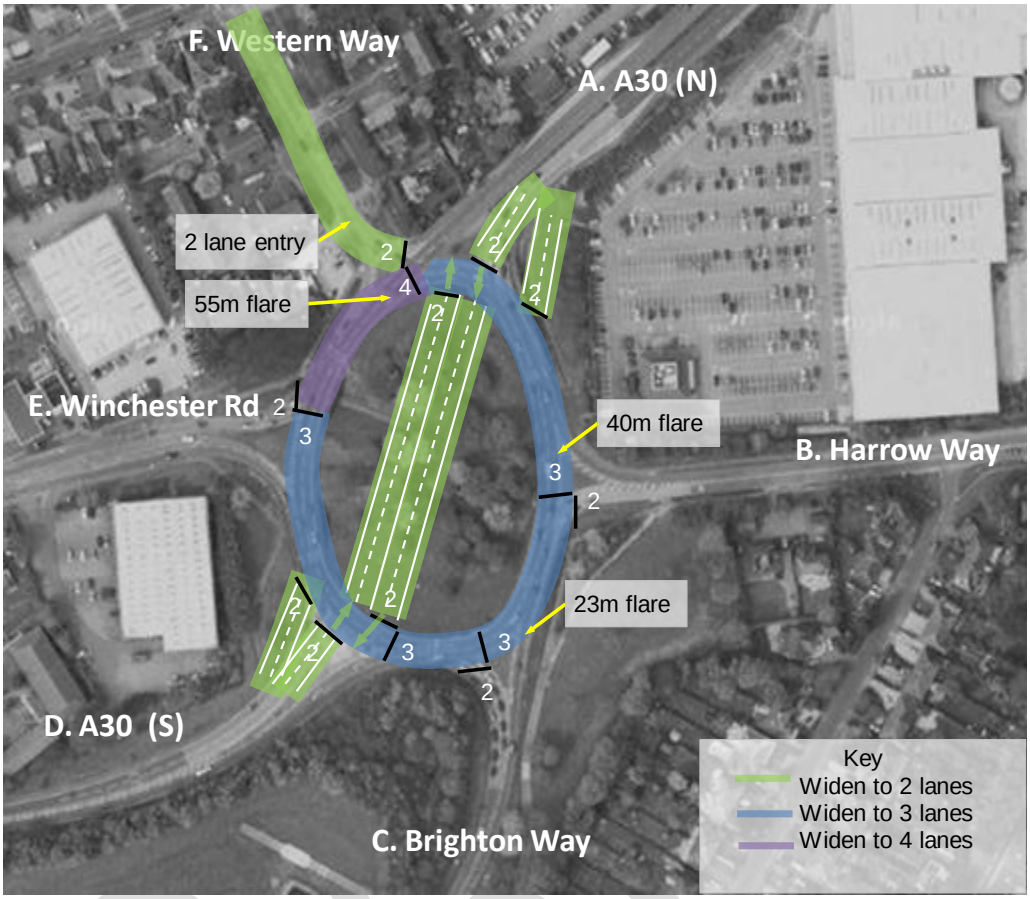


Figure 4.16 An Illustration of the Proposed Mitigation at Brighton Hill Roundabout

4.9.8 Table 4.29 below shows the variations in Degree of Saturation (DoS) resulting from different travel demand and the proposed mitigation measures. The demand at the original priority roundabout layout significantly exceeded the capacity to the extent that the modelling results suggest there are few opportunities for traffic from Arm F (AM) and Arm C (PM for Local Plan scenario without mitigation) to enter the roundabout. In both cases, this is a direct result of the large amount of traffic on the A30 heading northbound in the AM peak and southbound in the PM peak. The proposed design alleviates these problems, allowing traffic to enter from all arms and noticeably reducing the queuing and delay on all arms.

Table 4.33 Degree of Saturation at Each Entry for Brighton Hill Roundabout

Time	Arm	2029 Ref Case (%)	Local Plan without mitigation (%)	Local Plan with mitigation (%)
AM	Arm A – A30 North	77.3	72.3	108.5
	Arm B –Harrow Way	61.4	61.0	63.5
	Arm C – Brighton Way	140.8	147.0	85.9
	Arm D – A30 South	145.7	196.5	98.5
	Arm E – Winchester Rd	157.5	158.5	84.3
	Arm F – Western Way	-	-	106.0
PM	Arm A – A30 North	132.2	189.6	115.2
	Arm B –Harrow Way	146.6	163.7	96.8
	Arm C – Brighton Way	881.9	-	101.8
	Arm D – A30 South	46.2	44.8	59.3
	Arm E – Winchester Rd	45.5	49.8	112.0
	Arm F – Western Way	136.8	176.4	107.8

4.9.9 Table 4.34 shows the cost estimates for the proposed improvements to the Brighton Hill Roundabout. The estimates have been rounded and contain a contingency to take account of uncertainty at the concept design stage.

Table 4.34 Indicative Improvement Costs for Brighton Hill Roundabout

Brighton Hill Roundabout	Costs (£)
Site Clearance	107,867
Fencing	12,375
Pedestrian Guardrail etc	44,601
Drainage	445,025
Earthworks	575,228
Pavement	668,768
Kerbs & Footways	169,561
Signs & Markings (Inc Work to Traffic Lights)	160,130
Road Lighting Columns	163,078
Traffic Signals	499,125
Planting & Accommodation Works	110,000
Sub – Total	**2,955,758**
Preliminaries 7.5%	221,682
Traffic Management 20%	591,152
Sub – Total	**3,768,591**
Contingency / Risk 45%	1,695,866
Total £	**5,464,458**

4.10 Hackwood Road Roundabout

4.10.1 This is a four arm priority controlled roundabout on the southern part of the Ringway. Figure 4.13 shows demand on each entry arm in the 2029 Reference Case and Local Plan Scenario 2 with Network A, whilst Table 4.35 and Table 4.36 show the full turning demand.

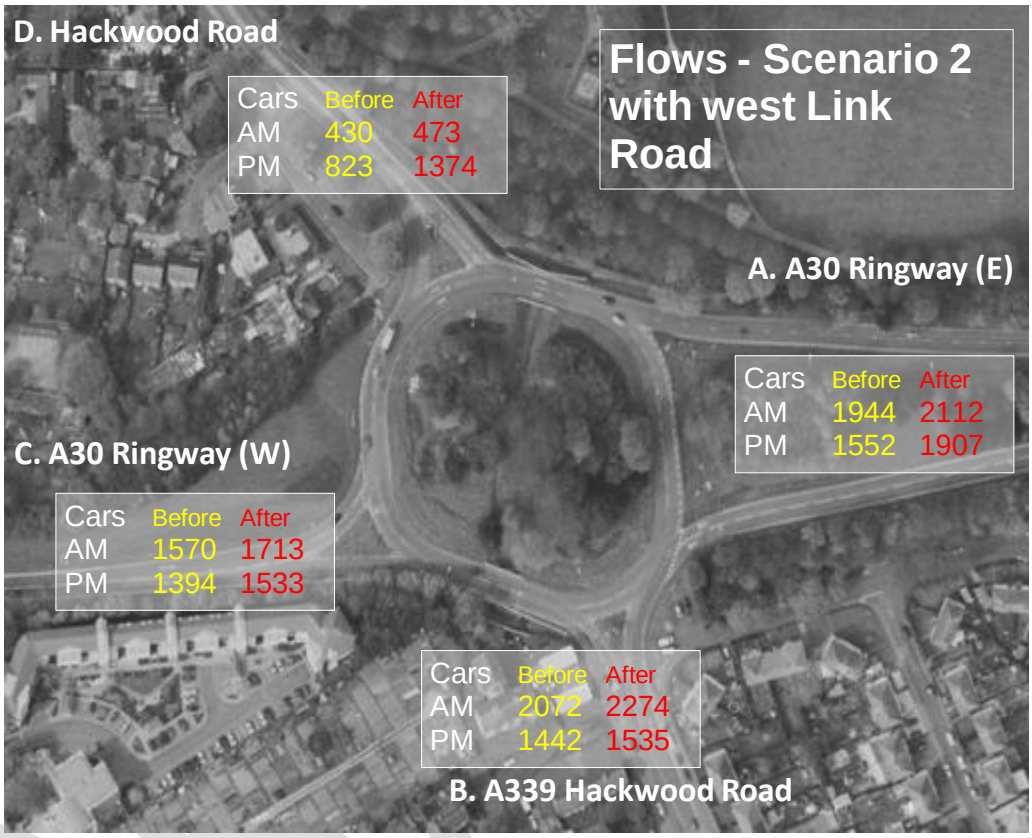


Figure 4.17 Demand at Hackwood Roundabout with and without Local Plan Developments

Table 4.35 AM Demand at Hackwood Roundabout by Turns

	From / To	Arm A	Arm B	Arm C	Arm D	Total
2029 Reference Case	Arm A – A30 Ringway E	2	956	640	346	1944
	Arm B – A339	1252	25	505	290	2072
	Arm C –A30 Ringway W	752	346	5	467	1570
	Arm D – Hackwood Rd	120	220	79	11	430
	Total	2126	1547	1229	1114	6016
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Total**
Local Plan Scenario 2 Network A	Arm A – A30 Ringway E	2	1007	647	456	2112
	Arm B – A339	1398	25	554	297	2274
	Arm C –A30 Ringway W	754	347	5	607	1713
	Arm D – Hackwood Rd	162	221	79	11	473
	Total	2316	1600	1285	1371	6572

Table 4.36 PM Demand at Hackwood Roundabout by Turns

	From / To	Arm A	Arm B	Arm C	Arm D	Total
2029 Reference Case	Arm A – A30 Ringway E	7	857	455	233	1552
	Arm B – A339	824	77	247	294	1442
	Arm C –A30 Ringway W	697	596	7	94	1394
	Arm D – Hackwood Rd	158	513	152	0	823
	Total	1686	2043	861	621	5211
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Total**
Local Plan Scenario 2 Network A	Arm A – A30 Ringway E	7	970	696	234	1907
	Arm B – A339	915	77	248	295	1535
	Arm C –A30 Ringway W	704	697	7	125	1533
	Arm D – Hackwood Rd	305	516	553	0	1374
	Total	1931	2260	1504	654	6349

4.10.2 The largest movements through this junction are between A30 Ringway E (Arm A) and A339 Hackwood Road (Arm B) in both peak hours. However, there are also several other large movements through the roundabout such as traffic moving between Arms A and C. All arms have fairly similar volumes of arriving traffic at their respective entries.

4.10.3 With the predicted level of demand growth, the junction is forecasted to experience significant congestion even in the 2029 Reference Case Scenario, particularly A339 Hackwood Rd (Arm B) in the AM peak and Hackwood Road (Arm D) in the PM peak. It is considered that the current form of the junction, a priority-controlled roundabout, does not provide sufficient capacity to accommodate the forecasted traffic flow. Following an initial design provided by HCC in August 2013, it is proposed to improve the operation of the junction by converting it to a signalised roundabout. A few minor amendments to the design received from HCC were made in order to accommodate the forecasted traffic patterns and volume of traffic as a result of the Local Plan development.

- The circulatory of the roundabout will be widened from 2 lanes to 3, with additional flares at stoplines near the A30 Ringway West and Hackwood Road (Arms C and D) entries to provide 4 lanes at these stoplines. This will increase the capacity on the circulatory to enable it to accommodate the likely queues and keep the circulatory free flowing.
- The existing flares on A30 Ringway West (Arm C) and Hackwood Road (Arm D) would be extended to 115m and 86m respectively, and a 60m flare would be added to the A30 Ringway East (Arm A) entry so that there are 3 lanes at the stopline.
- Existing exit funnels on A339 Hackwood Road (Arm B), A30 Ringway West (Arm C) and Hackwood Road (Arm D) will be utilised as part of the proposal. Some repainting of the exits may be required to formalise lane usage.

4.10.4 A visual check has been undertaken, which suggested that all proposed improvements may be accommodated within existing highway boundaries.

4.10.5 An illustration of the proposed mitigation is shown in Figure 4.18.

Figure 4.18 An Illustration of the Proposed Mitigation at Hackwood Roundabout

4.10.6 Table 4.37 below shows variations in the Degree of Saturation (DoS) resulting from different travel demand scenarios and the proposed mitigation measures.

Table 4.37 Modelled Degree of Saturation for Hackwood Roundabout entry arms

Time	Arm	2029 Ref Case (%)	Local Plan without mitigation (%)	Local Plan with mitigation (%)
AM	Arm A – A30 Ringway E	99.5	106.9	72.7
	Arm B – A339	177.2	200.8	106.2
	Arm C –A30 Ringway W	156.2	177.2	99.6
	Arm D – Hackwood Rd	66.4	67.4	78.6
PM	Arm A – A30 Ringway E	91.1	114.1	83.3
	Arm B – A339	106.5	127.6	96.4
	Arm C –A30 Ringway W	150.8	150.5	87.3
	Arm D – Hackwood Rd	170.1	286.0	98.3

4.10.7 It can be seen that the proposed improvements increase the capacity to accommodate almost all of the forecasted demand and the resulting DoS is similar to, or below those achieved in the Reference Case scenario. In particular the operation of The A339 (Arm B) in the AM peak and Hackwood Road (Arm D) in the PM peak is significantly improved. However, the A339 (Arm B) is forecasted to remain over capacity in the AM peak which will result in delay and queuing on this arm.

4.10.8 Table 4.38 shows the cost estimates for the proposed improvements to Hackwood Roundabout. The estimates have been rounded and contain a contingency to take account of uncertainty at the concept design stage.

Table 4.38 Indicative Improvement Costs for Hackwood Roundabout

Hackwood Roundabout	Costs (£)
Site Clearance	36,390
Fencing	0
Pedestrian Guardrail etc	15,047
Drainage	150,136
Earthworks	130,648
Pavement	252,387
Kerbs & Footways	57,204
Signs & Markings (Inc Work to Traffic Lights)	54,022
Road Lighting Columns	55,017
Traffic Signals	214,500
Sub – Total	**965,351**
Preliminaries 7.5%	72,401
Traffic Management 20%	193,070
Sub – Total	**1,230,823**
Contingency / Risk 45%	553,870
Total £	**1,784,693**

4.10.9 It is recommended that close liaison with HCC, similar to any other proposed junction improvements, is required in any future design for this junction to clarify any discrepancies with the options being considered by HCC, the practicality and deliverability of the proposal from this study.

4.11 Victory Roundabout

4.11.1 This is presently a four-arm priority roundabout located on the A3010 Churchill Way. The traffic demand is shown in Figure 4.19, with and without the influence from the Local Plan developments. Table 4.39 and Table 4.40 also present detailed turning movements at this junction for the 2029 Reference Case and Local Plan Scenario 2 with Network A.

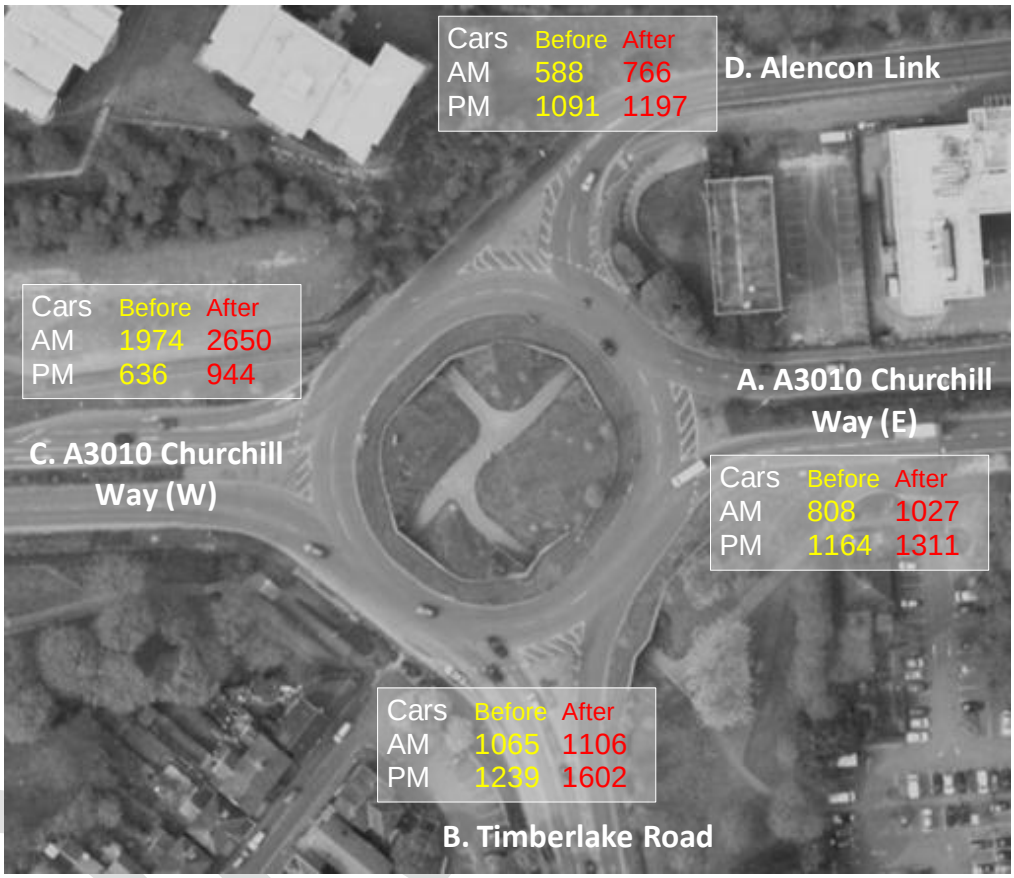


Figure 4.19 Demand at Victory Roundabout with and without Local Plan Developments

4.11.2 It can be seen from Table 4.39 and Table 4.40 that the current key movements at this junction are between Arm A (A3010 East) and Arm C (A3010 West) in both the AM and PM peak. Similarly, the demand increases as a result of the Local Plan developments are primarily focused on the movements between Arms A and C.

Table 4.39 AM Demand at Victory Roundabout in the AM Peak

	From / To	Arm A	Arm B	Arm C	Arm D	Total
2029 Reference Case	Arm A – A3010 East	91	25	306	386	808
	Arm B – Timberlake Road	580	0	155	330	1065
	Arm C – A3010 West	1341	17	1	615	1974
	Arm D – Alencon Link	290	9	289	0	588
	Total	2302	51	751	1331	4435
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Total**
Local Plan Scenario 2	Arm A – A3010 East	91	25	509	402	1027
	Arm B – Timberlake Road	584	0	156	366	1106

Network A	Arm C – A3010 West	2003	18	1	628	2650
	Arm D – Alencon Link	373	9	384	0	766
	Total	3051	52	1050	1396	5549

Table 4.40 Demand at Victory Roundabout in the PM Peak

	From / To	Arm A	Arm B	Arm C	Arm D	Total
2029 Reference Case	Arm A – A3010 East	98	10	807	249	1164
	Arm B – Timberlake Road	474	0	365	400	1239
	Arm C – A3010 West	365	10	4	257	636
	Arm D – Alencon Link	393	4	694	0	1091
	Total	1330	24	1870	906	4130
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Total**
Local Plan Scenario 2 Network A	Arm A – A3010 East	98	10	912	291	1311
	Arm B – Timberlake Road	477	0	593	532	1602
	Arm C – A3010 West	671	10	4	259	944
	Arm D – Alencon Link	463	4	730	0	1197
	Total	1709	24	2239	1082	5054

4.11.3 With the predicted level of demand growth, Arm C A3010 West of this junction is forecasted to experience significant congestion even in the 2029 Reference Case Scenario.

4.11.4 To accommodate the heavy traffic flow arriving on the A3010 Churchill Way West, the existing flare at the junction entry would require widening from three lanes to four (three ahead plus one for the left turn). The north part of the circulatory carriageway will therefore also require widening to three lanes to accommodate 3 lanes of ahead movements, with the provision of a funnel from three lanes back down to the existing two lanes on the A3010 Churchill Way East exit. The operation of the north Alencon Link approach, from which traffic needs to give way to the ahead movement from Arms C to A, would also benefit from utilising the existing hatched areas of pavement to develop a third lane at the stop line in order to achieve a higher discharge rate.

4.11.5 The A3010 Churchill Way East and Timberlake Road approaches are not expected to require any changes.

4.11.6 These proposed highway improvements are illustrated in Figure 4.20.

4.11.7 A visual check has been undertaken, which suggested that all proposed improvements may be accommodated within existing highway boundaries.

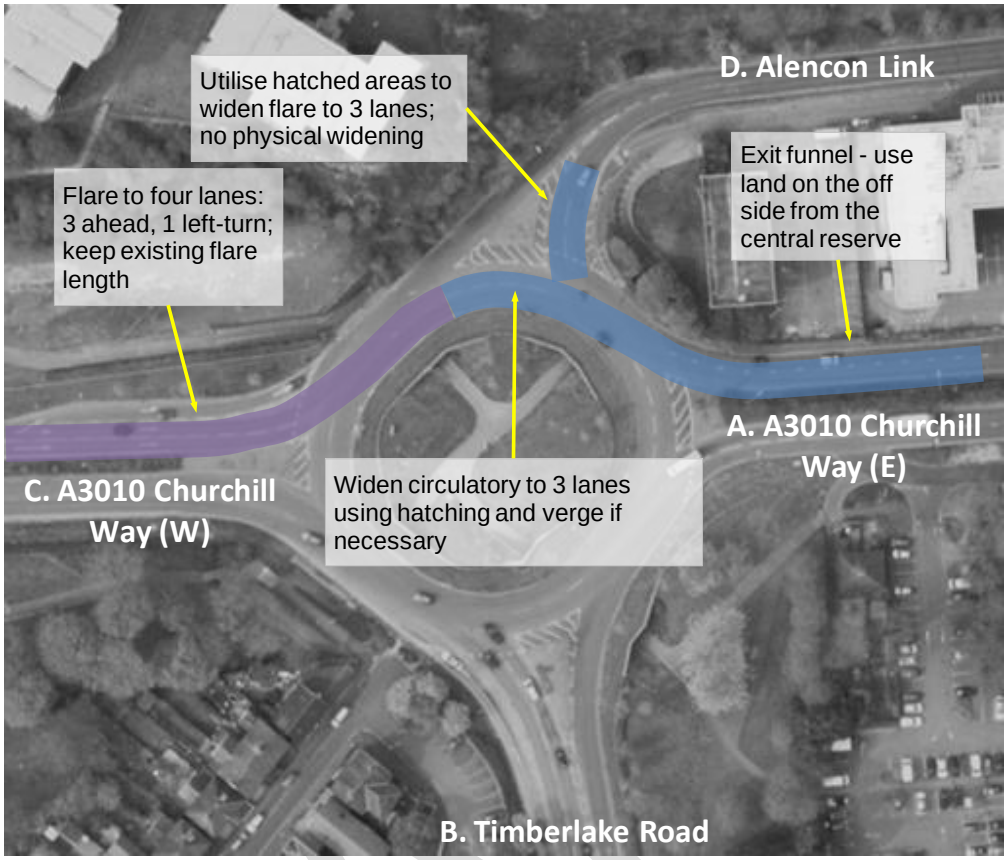


Figure 4.20 An Illustration of the Proposed Mitigation at Victory Roundabout

4.11.8 Table 4.41 below shows variations in the Degree of Saturation (DoS) resulting from different travel demand scenarios and the proposed mitigation measures.

Table 4.41 Modelled Ratio of Flow to Capacity at Each Entry of Victory Roundabout

Time	Arms	2029 Reference Case (%)	Local Plan without mitigation (%)	Local Plan with mitigation (%)
AM	Arm A – A3010 East	40	52	51
	Arm B – Timberlake Road	50	57	56
	Arm C – A3010 West	111	152	106
	Arm D – Alencon Link	77	108	118
PM	Arm A – A3010 East	65	72	74
	Arm B – Timberlake Road	76	103	106
	Arm C – A3010 West	34	53	37
	Arm D – Alencon Link	90	111	88

4.11.9 It can be seen from the model results that the operation of the A3010 Churchill Way West is significantly improved by the proposed mitigation measures in the AM peak hour. The mitigated junction still operates at a similar level of performance in comparison to the Reference Case conditions in most cases. The exceptions are Arm D in the AM peak hour and Arm B in the PM peak hour, where the performance is forecasted to worsen when the proposed mitigation is in place. Traffic from both arms gives way to the East / West movement on the A3010 so are penalised by the increased mainline traffic on the A3010.

4.11.10 The modelling results suggest that overall the junction would operate in a more balanced way across different arms and the arms with the highest traffic growth have received significant relief when the proposed mitigation is in place

4.11.11 Table 4.42 shows the cost estimates for the proposed improvements to Victory Roundabout. The estimates have been rounded and contain a contingency to take account of uncertainty at the concept design stage.

Table 4.42 Indicative Improvement Costs for Victory Roundabout

Victory Roundabout	Costs (£)
Site Clearance	19,907
Fencing	2,500
Pedestrian Guardrail etc	8,231
Drainage	82,131
Earthworks	71,470
Pavement	89,927
Kerbs & Footways	31,293
Signs & Markings (Inc Work to Traffic Lights)	29,553
Road Lighting Columns	30,097
Traffic Signals	0
Planting & Accommodation Works	10,000
Sub – Total	**375,109**
Preliminaries 10%	28,133
Traffic Management 20%	75,022
Sub – Total	**478,264**
Contingency / Risk 45%	215,219
Total £	**693,483**

4.11.12 It should be noted that further liaison with HCC, similar to any other junction mitigations, is required in any future design to ascertain and quantify impacts on Timberlake Road and Alencon Link as a result of the proposed improvement in order to refine its exact form. Any potential safety issues relating to the proposed widening of the northwest quarter of the roundabout circulatory carriageway should also be examined in further studies.

4.12 Aldermaston Road Roundabout

4.12.1 Aldermaston Road Roundabout is a six arm signalised roundabout on the Ringway North. The traffic demand is shown in Figure 4.21, with and without the influence from the Local Plan developments. Table 4.43 and Table 4.44 also present detailed turning movements at this junction for the 2029 Reference Case and Local Plan Scenario 2 with Network A.

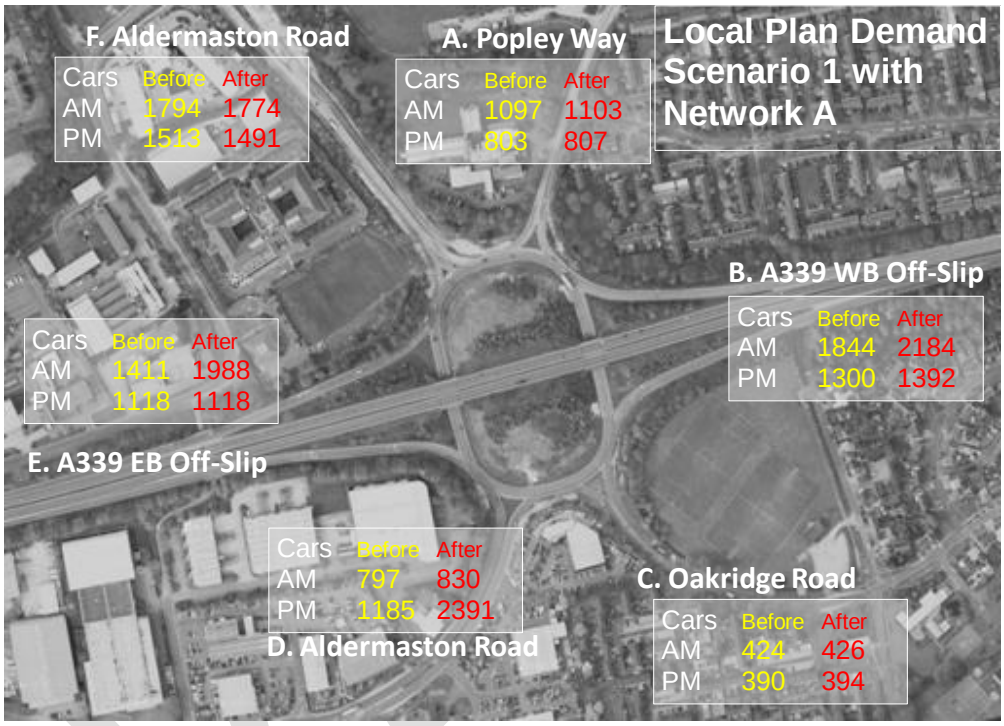


Figure 4.21 Demand at Aldermaston Roundabout with and without Local Plan Developments

Table 4.43 Demand at Aldermaston Roundabout in the AM Peak

	From / To	Arm A	Arm B	Arm C	Arm D	Arm E	Arm F	Total
2029 Reference Case	Arm A - Popley Way	7	276	100	326	321	67	1097
	Arm B - A339 WB Off-slip	191	63	12	712	1	865	1844
	Arm C - Oakridge Road	25	27	7	65	124	176	424
	Arm D - Aldermaston Rd S	67	161	2	14	131	422	797
	Arm E - A339 EB Off-slip	271	0	22	329	37	752	1411
	Arm F - Aldermaston Road	92	921	92	346	273	70	1794
	Total	653	1448	235	1792	887	2352	7367
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Arm E**	**Arm D**	**Total**
Local Plan Scenario 2 Network A	Arm A - Popley Way	7	277	101	327	323	68	1103
	Arm B - A339 WB Off-slip	192	63	12	1065	1	851	2184
	Arm C - Oakridge Road	25	27	7	65	125	177	426
	Arm D - Aldermaston Rd S	68	194	2	20	131	415	830
	Arm E - A339 EB Off-slip	272	0	23	920	37	736	1988
	Arm F - Aldermaston Road	93	904	93	348	266	70	1774
	Total	657	1465	238	2745	883	2317	8305

Table 4.44 Demand at Aldermaston Roundabout in the PM Peak

	From / To	Arm A	Arm B	Arm C	Arm D	Arm E	Arm F	Total
2029 Reference Case	Arm A - Popley Way	8	164	81	138	378	34	803
	Arm B - A339 WB Off-slip	209	97	34	298	6	656	1300
	Arm C - Oakridge Road	31	44	3	56	121	135	390
	Arm D - Aldermaston Rd S	136	426	5	8	540	670	1785
	Arm E - A339 EB Off-slip	373	15	15	64	56	595	1118
	Arm F - Aldermaston Road	130	571	109	188	466	49	1513
	Total	887	1317	247	752	1567	2139	6909
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Arm E**	**Arm D**	**Total**
Local Plan Scenario 2 Network A	Arm A - Popley Way	8	164	82	139	380	34	807
	Arm B - A339 WB Off-slip	210	97	34	393	6	652	1392
	Arm C - Oakridge Road	32	44	4	56	122	136	394
	Arm D - Aldermaston Rd S	137	759	5	13	803	674	2391
	Arm E - A339 EB Off-slip	374	15	15	67	56	591	1118
	Arm F - Aldermaston Road	131	566	110	186	449	49	1491
	Total	892	1645	250	854	1816	2136	7593

4.12.2 The junction performance was investigated with a number of alternative layouts but no solution could be found where the cost of the improvements was in proportion with the enhancement in junction performance. The width of the circulatory is limited by the bridges supporting the A339 mainline over the top of the roundabout and without widening the circulatory carriageway, options for improving junction performance are very limited.

4.12.3 Table 4.45 shows the modelled Degree of Saturation (DoS) at the roundabout with and without the Local Plan demand with the current layout.

Table 4.45 Degree of Saturation at Each Entry for Aldermaston Road Roundabout

Time	Arm	2029 Ref Case (%)	Local Plan without mitigation (%)
AM	Arm A - Popley Way	95.0	134.4
	Arm B - A339 WB Off-slip	9.5	92.7
	Arm C - Oakridge Road	92.1	110.0
	Arm D - Aldermaston Rd S	92.6	88.7
	Arm E - A339 EB Off-slip	90.0	134.3
	Arm F - Aldermaston Road N	102.2	131.1
PM	Arm A - Popley Way	67.8	94.5
	Arm B - A339 WB Off-slip	64.6	63.4
	Arm C - Oakridge Road	74.2	127.0
	Arm D - Aldermaston Rd S	125.5	137.3
	Arm E - A339 EB Off-slip	97.0	59.8
	Arm F - Aldermaston Road N	112.3	126.7

4.12.4 It has not been possible to find a cost effective solution at this junction with the worst case travel demand approach adopted in this study. In reality, drivers would not accept the likely high levels of delay and would re-route / re-time their journeys or change their destinations in the long run. All these changes lead to decrease in highway demand that can reach the junction in a given period of time.

4.12.5 Furthermore, all mitigation analysis in this study is based on demand flows, which are the total travel demand that intends to go through the junction. However, it is commonly recognised that some of the demand flow traffic may not be able to do so within the modelled hours due to delays and congestions elsewhere in the network, which leads to lower actual flows that arrive in a given period of time.

4.12.6 The limitation in the adopted modelling approach means that the aforementioned two types of potential reduction in highway demand in the future cannot be objectively estimated with the available tools. Further refinement of the approach will be required to find an acceptable solution at the junction in the future.

4.13 A339 / Ringway West Roundabout

4.13.1 This is a three-arm priority roundabout with entry flows as shown in Figure 4.22. These are presented for the Reference Case as well for Local Plan Scenario 2 with Network A. Table 4.46 and Table 4.47 also present detailed turning movements at this junction.

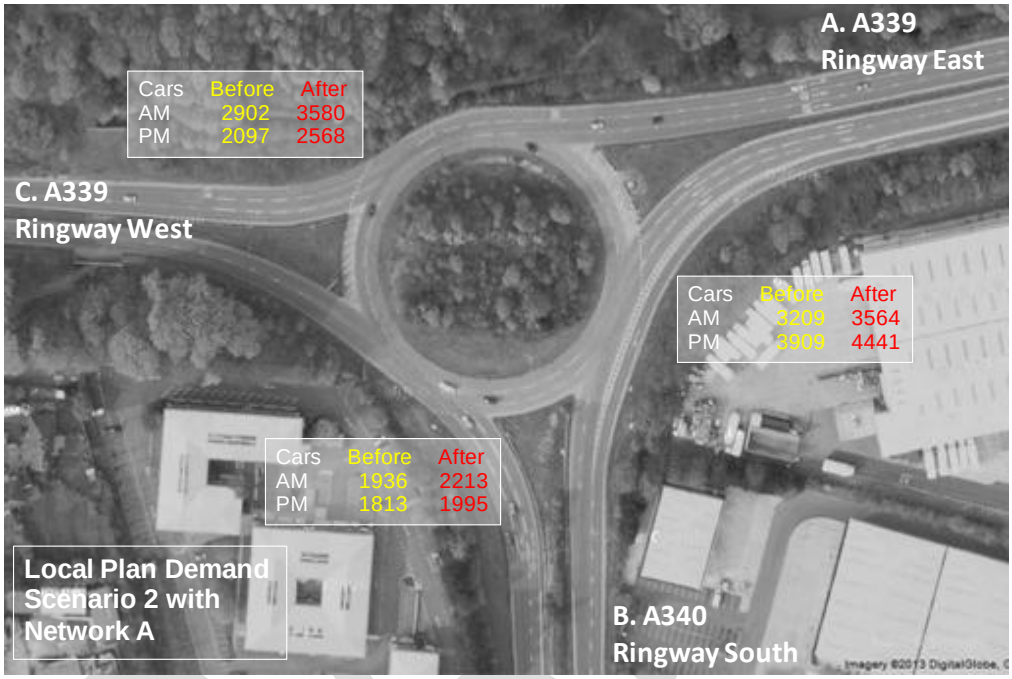


Figure 4.22 Demand at A339 / Ringway West Roundabout with and without Local Plan Developments

4.13.2 Figure 4.22 shows clear increase in travel demand at all entry arms. It is clear from Table 4.46 and Table 4.47 that the major movements at this junction are between Arm A (A339 Ringway East) and Arm C (A339 Ringway West) as well as Arm A (A339 Ringway east) and Arm B (A340 Ringway South) in both the AM and PM peak hours.

Table 4.46 AM Demand at A339 / Ringway West Roundabout by Turns

	From / To	Arm A	Arm B	Arm C	Total
2029 Reference Case	Arm A – A339 RW E	0	1059	2150	3209
	Arm B – A340 RW S	1787	0	149	1936
	Arm C – A339 RW W	2514	388	0	2902
	Total	4301	1447	2299	8047
	From / To	**Arm A**	**Arm B**	**Arm C**	**Total**
Local Plan Scenario 2 Network A	Arm A – A339 RW E	0	1129	2435	3564
	Arm B – A340 RW S	2020	0	193	2213
	Arm C – A339 RW W	3202	378	0	3581
	Total	5222	1507	2628	9357

Table 4.47 PM Demand at A339 / Ringway West Roundabout by Turns

	From / To	Arm A	Arm B	Arm C	Total
2029 Reference Case	Arm A – A339 RW E	6	1399	2500	3905
	Arm B – A340 RW S	1648	0	165	1813
	Arm C – A339 RW W	1700	397	0	2098
	Total	3354	1796	2665	7815
	From / To	**Arm A**	**Arm B**	**Arm C**	**Total**
Local Plan Scenario 4 Network A	Arm A – A339 RW E	6	1681	2754	4442
	Arm B – A340 RW S	1818	0	177	1996
	Arm C – A339 RW W	2121	447	0	2568
	Total	3945	2128	2932	9005

4.13.3 Given the high travel demand presented in the last two tables, Arm B and Arm C of this junction are forecasted to experience worsened congestion and delay, even in the 2029 Reference Case Scenario, in the PM and AM peak hours, respectively. Full signalisation of this junction is proposed to improve performance of the junction in light of traffic impacts from the Local Plan developments.

4.13.4 In addition to the signalisation of the roundabout, future highway improvements are proposed. The existing 60m flare on Arm B A340 Ringway West needs to be extended to 150m in length to enable continuous discharge of vehicles across the stopline in order to fully utilise the capacity available during the green period. At the stopline on the circulatory near Arm B entry, traffic is allowed to exit the roundabout onto the A339 from all three lanes. Therefore, the A339 (arm C) exit requires an exit funnel (narrow down from three to two lanes) to facilitate smooth movement and improve safety.

4.13.5 The large increase in travel demand from Arm C A339 in the AM peak hour requires that the existing three lane flare be extended to 60m in length and become four lanes wide. Consequently this change requires the widening of a section of the roundabout circulatory carriageway to four lanes and an exit funnel (narrow down from four to three lanes) on the A339 Ringway North exit. All the aforementioned highway improvements are illustrated in Figure 4.23.

4.13.6 A visual check has been undertaken, which confirmed that all proposed improvements can be accommodated within existing highway boundaries.

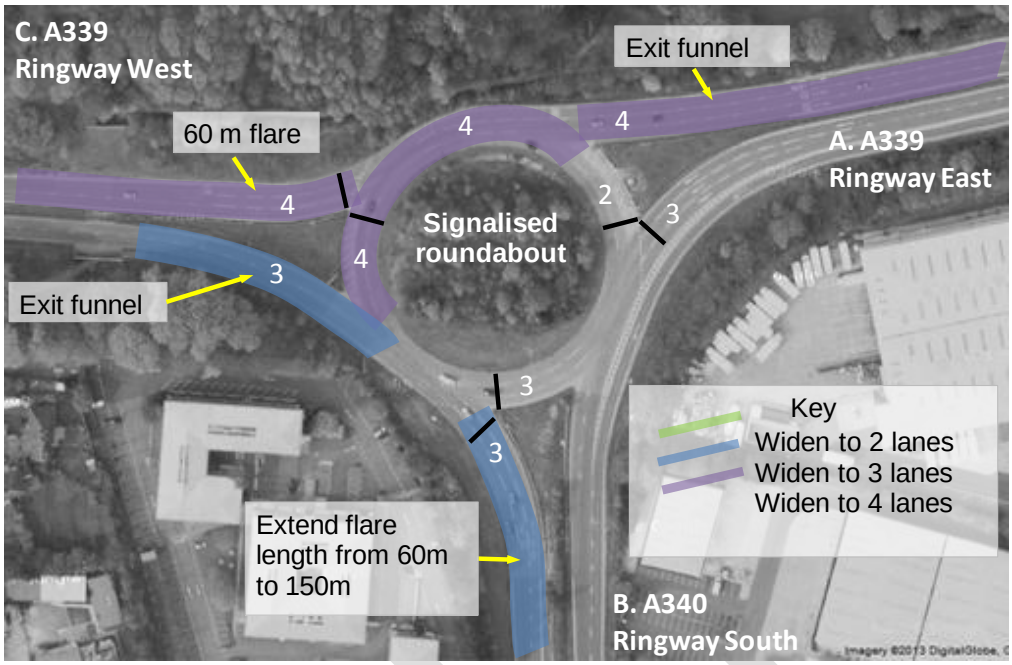


Figure 4.23 An Illustration of the Proposed Mitigation at A339 / Ringway West Roundabout

4.13.7 Table 4.48 below tabulates variations in the Degree of Saturation (DoS) resulting from different travel demand and the proposed mitigation measures. It is clear that the proposed highway improvements can significantly reduce traffic congestion in comparison to the performance without mitigation. Modelling results suggest that the mitigated junction would operate at a similar or higher level of performance in comparison to Reference Case.

Table 4.48 Degree of Saturation at Each Entry for A339 / Ringway West Roundabout

Time	Arms	2029 Reference Case (%)	Local Plan without mitigation (%)	Local Plan with mitigation (%)
AM	Arm A – A339 RW N	74	81	82
	Arm B – A340 RW	94	120	95
	Arm C – A339	137	164	91
PM	Arm A – A339 RW N	92	104	90
	Arm B – A340 RW	101	118	88
	Arm C – A339	94	113	62

4.13.8 Table 4.49 shows the cost estimates for the proposed improvements to A339 / Ringway West Roundabout. The estimates have been rounded and contain a contingency to take account of uncertainty at the concept design stage.

Table 4.49 Indicative Improvement Costs for A339 / Ringway West Roundabout

A33 / Ringway West Roundabout	Costs (£)
Site Clearance	26,681
Fencing	0
Pedestrian Guardrail etc	11,032
Drainage	110,079
Earthworks	95,791
Pavement	197,858
Kerbs & Footways	41,942
Signs & Markings (Inc Work to Traffic Lights)	39,609
Road Lighting Columns	40,338
Traffic Signals	148,500
Accommodation Works / Planting	0
Sub – Total	**711,830**
Preliminaries 10%	53,387
Traffic Management 20%	142,366
Sub – Total	**907,583**
Contingency / Risk 45%	408,412
Total £	**1,315,996**

4.14 A339 / Roman Road Roundabout

4.14.1 This is a four-arm priority controlled roundabout with two-lane entries from all arms. Its entry flows with and without the influence from the Local Plan developments are shown in Figure 4.24.

4.14.2 Table 4.50 and Table 4.51 present detailed turning movements at this junction.

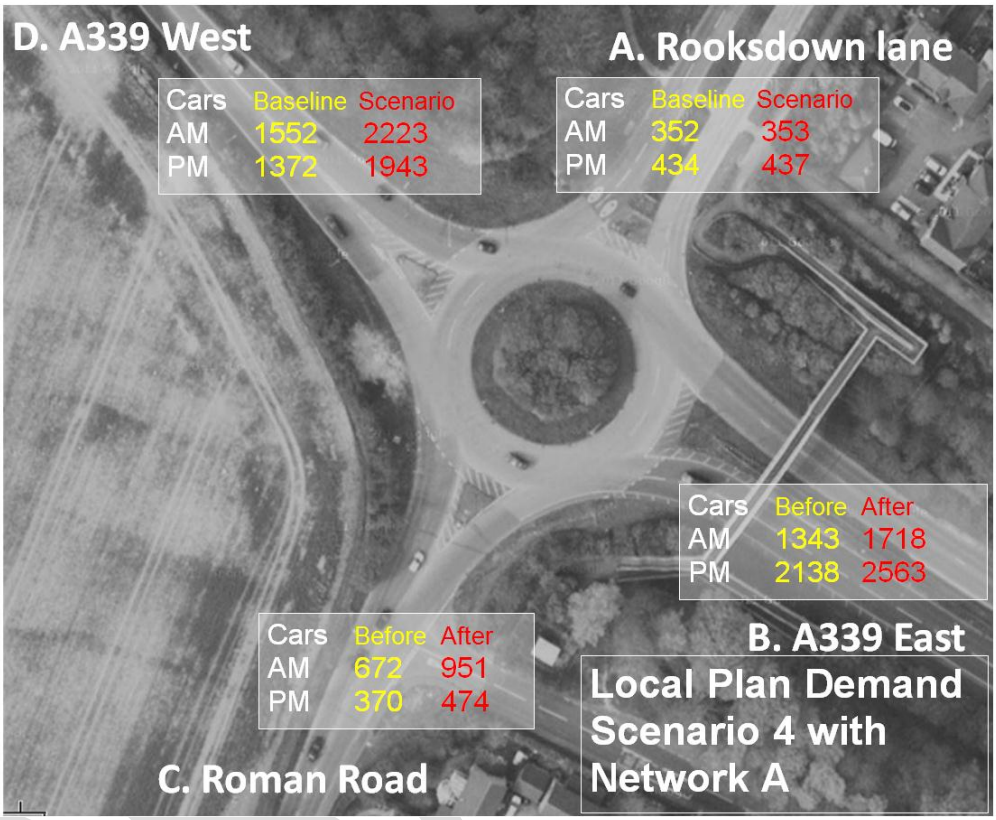


Figure 4.24 Demand at A339 / Roman Road Junction with and without Local Plan Developments

Table 4.50 AM Demand at A339 / Roman Road Junction by Turns

	From / To	Arm A	Arm B	Arm C	Arm D	Total
2029 Reference Case	Arm A – Rooksdown Ln	0	197	126	28	352
	Arm B – A339 East	123	0	398	921	1319
	Arm C – Roman Rd	265	552	0	116	667
	Arm D – A339 West	35	1455	76	0	1530
	Total	423	2204	600	1065	4291
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Total**
Local Plan Scenario 4 Network A	Arm A – Rooksdown Ln	0	198	127	28	354
	Arm B – A339 East	124	0	425	1091	1516
	Arm C – Roman Rd	267	572	0	97	669
	Arm D – A339 West	35	2133	17	0	2150
	Total	425	2903	569	1216	5114

Table 4.51 PM Demand at A339 / Roman Road Junction by Turns

	From / To	Arm A	Arm B	Arm C	Arm D	Total
2029 Reference Case	Arm A – Rooksdown Ln	0	176	223	35	434
	Arm B – A339 East	122	0	690	1390	2079
	Arm C – Roman Rd	113	241	0	129	370
	Arm D – A339 West	16	1170	187	0	1357
	Total	252	1587	1100	1554	4493
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Total**
Local Plan Scenario 4 Network A	Arm A – Rooksdown Ln	0	177	224	36	436
	Arm B – A339 East	123	0	645	1708	2353
	Arm C – Roman Rd	114	242	0	109	351
	Arm D – A339 West	17	1660	204	0	1863
	Total	254	2078	1073	1853	5258

4.14.3 It is clear from the above two tables that the major movements at this junction are between the A339 arms in both directions. These two movements also receive the most significant increase in travel demand. The increase in travel demand on A339 is forecasted to cause significant delays and queuing in the future. Signalisation of the roundabout has been explored but was deemed impractical considering the limited storage capacity for regular queuing on the circulatory after signalisation. In light of this, a signalised cross-road junction is proposed to mitigate the traffic impacts, as illustrated in Figure 4.25.

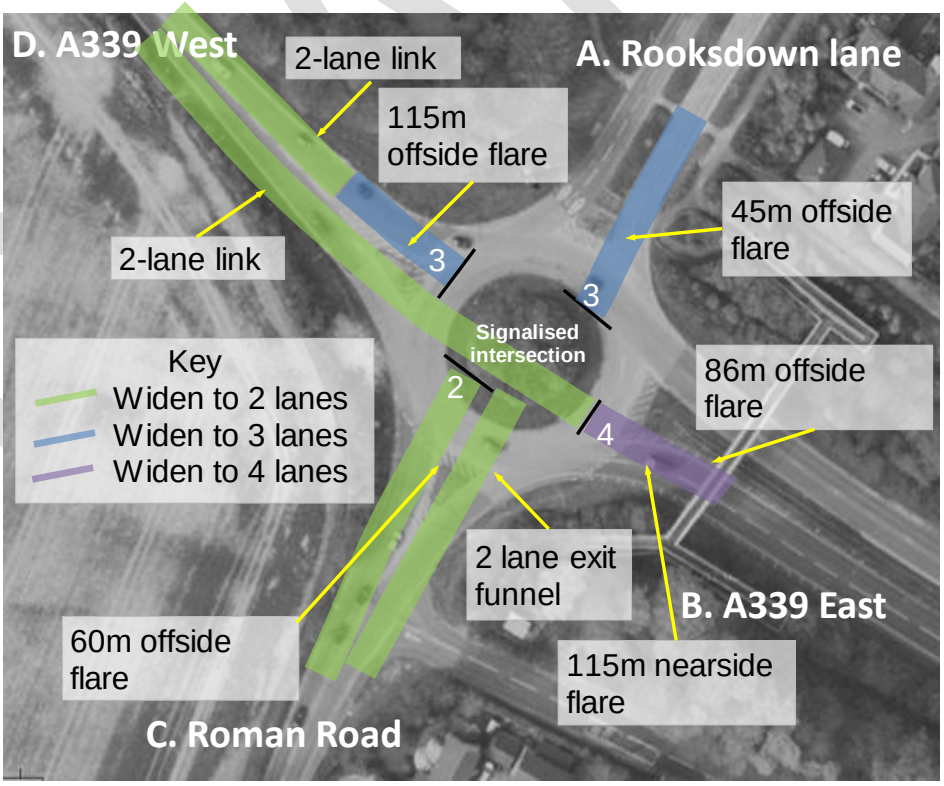


Figure 4.25 An Illustration of the Proposed Mitigation at A339 / Roman Road Junction

4.14.4 The proposed mitigation will replace the existing roundabout with a signalised intersection. Arm D (A339 West) is widened in both directions from one to two lanes up to where the proposed A339 / B3400 Link Road joins the A339. In addition, the A339 West entry also requires a 115m flare on the offside for the right-turning traffic.

4.14.5 On the entry from the east side of the A339 (Arm B), a 115m flare is required on the nearside and another 86m one on the offside to provide a separate lane for left and right-turning traffic, respectively, at the four-lane stopline. This requires taking some land from the central reserve on the offside as well as the nearside within the existing highway boundary.

4.14.6 For Arm A (Rooksdown Lane), a 45m flare will be added to the offside to provide a separate lane for the right-turning traffic. For Arm C (Roman Road), an offside flare will be required to provide an extra lane for right-turning traffic.

4.14.7 Table 4.52 below tabulates variations in the Degree of Saturation (DoS) resulting from different travel demand and the proposed mitigation measures. It clearly demonstrates that the proposed measures can greatly improve the performance of both entries on the A339. However, increased delays are forecasted on the Rooksdown Lane and Roman Road entries.

Table 4.52 Degree of Saturation at Each Entry for A339 / Roman Road Junction

Time	Arms	2029 Reference Case (%)	Local Plan without mitigation (%)	Local Plan with mitigation (%)
AM	Arm A – Rooksdown	36	36	91
	Arm B – A339 East	70	77	70
	Arm C - Roman Road	72	77	114
	Arm D - A339 West	126	167	113.9
PM	Arm A – Rooksdown	40	44	92
	Arm B – A339 East	116	127	93
	Arm C - Roman Road	43	43	93
	Arm D - A339 West	90	116	79.6

4.14.8 The above proposal is presented for the purpose of demonstrating a potential solution at the A339 / Roman Road Junction in light of the demand increase in the future. The proposal is subject to further refinement and should be considered in conjunction with the A339 / B3400 Link Road proposal in the future.

4.14.9 At the time of producing this document, three different proposals (Appendix D, Initial Strategic Transport Assessment) for the A339 / B3400 Link Road have been provided. Two options involve a junction between the link road and the A339 at a location approximately 115m west of A339 / Roman Road junction. The last option features closure of access from Roman Road to A339 and Combining the Link Road / A339 junction and the A339 / Roman Road junction into a single roundabout.

4.14.10 Considering the uncertainty in the exact form of the proposed A339 / B3400 Link Road and its subsequent impact on the form of the mitigation proposal at the A339 / Roman Road junction, a costing for the highway improvements proposed in Figure 4.25 has not been produced.

4.14.11 Another issue that should be considered at this junction, in close liaison with HCC as the highway authority, is managing access on surrounding routes such as the T-junction between Wellington Terrace and Roman Road. There is a known problem at this access for near miss accidents, particularly between vehicles turning right out of Wellington Terrace and those exiting the A339 / Roman Road roundabout. The proposed conversion of the roundabout into a signalised crossroad would help to address the problem by increasing the gap between these two movements but the proposal still needs to be examined in detail from the safety perspective if it is to be taken forward.

4.15 B3400 Worting Road / Roman Way Roundabout

4.15.1 This is currently a three-arm priority roundabout located on the B3400. Its entry flows are shown in Figure 4.26, with and without the influence from the Local Plan developments. Table 4.53 and Table 4.54 also present detailed turning movements at this junction for the 2029 Reference Case and Local Plan Scenario 2 with Network A.

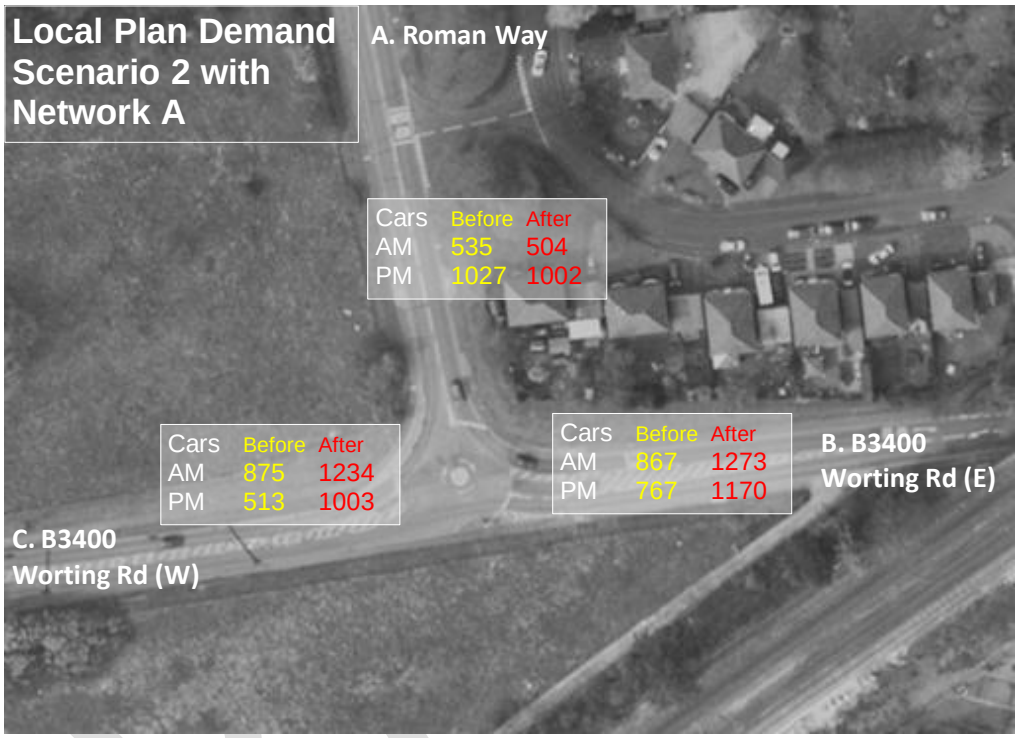


Figure 4.26 Demand at B3400 Worting Road / Roman Way Roundabout with and without Local Plan Developments

4.15.2 It can be seen from Table 4.53 and Table 4.54 that demand is focused on the B3400 Worting Road approaches in the AM peak and spread more evenly in the PM peak hour. The Local Plan developments mostly add trips to the B3400 Worting Road approaches (Arms B and C).

Table 4.53 AM Demand at B3400 Worting Road / Roman Way Roundabout in the AM Peak

	From / To	Arm A	Arm B	Arm C	Total
2029 Reference Case	Arm A – Roman Way	0	345	190	535
	Arm B – B3400 Worting Rd (E)	628	0	239	867
	Arm C – B3400 Worting Rd (W)	472	403	0	875
	Total	1100	748	429	2277
	From / To	**Arm A**	**Arm B**	**Arm C**	**Total**
Local Plan Scenario 2 Network A	Arm A – Roman Way	0	334	170	504
	Arm B – B3400 Worting Rd (E)	649	0	624	1273
	Arm C – B3400 Worting Rd (W)	456	778	0	1234
	Total	1105	1112	794	3011

Table 4.54 Demand at B3400 Worting Road / Roman Way Roundabout in the PM Peak

	From / To	Arm A	Arm B	Arm C	Total
2029 Reference Case	Arm A – Roman Way	0	560	467	1027
	Arm B – B3400 Worting Rd (E)	294	0	473	767
	Arm C – B3400 Worting Rd (W)	236	277	0	513
	Total	530	837	940	2307
	From / To	**Arm A**	**Arm B**	**Arm C**	**Total**
Local Plan Scenario 2 Network A	Arm A – Roman Way	0	567	435	1002
	Arm B – B3400 Worting Rd (E)	301	0	869	1170
	Arm C – B3400 Worting Rd (W)	211	792	0	1003
	Total	512	1359	1304	3175

4.15.3 With the predicted level of demand growth, the junction is forecasted to experience congestion even in the 2029 Reference Case Scenario, particularly on B3400 Worting Rd (W) in the AM peak hour and Roman Way in the PM peak hour. It is considered that the current form of the junction, a priority-controlled mini-roundabout, does not provide sufficient capacity for the traffic flow in the future. In order to improve the operation of the junction it is proposed to upgrade it to a full sized roundabout.

4.15.4 In addition to the roundabout upgrade, it is proposed that all three approaches are widened to accommodate a flare.

Figure 4.27 An Illustration of the Proposed Mitigation at B3400 Worting Road / Roman Way Roundabout

4.15.5 Table 4.55 below shows variations in the Degree of Saturation (DoS) resulting from different travel demand scenarios and the proposed mitigation measures.

Table 4.55 Modelled Degree of Saturation at Each Entry of B3400 Worting Road / Roman Way Roundabout

Time	Arms	2029 Reference Case (%)	Local Plan without mitigation (%)	Local Plan with mitigation (%)
AM	Arm A – Roman Way	101	109	48
	Arm B – B3400 Worting Rd (E)	97	139	96
	Arm C – B3400 Worting Rd (W)	180	225	106
PM	Arm A – Roman Way	205	270	99
	Arm B – B3400 Worting Rd (E)	89	128	99
	Arm C – B3400 Worting Rd (W)	83	156	73

4.15.6 It can be seen from the model results that the operation of the junction is significantly improved by the proposed mitigation measures in both modelled peak hours. As the junction is expected to operate at or just above capacity, some delays and queuing do occur, but not outside the common experience of drivers travelling in peak periods.

4.15.7 Table 4.56 shows the cost estimates for the proposed improvements to this junction. The estimates have been rounded and contain a contingency to take account of uncertainty at the concept design stage.

Table 4.56 Indicative Improvement Costs for B3400 Worting Road / Roman Way Roundabout

B3400 Worting Road / Roman Way Roundabout	Costs (£)
Site Clearance	60,493
Fencing	6,250
Pedestrian Guardrail etc	25,012
Drainage	249,574
Earthworks	572,998
Pavement	297,354
Kerbs & Footways	95,091
Signs & Markings (Inc Work to Traffic Lights)	89,802
Road Lighting Columns	91,455
Traffic Signals	0
Accommodation Works	50,000
Sub – Total	**1,538,029**
Preliminaries 7.5%	115,352
Traffic Management 20%	307,606
Sub – Total	**1,960,987**
Contingency / Risk 45%	882,444
Total £	**2,843,431**

4.15.8 A visual check has been undertaken, which suggested that all proposed improvements may be accommodated within existing highway boundaries. A potential issue that needs investigation in future design is whether the provision of pedestrian facilities to the immediate south of the enlarged roundabout can be accommodated within the existing highway boundaries.

4.16 B3400 Worting Road Roundabout

4.16.1 This is presently a four-arm priority roundabout located on the A3010 Churchill Way. The traffic demand is shown in Figure 4.28, with and without the influence from the Local Plan developments. Table 4.57 and Table 4.58 also present detailed turning movements at this junction for the 2029 Reference Case and Local Plan Scenario 2 with Network A.

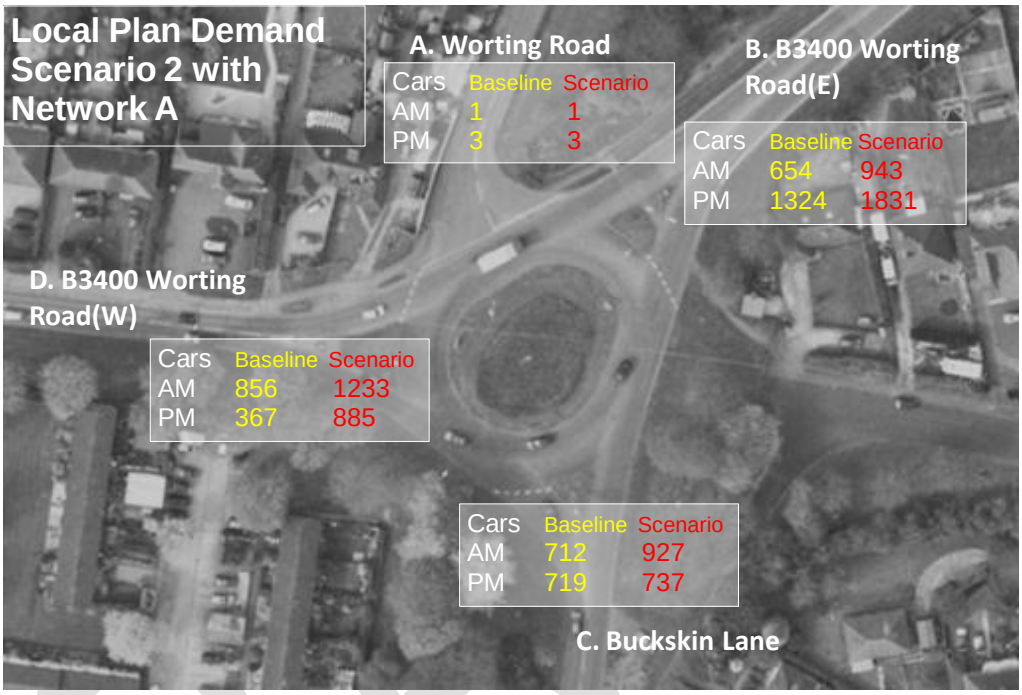


Figure 4.28 Demand at Worting Road Roundabout with and without Local Plan Developments

4.16.2 It can be seen from Table 4.57 and Table 4.58 that the current key movements at this junction are onto B3400 Worting Road East (Arm B) heading towards the town centre in the AM peak hour and leaving the town centre on Arm B in the evening peak hour.

Table 4.57 AM Demand at Worting Road Roundabout in the AM Peak

	From / To	Arm A	Arm B	Arm C	Arm D	Total
2029 Reference	Arm A – Worting Road	0	1	0	0	1
	Arm B – B3400 Worting Road (E)	0	0	384	270	654
	Arm C – Buckskin Lane	0	604	0	108	712
	Arm D – B3400 Worting Road (W)	1	668	187	0	856
	Total	1	1272	571	378	2222
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Total**
Local Plan Scenario 2 Network A	Arm A – Worting Road	0	1	0	0	1
	Arm B – B3400 Worting Road (E)	0	0	397	545	943
	Arm C – Buckskin Lane	0	672	0	255	927
	Arm D – B3400 Worting Road (W)	1	1042	190	0	1233
	Total	1	1715	588	800	3104

Table 4.58 Demand at Worting Road Roundabout in the PM Peak

	From / To	Arm A	Arm B	Arm C	Arm D	Total
2029 Reference	Arm A – Worting Road	0	1	1	1	3
	Arm B – B3400 Worting Road (E)	1	0	640	683	1324
	Arm C – Buckskin Lane	4	491	0	224	719
	Arm D – B3400 Worting Road (W)	0	293	73	0	367
	Total	5	785	715	908	2413
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Total**
Local Plan Scenario 2 Network A	Arm A – Worting Road	0	1	1	1	3
	Arm B – B3400 Worting Road (E)	1	0	749	1081	1831
	Arm C – Buckskin Lane	4	501	0	232	737
	Arm D – B3400 Worting Road (W)	0	629	257	0	885
	Total	5	1131	1007	1313	3457

4.16.3 With the predicted level of demand growth, the junction is forecasted to experience congestion in the 2029 Local Plan Scenario 2, on the B3400 Worting Road West entry (Arm D) in the morning peak hour and the B3400 Worting Road East entry (Arm B) in the evening.

4.16.4 To accommodate the additional traffic it is proposed to extend the flares on the East, South and West approaches. No changes to Arm A Worting Road are proposed. The circulatory carriageway needs to be 2 lanes. As it is currently 8m wide, the carriageway only needs to be repainted to formalise it. These proposed highway improvements are illustrated in Figure 4.29.

4.16.5 A visual check has been undertaken, which confirmed that all proposed improvements can be accommodated within existing highway boundaries.

Figure 4.29 An Illustration of the Proposed Mitigation at Worting Road Roundabout

4.16.6 Table 4.59 below shows variations in the Degree of Saturation (DoS) resulting from different travel demand scenarios and the proposed mitigation measures.

Table 4.59 Modelled Degree of Saturation at Each Entry of Worting Road Roundabout

Time	Arms	2029 Reference Case (%)	Local Plan without mitigation (%)	Local Plan with mitigation (%)
AM	Arm A – Worting Road	5	5	5
	Arm B – B3400 Worting Road (E)	38	54	50
	Arm C – Buckskin Lane	56	83	72
	Arm D – B3400 Worting Road (W)	81	121	92
PM	Arm A – Worting Road	5	5	5
	Arm B – B3400 Worting Road (E)	68	108	99
	Arm C – Buckskin Lane	33	84	75
	Arm D – B3400 Worting Road (W)	33	79	61

4.16.7 Overall the roundabout is forecasted to be busier than the 2029 Reference Case but most arms are operating within the capacity except Arm B B3400 Worting Road East Entry in the PM peak due to significant increase in travel demand. However, the performance of this arm is still much better than that of the Local Plan scenario without mitigation as shown in the table above.

4.16.8 Table 4.60 shows the cost estimates for the proposed improvements to this junction. The estimates have been rounded and contain a contingency to take account of uncertainty at the concept design stage.

Table 4.60 Indicative Improvement Costs for Worting Road Roundabout

Worting Road Roundabout	Costs (£)
Site Clearance	4,447
Fencing	0
Pedestrian Guardrail etc	1,839
Drainage	18,347
Earthworks	15,965
Pavement	44,178
Kerbs & Footways	6,990
Signs & Markings (Inc Work to Traffic Lights)	8,102
Road Lighting Columns	6,723
Traffic Signals	0
Accommodation Works	10,000
Sub – Total	116,591
Preliminaries 10%	11,659
Traffic Management 20%	23,318
Sub – Total	151,568
Contingency / Risk 45%	68,206
Total £	**219,774**

4.17 West Ham Roundabout

4.17.1 This is a six arm roundabout on the B3400 to the west of the centre of Basingstoke. Figure 4.13 shows demand on each entry arm in the 2029 reference case and Local Plan demand, whilst Table 4.61 and Table 4.62 show the full turning demand.

Figure 4.30 Demand at West Ham Roundabout with and without Local Plan Developments

Table 4.61 AM Demand at West Ham Roundabout by Turns

	From / To	Arm A	Arm B	Arm C	Arm D	Arm E	Arm F	Total
2029 Reference Case	Arm A - B3400 Churchill Way	0	71	210	6	336	69	692
	Arm B - Grafton Way	40	0	31	3	56	1	131
	Arm C - Worting Rd	279	173	0	40	254	76	822
	Arm D - West Ham Close	12	0	13	0	15	3	43
	Arm E - B3400 Worting Rd	675	120	403	13	1	65	1277
	Arm F - Uskirchen Way	35	20	71	0	32	0	158
	Total	1041	384	728	62	694	214	3123
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Arm E**	**Arm D**	**Total**
Local Plan Scenario 2 Network A	Arm A - B3400 Churchill Way	0	71	212	6	623	70	982
	Arm B - Grafton Way	40	0	31	3	56	1	131
	Arm C - Worting Rd	280	174	0	40	256	76	826
	Arm D - West Ham Close	12	0	13	0	15	3	43
	Arm E - B3400 Worting Rd	1114	120	405	13	1	66	1719

	Arm F - Uskirchen Way	35	20	71	0	32	0	158
	Total	1481	385	732	62	983	216	3859

Table 4.62 PM Demand at West Ham Roundabout by Turns

	From / To	Arm A	Arm B	Arm C	Arm D	Arm E	Arm F	Total
2029 Reference Case	Arm A - B3400 Churchill Way	0	70	469	11	769	244	1563
	Arm B - Grafton Way	98	0	88	0	144	2	332
	Arm C - Worting Rd	217	118	0	27	168	54	584
	Arm D - West Ham Close	1	0	9	0	12	2	24
	Arm E - B3400 Worting Rd	439	70	287	16	2	52	866
	Arm F - Uskirchen Way	50	10	102	0	26	0	188
	Total	805	268	955	54	1121	354	3557
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Arm E**	**Arm D**	**Total**
Local Plan Scenario 2 Network A	Arm A - B3400 Churchill Way	0	70	472	11	1273	246	2072
	Arm B - Grafton Way	98	0	89	0	145	2	334
	Arm C - Worting Rd	219	119	0	27	169	54	588
	Arm D - West Ham Close	1	0	9	0	12	2	24
	Arm E - B3400 Worting Rd	783	70	289	16	2	52	1212
	Arm F - Uskirchen Way	51	10	103	0	26	0	190
	Total	1152	269	962	54	1627	356	4420

4.17.2 The key movements through West Ham Roundabout are along the B3400 between Churchill Way (Arm A) and Worting Road (Arm E). This movement is tidal with the majority of traffic heading eastbound in the AM peak and westbound in the PM peak.

4.17.3 With the predicted level of growth in travel demand, the junction is forecasted to experience significant congestion, particularly on the B3400 (Arms A and E) as a result of the Local Plan development. In order to improve the operation of the junction it is proposed to widen the B3400 Churchill Way entry (Arm A) by adding a short flare, and increase the capacity of the B3400 Worting Road entry (Arm E) by lengthening the existing flare to 150m. These improvements will require the circulatory carriageway to be widened from 2 to 3 lanes on the southern section between Arm A and Arm E, and an exit funnel from 2 lanes to 1 on the B3400 Worting Road (Arm E) exit. The roundabout would remain as priority controlled.

4.17.4 A visual check has been undertaken, which confirmed that all proposed improvements can be accommodated within existing highway boundaries.

4.17.5 An illustration of this proposed mitigation is shown in Figure 4.31.

Figure 4.31 An Illustration of the Proposed Mitigation at West Ham Roundabout

4.17.6 Table 4.63 below shows the variations in Degree of Saturation (DoS) resulting from different travel demand and the proposed mitigation measures. Without the mitigation proposal the roundabout cannot provide sufficient capacity for the demand, particularly on the B3400 Worting Road in the AM peak and the B3400 Churchill Way in the PM peak. The mitigation proposal would relieve the congestion on both of these arms.

Table 4.63 Degree of Saturation at Each Entry for West Ham Roundabout

Time	Arm	2029 Ref Case (%)	Local Plan without mitigation (%)	Local Plan with mitigation (%)
AM	Arm A - B3400 Churchill Way	50.2	67.7	50.1
	Arm B - Grafton Way	15.0	16.3	17.0
	Arm C - Worting Rd	79.4	92.8	61.8
	Arm D - West Ham Close	7.6	9.9	9.9
	Arm E - B3400 Worting Rd	99.1	133.5	103.3
	Arm F - Uskirchen Way	25.4	26.3	37.0
PM	Arm A - B3400 Churchill Way	104.8	139.0	99.3
	Arm B - Grafton Way	54.3	55.4	82.6
	Arm C - Worting Rd	86.4	96.3	77.3
	Arm D - West Ham Close	6.8	8.1	21.8
	Arm E - B3400 Worting Rd	69.1	94.5	75.0
	Arm F - Uskirchen Way	22.3	28.1	28.2

4.17.7 Table 4.34 shows the cost estimates for the proposed improvements to the West Ham Roundabout. The estimates have been rounded and contain a contingency to take account of uncertainty at the concept design stage.

Table 4.64 Indicative Improvement Costs for West Ham Roundabout

West Ham Roundabout	Costs (£)
Site Clearance	13,519
Fencing	0
Pedestrian Guardrail etc	5,590
Drainage	55,773
Earthworks	50,101
Pavement	99,568
Kerbs & Footways	21,251
Signs & Markings (Inc Work to Traffic Lights)	20,069
Road Lighting Columns	20,438
Traffic Signals	0
Accommodation Works/Planting	15,000
Sub – Total	**301,309**
Preliminaries 7.5%	22,598
Traffic Management 20%	60,262
Sub – Total	**384,169**
Contingency / Risk 45%	172,876
Total £	**557,045**

4.18 Fiveways Junction

4.18.1 This is presently a four-arm traffic signal controlled junction located on Pack Lane to the west of Basingstoke town centre. The traffic demand is shown in Figure 4.32, with and without the influence from the Local Plan developments. Table 4.65 and Table 4.66 also present detailed turning movements at this junction for the 2029 Reference Case and Local Plan Scenario 2 with Network A.

Figure 4.32 Demand at Fiveways Junction with and without Local Plan Developments

4.18.2 It can be seen from Table 4.65 and Table 4.66 that the current key movements at this junction are between Arm C (Kempshott Lane) and Arm A (Buckskin Lane) in both the AM and PM peak.

Table 4.65 Demand at Fiveways Junction in the AM Peak

	From / To	Arm A	Arm B	Arm C	Arm D	Total
2029 Reference Case	Arm A – Buckskin Lane	0	133	402	12	547
	Arm B – Pack Lane (East)	165	0	6	302	473
	Arm C – Kempshott Lane	928	6	0	223	1157
	Arm D – Pack Lane (West)	158	131	139	0	428
	Total	1251	270	547	537	2605
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Total**
Local Plan Scenario 2 Network A	Arm A – Buckskin Lane	0	134	405	15	554
	Arm B – Pack Lane (East)	230	0	6	314	550
	Arm C – Kempshott Lane	933	6	0	401	1340
	Arm D – Pack Lane (West)	306	141	167	0	614
	Total	1469	281	578	730	3058

Table 4.66 Demand at Fiveways Junction in the PM Peak

	From / To	Arm A	Arm B	Arm C	Arm D	Total
2029 Reference Case	Arm A – Buckskin Lane	0	56	1215	87	1358
	Arm B – Pack Lane (East)	297	0	36	243	576
	Arm C – Kempshott Lane	701	6	0	186	893
	Arm D – Pack Lane (West)	93	194	13	0	300
	Total	1091	256	1264	516	3127
	From / To	**Arm A**	**Arm B**	**Arm C**	**Arm D**	**Total**
Local Plan Scenario 2 Network A	Arm A – Buckskin Lane	0	57	1354	220	1631
	Arm B – Pack Lane (East)	299	0	37	365	701
	Arm C – Kempshott Lane	705	6	0	228	939
	Arm D – Pack Lane (West)	108	275	216	0	599
	Total	1112	338	1607	813	3870

4.18.3 With the predicted level of demand growth, the junction is forecasted to experience significant congestion even in the 2029 Reference Case Scenario.

4.18.4 The junction and all four approach roads are tightly bound on both sides by private land, limiting the space available for delivering junction improvements. In order to deliver the suggested junction mitigation, some adjustment of the existing highway footprint could be required.

4.18.5 The proposed scheme to enhance the capacity of Fiveways junction requires the following changes to the existing infrastructure:

- Extend the existing flares on Buckskin Lane and Pack Lane East to 35m.
- Extend the existing flare on Kempshott Lane to 58m.

4.18.6 These proposed highway improvements are illustrated in Figure 4.33

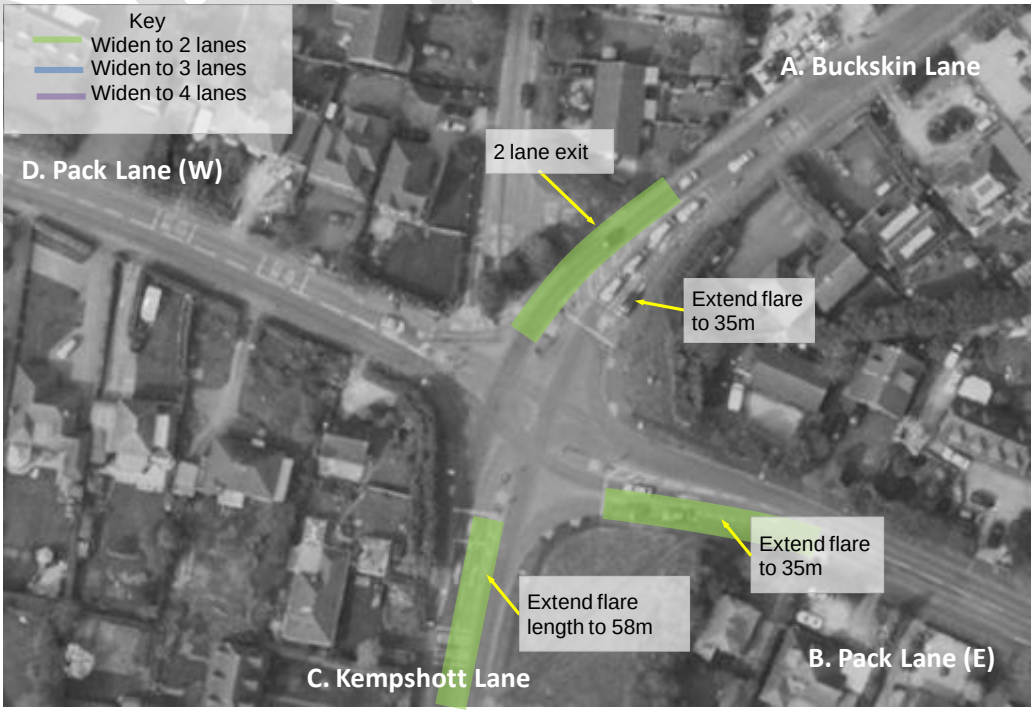


Figure 4.33 An Illustration of the Proposed Mitigation at Fiveways Junction

4.18.7 Table 4.67 below shows variations in the Degree of Saturation (DoS) resulting from different travel demand scenarios and the first proposed mitigation option to convert the roundabout to traffic signal control.

Table 4.67 Modelled Degree of Saturation at Each Entry at Fiveways Junction

Time	Arms	2029 Reference Case (%)	Local Plan without mitigation (%)	Local Plan with mitigation (%)
AM	Arm A – Buckskin Lane	131.4	174.7	121.0
	Arm B – Pack Lane (East)	131.4	172.9	122.9
	Arm C – Kempshott Lane	133.9	173.5	126.0
	Arm D – Pack Lane (West)	108.3	120.3	62.0
PM	Arm A – Buckskin Lane	191.4	210.0	184.8
	Arm B – Pack Lane (East)	188.5	210.1	179.1
	Arm C – Kempshott Lane	195.1	207.4	170.6
	Arm D – Pack Lane (West)	51.8	208.8	67.5

4.18.8 Results presented in Table 4.67 suggest that the proposed improvements would mitigate traffic impacts from the Local Plan by enhancing the performance of the junction approximately to a similar level to that of the 2029 Reference Case. Travellers going through this junction would still experience queuing and delay similar to any overcapacity junctions. A visual inspection of the proposed improvement suggests that it is unlikely both the widened carriageway and pedestrian facilities can be completely accommodated within the existing highway boundaries. Close liaison with HCC is recommended in any future design to explore opportunities for improving this junction as the Local Plan developments come forward.

4.18.9 Table 4.68 shows the cost estimates for the proposed improvements this junction. The estimates have been rounded and contain a contingency to take account of uncertainty at the concept design stage. The estimated cost does not consider any land take required to accommodate the proposed junction improvements.

Table 4.68 Indicative Improvement Costs for Fiveways Junction

Fiveways Junction	Costs (£)
Site Clearance	3,172
Fencing	0
Pedestrian Guardrail etc	1,312
Drainage	13,087
Earthworks	11,388
Pavement	20,665
Kerbs & Footways	4,986
Signs & Markings (Inc Work to Traffic Lights)	4,709
Road Lighting Columns	4,796
Traffic Signals	20,000
Accommodation Works	15,000
Sub – Total	**99,115**
Preliminaries 7.5%	9,912
Traffic Management 20%	19,823
Sub – Total	**128,850**
Contingency / Risk 45%	57,982
Total £	**186,832**

5 CONCLUSIONS

5.1 Summary

5.1.1 This Transport Assessment for Basingstoke and Deane Borough was aimed to evaluate potential traffic impacts from developments in the emerging Local Plan and explore mitigation measures to alleviate such impacts where necessary. The assessment was based on committed and planned development in the Borough and surrounding areas covering a period of time between 2011 and 2029.

5.1.2 The first part of the assessment was undertaken using a bespoke spreadsheet model for the AM (08:00-09:00) and PM (17:00-18:00) peaks. The development of the tool and its use in the assessment of different Local Plan scenarios has been described in this report. As the spreadsheet model is based on aggregate descriptions of travel demand and simplified representation of interaction between traffic flow and capacity, it was then complemented by standard junction modelling packages such as LinSig and ARCADY, which specialise in evaluating interaction between traffic of conflicting movements, queuing and delays at junctions. The combined application of the developed spreadsheet model and detailed junction models provides a suite of tools that are suitable for a strategic assessment of the traffic impacts from the Local Plan development from the perspectives of both the entire network and individual junctions.

5.1.3 The main objectives of the study were to:

- Collate information to identify the amounts and locations of development in the Borough in the future reference and development scenarios;
- Estimate the quantum and distribution of vehicular trips resulting from the additional development in the future;
- Assess traffic impacts and junction performance in the defined highway network and identify key junctions requiring mitigations;
- Propose mitigation measures or test existing concept designs and advise on their effectiveness; provide costing and identify phasing for mitigations where appropriate;
- Report findings on the main traffic impacts on the highway network and how these can be managed with the identified mitigation measures.

5.1.4 Base year traffic demand was established using information from existing traffic survey data and, where no data was available, the Basingstoke SATURN model. The forecasting of development related traffic growth was undertaken using local planning data / assumptions provided by BDBC and trip rates determined using TEMPRO / TRICS data. The study considered growth from development within Basingstoke and Deane Borough as well as the relevant LDF (or Local Plan) developments promoted by West Berkshire Council, Hart District Council, East Hampshire Council, Winchester City Council, Test Valley Borough Council, Reading Borough Council and Wokingham Borough Council. Area wide growth factors were determined to represent the background growth in traffic including changes to car ownership, income and fuel. The distribution of trips was determined from the Census Journey to Work data and assumptions of routing through the network were made for base and forecast trips using AA route planner as suggested in the HA's ETI guidance for spreadsheet modelling.

5.1.5 Numerous forecasting scenarios were modelled and analysed combining four land use scenarios and five networks into 21 scenarios. The network changes applied to develop each of the five networks is summarised in Table 5.1 and the 21 scenarios are set out in Table 5.2 below.

Table 5.1 Network Changes in the Modelled Future Highway Network

Highway improvements \ Networks	Net A	Net B	Net C	Net D	Net E
1) Black Dam Roundabout	Yes	Yes	Yes	Yes	Yes
2) Cufuade Lane / Gaiger Avenue link road		Yes		Yes	
3) Brighton Hill Roundabout improvement			Yes	Yes	
4) A339 / B3400 link road	Yes	Yes	Yes	Yes	
5) A Western Bypass					Yes

Table 5.2 Traffic Forecasts Undertaken

	Base	Net A	Net B	Net C	Net D	Net E
2029 Reference	√					
Scenario 1 – Cabinet suggested		√	√	√	√	√
Scenario 2 – Cabinet agreed		√	√	√	√	√
Scenario 3 – Western focus		√	√	√	√	√
Scenario 4 – Eastern focus		√	√	√	√	√

* Definition of networks A through to E is given in

5.1.6 The developed spreadsheet model assumes no changes to mode choice or time of day of travel and is also not an assignment model. It is assumed that traffic will not re-route irrespective of the congestion on links or junctions. As such, forecasted travel demand from the model is considered to represent a worst case scenario.

5.1.7 Congestion 'hotspots' were identified in the modelled area and detailed junction analysis was undertaken to explore suitable improvements to mitigate the impacts of the Local Plan development traffic. Whilst the mitigations suggested in this study require further refinement or investigation in close liaison with HCC when developments in the Local Plan come forward in the future, it is considered by Basingstoke and Deane Borough Council that the assessment indicates that the majority of the impacts on the highway network resulting from the Local Plan development scenarios could be accommodated after mitigation.

5.2 Traffic Impacts of Development

5.2.1 This transport assessment is focused on the projected unconstrained amount of trips generated by committed and planned development within Basingstoke and Deane and its surrounding areas. However, the impact of these trips has been assessed within Basingstoke and Deane Borough only.

5.2.2 The increase in traffic demand in each scenario is set out in Table 5.3 below. These figures do not include the area wide growth factors that are applied in addition to the trips specific to each development as well as representing background growth, these factors incorporate the impact of small developments (less than 30 jobs or 40 dwellings) and planned developments for which a location has not yet been identified.

5.2.3 The level of traffic resulting from the Local Plan development is very similar between each of the four demand scenarios and so the model results are also similar.

Table 5.3 Forecasted Travel Demand Growth

Source of Growth		2029 Ref	Local Plan			
			1	2	3	4
AM trips to development	Committed	1578	1578	1578	1578	1578
	Trips from Basingstoke to neighbouring areas	1401	1096	1096	1096	1096
	Basingstoke Local Plan	0	1717	1727	1722	1734
	Total	3148	4865	4875	4870	4882
AM trips from development	Committed	1506	1506	1506	1506	1506
	Trips from neighbouring areas to Basingstoke	450	362	362	362	362
	Basingstoke Local Plan	0	3599	3637	3619	3662
	Total	2491	6090	6128	6110	6153
PM trips to development	Committed	1532	1532	1532	1532	1532
	Trips from Basingstoke to neighbouring areas	1202	1089	1089	1089	1089
	Basingstoke Local Plan	0	3677	3718	3700	3743
	Total	3573	7250	7291	7273	7316
PM trips from development	Committed	1834	1834	1834	1834	1834
	Trips from neighbouring areas to Basingstoke	1078	913	913	913	913
	Basingstoke Local Plan	0	2566	2590	2579	2603
	Total	3101	5667	5691	5680	5704

5.3 Local Road Network Findings

5.3.1 A comparison was made between the Local Plan scenarios, the 2012 Base and the 2029 Reference Case scenarios to identify local roads that may experience congestion issues as a result of the Local Plan developments. The roads within Basingstoke were split into three sets for the purpose of this analysis;

- Cordon links that directly feed traffic to the Ringway from all directions
- Selected links on different sections of the Ringway
- Selected links within the urban area enveloped by the Ringway

5.3.2 To identify and isolate the impacts of the Local Plan developments this analysis has focused on identifying links where the RFC is below 1 in the Reference Case but over 1 in the Local Plan scenarios, or the increase is over 10% where the RFC is over 1 in both scenarios. The following cordon links meet this criteria;

- A30 Winchester Road inbound (AM) and outbound (PM)
- B3400 Churchill Way West inbound (AM) and outbound (PM)
- A339 Kingsclere Road inbound (AM & PM) and outbound (PM)
- A339 Hackwood Road outbound (PM)

5.3.3 The following Ringway links meet this criteria (the locations of these links can be seen in Figure 3.1);

- Ringway North 1 clockwise and anti-clockwise (AM & PM)
- Ringway North 2 clockwise and anti-clockwise (AM & PM)
- Ringway East 1 clockwise and anti-clockwise (AM)
- Ringway East 2 clockwise (AM & PM)
- Ringway South 1 anti-clockwise (AM & PM)
- Ringway South 2 clockwise (PM) and anti-clockwise (AM)
- Ringway West 1 clockwise (AM & PM) and anti-clockwise (PM)
- Ringway West 2 clockwise (AM & PM) and anti-clockwise (PM)

5.3.4 On the following urban links the demand exceeds the capacity following the implementation of the Local Plan development;

- A3010 Churchill Way West eastbound (AM)
- Winchester Road westbound (PM)
- Hackwood Road southbound (PM)

5.3.5 As well as considering the performance of links within the study area, an assessment of the junction performance was undertaken. 17 junctions were identified and agreed with BDBC as those requiring mitigation measures in order to accommodate the Local Plan development traffic. The study then went on to consider the transport infrastructure opportunities to mitigate the impact of development at these identified junctions. This may include measures such as lane widening or signalisation.

5.3.6 Table 5.4 presents a summary of the junction mitigation assessment. It covers names of the 17 junctions investigated, the form of junction improvements recommended, their indicative costs and effectiveness in traffic terms.

Table 5.4 An Overview of Junction Mitigation Findings

Location	No.	Junction Name	Form of Mitigations	Indicative costs	Effectiveness[1] of Mitigation				
					Total num of arms	Arms mitigated			
						AM		PM	
A33 corridor	1	A33 / Bramley Road Roundabout	* Partial signalisation of the roundabout at A33 entries and widening of its circulatory * Flare both A33 entries * Provide exit funnels at both A33 exits	£661,039	3	2	67%	3	100%
	26	A33 / Gaiger Avenue Junction	* Convert roundabout to a signalised intersection	£3,010,811	4	4	100%	4	100%
	20	A33 / Thornhill Way Junction	* New or lengthened flares on A33 entries * Widen Thornhill Way entry to two lanes	£1,054,695	4	3	75%	4	100%
	4	Binfields Roundabout	* Option A - Widen the entries and circulatory to 3 or 4 lanes where appropriate	£1,993,080	5	5	100%	5	100%
			* Option B - A 'through-about'	N/A	5	5	100%	5	100%
	7	Crockford Roundabout	* Signalise the roundabout * Widen Crockford Lane and A33 East entries using flares * An additional lane on the A33 up to the Popley Way junction	£1,909,605	4	3	75%	2	50%
A30 corridor	23	A30 / Wallop Drive Roundabout	* Convert roundabout to a signalised junction	£2,261,703	3	3	100%	0	0%
			* Widen 750m of A30 southbound carriageway up to Kempshott roundabout	£5,488,650					
	13	Kempshott Roundabout	* Signalise the roundabout * Flare widening at all entries * Widen the circulatory	£3,863,026	4	3	75%	3	75%
	6	Brighton Hill Roundabout	* Minor amendments based on a signalised 'Hamburger' design provided by BDBC	£5,464,458	6	5	83%	5	83%
B3400	27	Worting Road / Roman Way Roundabout	* Roundabout enlargement * Flare widening all entries	£2,843,431	3	3	100%	2	67%
	25	B3400 Worting Road Roundabout	* Flare widening 3 arms * Repaint the circulatory to 2 lanes	£219,774	4	3	75%	3	75%
	28	West Ham Roundabout	* Flare widening 3 entries * Widen the southern half of the circulatory	£557,045	6	6	100%	6	100%
A339	19	A339 / Roman Road Roundabout	* Convert roundabout to a signalised intersection * Flare widening all entries	N/A	4	2	50%	2	50%
Ringway and inner	29	A339 / Ringway West	* Full signalisation of the roundabout * Flare widening all entries	£1,315,996	3	3	100%	3	100%

Location	No.	Junction Name	Form of Mitigations	Indicative costs	Effectiveness[1] of Mitigation				
					Total num of arms	Arms mitigated			
						AM		PM	
urban areas		Roundabout	* Widen the northern half of the circulatory						
	2	Aldermaston Road roundabout	* No cost effective solution[2]	N/A	N/A		N/A		N/A
	11	Hackwood Road Roundabout	* Flare widening of all entries and the circulatory carriageway	£1,784,693	4	4	100%	4	100%
	22	Victory Roundabout	* Flare widening of the A3010 West and Alencon entries * Widen the northern section of the circulatory	£693,483	4	3	75%	3	75%
Other	10	Fiveways Junction	* Lengthen flares on 3 entries	£186,832	4	4	100%	4	100%

1. The Effectiveness of Mitigation is measured by the number of arms successfully mitigated as a percentage of the total number of arms at individual junctions. An arm is deemed successfully mitigated if the modelled DoS after mitigation is no greater than 85% or no more than 5% over the DoS in 2029 Reference Case.

2. The limitation in the adopted modelling approach based on the worst case scenario travel demand means that demand reductions due to potential re-routing, re-timing, re-distribution of traffic and the difference between actual and demand flows cannot be objectively estimated with the available tools in this study. Further refinement of the approach will be required to find an acceptable solution at the junction in the future.

5.3.7 It should be noted that mitigation measures were identified in a way that is focused on relieving the traffic impacts from the Local Plan development rather than completed removing congestion and delays at the junctions investigated. A junction is deemed mitigated if its Degree of Saturation (DoS) is lower than 85% or is at a similar value to that of the 2029 Reference Case where no Local Plan developments are included.

5.3.8 Table 5.4 also summarises the effectiveness of mitigation by presenting the number of arms mitigated as a percentage of the total number of arms. It is clear that the Local Plan traffic impacts on the majority of the assessed junctions can be effectively mitigated with high percentage values reported in most cases. There are only two exceptions. The A30 / Wallop Drive Roundabout is forecasted to operate with worsened performance in the PM peak hour with both Local Plan traffic and the proposed mitigation in place. However, examination of the modelled queuing and delays indicated that the proposed improvements would still bring significant congestion relief to the heavily trafficked A30 and enable the junction operate in a much more balanced way.

5.3.9 Whilst the mitigations suggested in this study require further refinement or investigation in close liaison with HCC when developments in the Local Plan come forward in the future, it is considered by Basingstoke and Deane Borough Council that the assessment indicates that the majority of the impacts on the highway network resulting from the Local Plan development scenarios could be accommodated after mitigation. This is subject to further discussion and agreement with the Highway Authority regarding the mitigation/ improvement works required to satisfy this.

5.3.10 It should be noted that the list of junctions that may require mitigation is not exhaustive and other junctions and links (as identified in Chapter 3) within the modelled area may also require improvements in further studies as the Local Plan is taken forward.

5.4 Strategic Road Network Findings

5.4.1 The M3 between junction 6 and junction 8 is located within Basingstoke and Deane Borough.

5.4.2 The additional traffic generated by the Local Plan developments has a minimal impact on this section of the M3 due to the size of the increase in traffic relative to the existing flows. The largest increase in traffic is on the section between junction 8 and junction 7 where the flow increases by 4% (252 vehicles per hour) between the 2029 Reference and Local Plan Scenario 2.

5.4.3 All analysis undertaken within this transport assessment has not identified any significant worsening of the performance of the M3 within Basingstoke and Deane Borough.

5.5 Limitations of Study

5.5.1 Given the strategic nature of the study and the tools employed, there are a number of key assumptions and limitations which need to be considered during the interpretation of the identified highway impacts, conclusions and recommendations made in this report.

5.5.2 First of all, all performance assessments adopt a worst case scenario approach and are based on unconstrained traffic growth on the highway network as a whole and at individual junctions. This approach ensures robustness of the assessments on the basis that, if unconstrained demand can be accommodated (along with reasonable mitigation), the Local Plan will be sound on transport grounds. However, this approach also means that benefits from further highway demand reductions as a result of the following considerations are not considered in this study:

- The scope for behavioural changes that may result due to increased congestion at a particular junction. For example, the spreading of journeys to times which are less busy or the scope to divert to alternative routes
- The potential for a modal shift from use of the private car to alternatives, such as public transport, cycling and walking
- Changes to trip frequency, origins, destinations, or journey distance

5.5.3 In addition to the above assumptions, the assessment considers all travel demand (demand flows in traffic modelling terms) that intends to go through individual junctions and assume all these demand can reach the specific junction during the modelled period of time. In reality it is commonly recognised that some of the demand may not materialise in the modelled hours due to congestion elsewhere in the network, which leads to lower actual flows that arrive during a given period of time.

5.5.4 The modelling tool developed in this study is in the form of a spreadsheet model, which reflects the aforementioned assumptions and limitations. It does not undertake any assignment so traffic is not going to re-route as a result of congestion. Also, it does not consider any shifting of traffic between different modes so the potential impacts on highway travel demand from the promotion of smarter choices measures are not directly captured by the model.

5.5.5 In light of the aforementioned assumptions and limitations, it is important that these considerations are taken into account in any further study as the Local Plan is taken forward. This will be for the purpose of either achieving better value for money by reducing the scale of the proposed mitigation schemes (if the forecasted travel demand could be lower) or further exploring highway improvements (where no satisfactory mitigation has been found in this study).

5.5.6 A selection of 17 key junctions were taken into detailed assessment and mitigated after discussion with BDBC. Findings presented in this report suggest that there are still other junctions and highway links that may experience increased travel demand and its associated congestion and delays. These could be considered in further studies or when the proposed mitigation measures are reviewed for refinement in the future.

PART B

6 MODEL SPECIFICATION

6.1 Introduction

6.1.1 The spreadsheet model is a simple and fit for purpose tool for high-level analysis of traffic impacts from different development scenarios on the modelled highway network. Its main purpose is to inform further investigation to assess performance of selected individual junctions and identify mitigations.

6.1.2 The extent of the highway network in the spreadsheet model is already illustrated in Figure 2.1 and Figure 2.2 in Part A of this report. This was set out by BDBC at the start of this study.

6.1.3 The spreadsheet model has a base year of 2012 and a single forecasting year of 2029. The modelled periods are 08:00 to 09:00 for the AM peak and 17:00 to 18:00 for the PM peak

6.2 Model Configuration

6.2.1 Figure 6.1 shows a screenshot of the front end user interface of the spreadsheet model. Further detail on functionalities available via the user interface is given in Appendix D of this report.

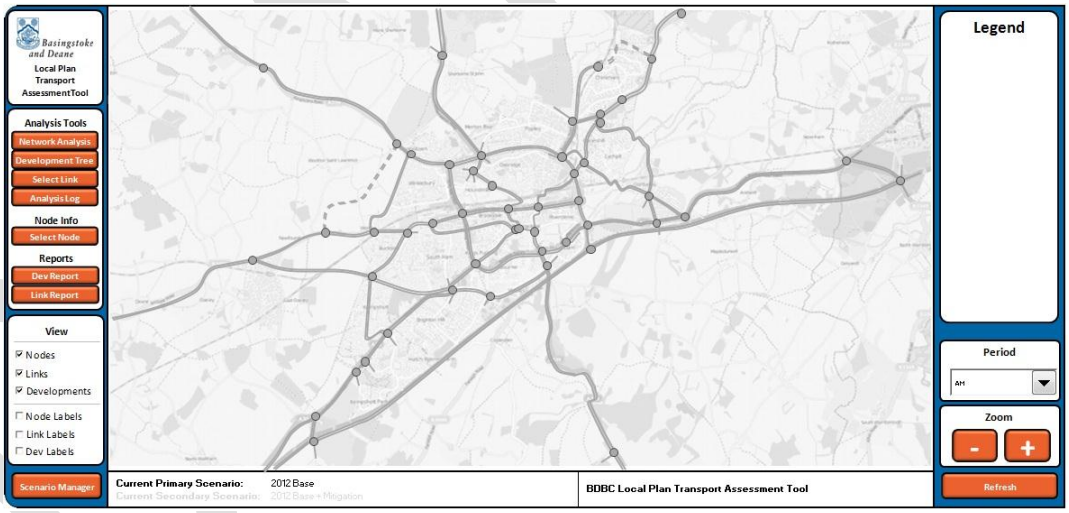


Figure 6.1: An Illustration of the Model User Interface

6.2.2 The model features three key areas of functionality:

- Scenario management – allows selection of different predefined development scenarios for subsequent analysis. In addition to a primary scenario, a secondary scenario can also be designated to enable cross scenario analysis. This function is provided for the purpose of understanding impacts on travel demand and network performance between two selected scenarios as a result of changes in land use scenarios or implementation of highway interventions.

- Analysis management – enables a variety of pre-defined analyses of one or two selected scenarios. This covers the visualisation of modelled flows and RFC (Ratio of Flow over Capacity) for links and nodes, and illustration of route choice of development related trips.
- Visualisation & tabulation – offers a range of functions to identify individual modelled elements (node, link and development labelling), visualise findings from any analysis undertaken and tabulate full details for further analysis by the advanced users.

6.2.3 All functions of the spreadsheet model are built upon six basic objects in the model as defined below:

- Nodes – each node represents a junction. 68 nodes were defined in the modelled network, 25 out of these have been identified by BDBC as key junctions. Each node has a set of basic attributes such as form of control, name, location and a unique junction number. Table 7.1 in the next chapter of this report contains a full list of 25 key junctions.
- Turns – three neighbouring nodes form a turn. Traffic going through any junctions (nodes) is defined on a turn-by-turn basis.
- Links – two neighbouring nodes form a link. Any two-way road is modelled as two different links based on the direction of travel. Basic attributes for a link include road classification, origin node, destination node, exit capacity, and upstream and downstream traffic flows.
- Developments – a proposal of certain quantum of different land uses that produce and attract trips.
- Network – a collection of nodes (junctions) and links; different networks are defined in the model in order to assess the changes brought by individual highway interventions.
- Scenarios – the combination of a network with a collection of developments of varying quantum and distribution in BDBC.
- Routes – a route is a sequence of consecutive nodes between the origin and destination of a journey. It carries a certain volume of traffic and is associated with specific scenario(s) and development(s)

6.3 Key Features

6.3.1 A range of features have been provided in the spreadsheet model for the purpose of demonstrating key assumptions made during the model development process and interrogating the modelling results to inform the transport assessment.

- Link and junction capacity map – capacity maps can be produced to highlight links and junctions that are likely to be congested in the future based on forecasted RFCs for links or each entry arm of individual junctions. The maps would inform the identification of junctions that should be brought into further junction modelling assessment and mitigation testing. All modelling results underpinning these maps can also be tabulated and reported separately.

- Junction turning flow output – detailed turning movement matrices are available for each modelled junction. These can be copied and pasted directly into separate junction models for more robust analysis.
- Development select link – an analysis to visualise all developments that contribute traffic to a specific link.
- Development route tree – an analysis to visualise the origins or destinations of all trips to or from the selected development.

7 DATA AND ASSUMPTIONS

7.1 Introduction

7.1.1 This section summarises traffic flow and capacity data that was incorporated in the spreadsheet model and key assumptions that were adopted to close gaps in some of these data.

7.2 Traffic Counts

7.2.1 Junction turning counts collected in different years have been identified for all 25 key junctions in the modelled area. Table 7.1 shows a list of these junctions, the year of survey and scaling factors used to covert historic turning counts to the model base year 2012.

Table 7.1 A List of 25 Key Junctions with Scaling Factors Used

25 Key Junctions		Survey Year	Scaling Factors	
			AM	PM
1	A33 / Bramley Road	2013	1	1
2	Aldermaston Roundabout	2010	1.1045	1.0809
3	Beggarwood Lane / A30 Signalised Junction	2012	1	1
4	Binfields Roundabout	2011	1.0787	1.0625
5	Black Dam Roundabout	2011	1.0787	1.0625
6	Brighton Hill	2008	1.0463	0.9912
7	Crockford Lane Roundabout	2011	1.0787	1.0625
8	Daneshill Roundabout	2011	1.0787	1.0625
9	Eastrop Roundabout	2011	1.0787	1.0625
10	Fiveways	N/A[#]	N/A[#]	N/A[#]
11	Hackwood Roundabout	2005	1.0559	1.0209
12	Hatch Lane / A30 Junction	2013	1	1
13	Kempshott Roundabout	2012	1	1
14	M3 Junction 6	2011	1.0787	1.0625
15	M3 Junction 7	2012	1	1
16	M3 Junction 8	2012	1	1
17	Pelton Road Junction	2011	1.0787	1.0625
18	Reading Road Roundabout	2011	1.0787	1.0625
19	Rooksdown Roundabout	2005	1.0559	1.0209
20	Thornhill Cross Roads	2012	1	1
21	Thornycroft Roundabout	2004	1.166	1.0313
22	Victory Roundabout	2004	1.166	1.0313
23	Wallop Drive	2012	1	1
24	Winchester Road Roundabout	2011	1.0787	1.0625
25	Worting Road Roundabout	2012	1	1

[#] Junction turning movements were extracted from the Basingstoke SATURN model. See paragraph 7.2.4.

7.2.2 Turning flows for 24 out of the 25 key junctions were extracted from count data as inputs to the spreadsheet model. Scaling factors, as demonstrated in Table 7.1, were applied during this process so all input flows have the same base year. These factors were derived using long term Automatic Traffic Count (ATC) data in order to scale the older counts to 2012 traffic levels. The only site with sufficiently long term coverage was on the A30 Ringway South between Hackwood Road and Winchester Road roundabouts. The counts available from this site are a mixture of whole year, single month and single week average volumes. The 2012 counts supplied for this site cover the last week of September (from 24/09/2012 to 01/10/2012), the other counts cover either May (2003-2005, 2007-2008) or the whole year (2004, 2009-2011). The supplied data allowed a comparison between the May and whole year data for 2004 which suggested that the observed flows in May were very similar to the whole year average. The 2006 traffic volume at this site has been estimated using 2005-2007 counts at two other locations around Basingstoke (A339 Ringway East and A30 Winchester Road).

7.2.3 A list of the scaling factors derived is given in Table 7.2. It can be observed from the table that the value of scaling factors for different years prior 2012 reflects influences from the recent economic recession and changes in the fuel price.

Table 7.2 A List of Scaling Factors for Traffic Counts

Year	AM	PM
2003	1.084	1.018
2004	1.166	1.031
2005	1.056	1.021
2006	1.050	0.989
2007	1.048	0.963
2008	1.046	0.991
2009	1.089	1.073
2010	1.105	1.081
2011	1.079	1.063
2012	1.000	1.000

7.2.4 For the other 43 non-key junctions in the modelled area, traffic counts were only available for 6 of them. Therefore, for the remaining 37 non-key junctions and one key junction (no.10 Fiveways) where no existing turning data is available, it was agreed with BDBC to infill this gap in data following two approaches set out below:

- Deriving traffic turning volumes by extracting turning proportions from the existing SATURN model[9] and controlling link flow on each arm to the observed volumes where link counts are available.
- Where neither turning counts nor link flows can be found, junction turning movements are extracted from the SATURN model directly.

[9] Basingstoke Transport Model provided by Hampshire County Council; the model was last reviewed and revalidated in 2009.

7.2.5 The above two approaches were deemed reasonable in light of data gaps as these links and junctions are unlikely to be critical in future years. If any of the junctions that were infilled with SATURN turning information and/or link flows are identified to be of significant concerns in the subsequent stages of the study, additional traffic surveys can be undertaken where appropriate to achieve better accuracy in base year traffic data.

7.3 Junction Models

7.3.1 Existing junction models were also collated during the spreadsheet model development process. For the 25 key junctions where no existing model is available, new models have been constructed (approximately 18 out of 25). This exercise enables detailed assessment of individual key junctions based on flows from the spreadsheet model in the subsequent stages of the work.

7.3.1 The junctions models collated or constructed during this process were also used to derive the entry arm capacity for individual key junctions. These capacities were then incorporated into the spreadsheet model to support the junction capacity map functionality. It should be noted that the input capacity for each arm would not vary in accordance with the variations in the modelled flows at each junction in traffic forecasting. Therefore the capacity map function of the spreadsheet model should only be used for illustrative purpose to identify junctions that might be under pressure in the future year rather than taking over the role of more accurate junction assessment that is planned at a later stage of the transport assessment.

7.3.2 The entry arm capacity for all the non-key junctions in the spreadsheet model was derived from the existing SATURN model.

8 TRAFFIC FORECASTING

8.1 Overview

8.1.1 This section runs through the overarching structure of the traffic forecasting process based on land use assumptions received from the BDBC. Figure 8.1 below illustrates different components of traffic growth to be considered in the traffic forecasting process using the spreadsheet model.

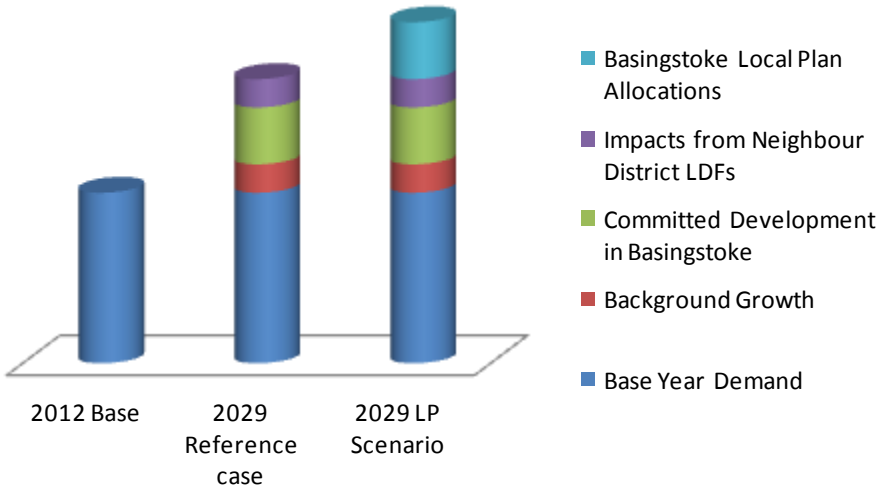


Figure 8.1: Illustration of Traffic Growth in the Model Network

8.1.2 It can be seen that there are broadly two types of forecasting scenarios. The former is a 2029 Reference Case, which contains all committed developments. The latter is a group of Local Plan development scenarios, which will be considered in addition to the growth assumed in the reference. All these Local Plan scenarios have varying quantum and distribution of developments representing different aspirations of the emerging local plan.

8.1.3 Table 8.1 illustrates the relationship between different components of identified development growth and proposed traffic forecasting scenarios. Individual components of this table are further explained in the remainder of this chapter with the forecasted number of trips in the 2029 Reference for illustration purpose.

Table 8.1 Components of Traffic Growth VS Forecasting Scenarios

		2012 Base	2029 Reference	2029 Local Plan scenarios
Base year demand		✓	✓	✓
Background growth		×	✓	✓
Committed developments	Identified residential and commercial sites	×	✓	✓
	Area wide growth (outstanding small site commitments and sites < 40 dwellings or 30 jobs)	×	✓	✓
Impact from neighbouring districts		×	✓	✓
Basingstoke Local Plan allocations	Local plan development sites	×	×	✓
	Unallocated or non-committed sites (from existing local plan)	×	×	✓
	Area wide growth (windfall and sites < 40 dwellings or 30 jobs)	×	×	✓

8.2 Background Growth

8.2.1 Background growth representing influences from changes in car ownership, income and fuel prices is applied using growth factors determined from NTEM dataset 6.2 and relevant guidance in WebTAG 3.15.2 as shown in Table 8.2 below.

Table 8.2 Background Traffic Growth for Basingstoke between 2012 and 2029

Sources of impacts \ time period	AM	PM
Car ownership changes[10]	0.996	1.003
Income Adjustment	1.053	1.053
Fuel Adjustment	1.015	1.015
Combined Income & Fuel Adjustment	1.068	1.068
Combined background growth factor	1.064	1.072

8.3 Committed Developments in Basingstoke

8.3.1 A summary of committed development by 2029 was provided by BDBC. It was agreed that any development with over 40 dwellings or 30 jobs should be explicitly modelled in traffic forecasting in terms of their quantum and spatial distribution. For any development lower than this threshold, they will be incorporated into an area wide growth factor.

8.3.2 23 large commercial and retail developments are listed in Table 8.3, while the other 31 sites with lower than 30 jobs are summarised in Table 8.4. It can be seen from Table 8.5 that the small sites only account for 8% of the total growth in the number of jobs. Therefore the simplification of representing these small growths with an area wide factor is deemed reasonable.

[10] derived by zeroing all development growth between 2012 and 2029 using the 'alternative planning data' function in TEMPRO

Table 8.3: Large Reference Employment Development with at least 30 Jobs

No.	Ref	Large Development (with over 30 jobs)	Type of Land Use	Net Gain in Jobs	Net gain in 100 sqm
1	108	120-122 Worting Road	Retail trade	146	28
2	1002	16-18 Winchester Road	Business	62	11
3	040GA	Adjacent Alberto Culver	Business	100	20
4	-	Airkix*	Recreation & sport	N/A[11]	-
5	130	Armstrongs Yard	Business	N/A[12]	6
6	124	Avenue Nurseries	Retail trade	46	9
7	235	Boundary Hall	Residential	53	9
8	010HA	Elderwood	Business	121	22
9	216	Former Mod Site	Business	55	6
10	142	Former Victoria And Eli Lilley Sites	Business	82	32
11	252	J Sainsburys Plc	Industry, construction & transport	150	114
12	240	Kempshott Park Industrial Estate	Residential	80	146
13	136	Land At Gresley Road	Business	559	101
14	001AH, 001BA, 001BC, 192	Land At Jays Close	Business	750	135
15	054	Land At North Of Popley Way	Retail trade	79	15
16	104	Land At Winchester Road	Retail trade	529	90
17	010K	Larchwood	Business	584	105
18	113	Park Prewett Hospital	Retail trade	51	10
19	010J	Redwood	Business	286	51
20	123	The Annexe	Retail trade	45	1
21	136	The White Building	Retail trade	50	2
22	253	Unit A, Rutherford Road	Business	48	19
23	233	Worting Park	Business	-70[13]	-3
			Total Large Employment	**3,807**	**928**

[11] No information on the number of jobs at Airkix was provided. Number of development trips was taken directly from the relevant Transport Assessment.
[12] No information on the number of jobs at Armstrong Yard was provided.
[13] The site is currently occupied with 120 jobs. The proposed redevelopment would only provide 50 jobs so the net gain is -70.

Table 8.4: Small Reference Employment Development with less than 30 Jobs

No.	Ref	Large Development (with over 30 jobs)	Type of Land Use	Net Gain in Jobs
1	017	TAYLORS FARM	Retail	25
2	131	YEW TREE FARM GARDEN CENTRE	Retail	26
3	0132	FORMER SERVICE STATION	Retail	16
4	0133	SHERFIELD ON LODDON GARDEN CENTRE	Retail	12
5	0134	BARCLAY HOUSE	Retail	21
6	0135	LAND AT FAROE CLOSE AND MALDIVE ROAD	Retail	18
7	129	35, WINCHESTER STREET	Retail	14
8	097	NORTH OF POPLEY WAY	Retail	23
9	111	UNITS 3A & 4A MONITON ESTATE	Retail	9
10	114	PARK PREWETT HOSPITAL	Retail	28
11	115	LAVERSTOKE PARK CRICKET CLUB	Retail	4
12	117	TAYLORS FARM	Retail	14
13	122	OVERTON RECREATION GROUND	Retail	5
14	126	THE HOLDING FIELD	Retail	3
15	107	HAMPSHIRE COURT HOTEL	Retail	19
16	128	105-107, CLIDDESDEN ROAD	Retail	5
17	0137	SANDFORD SPRINGS GOLF CLUB	Retail	13
18	0138	BARCLAY HOUSE	Retail	29
19	0140	PREMIER INN	Retail	9
20	198	HARROW GARAGE	Industry and Office	-27[14]
21	218	T T TENTS LTD	Industry and Office	0
22	223	RIVERSIDE VIEW	Industry and Office	0
23	227	SHOTHANGER WORKS	Industry and Office	1
24	241	BLANDYS FARM	Industry and Office	16
25	242	LOWER LINK FARM	Industry and Office	0
26	244	CONSTRUCTION HOUSE	Industry and Office	2
27	248	VISA INTERNATIONAL	Industry and Office	10
28	249	WHITWAY FARM	Industry and Office	5
29	251	UNIT 5 THE CAROUSEL	Industry and Office	3
30	256	MODERN MOULDS ASSOCIATES LTD	Industry and Office	3
31	257	58-59 WATSON WAY	Industry and Office	24
			Total Small Employment	**337**

[14] The site is currently occupied with 53 jobs. The proposed redevelopment would only provide 26 jobs so the net gain is -27.

Table 8.5: Total Reference Employment Development

Category	Number of jobs	%
Total jobs in large employment sites	3,807	92%
Total jobs in small employment sites	337	8%
Total number of jobs	4,144	100%

8.3.3 For residential developments in the reference scenario, there are 13 large sites (at least 40 dwellings) and 9 small ones as summarised in Table 8.6 and Table 8.7. It can be seen from Table 8.8 that the small sites only account for 10% of the total increase in the number of dwellings. Therefore the simplification of representing these small sites with an area wide factor is deemed reasonable due to their marginal impact on road traffic.

Table 8.6: Large Reference Residential Development with at least 40 Dwellings

No.	Ref	Development	Number of Dwellings
1	-	Beech Down Pre School	70
2	-	Boundary Hall	115
3	-	John Hunt School Site, Popley	164
4	-	Kempshott Park Industrial Estate	62
5	-	North Of Popley/ Merton Rise	784
6	-	Park Prewett	132
7	-	Taylors Farm /Sherfield Park	257
8	-	Webbers Garage, New Road	94
9	-	West Ham Lane (And To Moniton Estate)	50
10	TAD008	Land between Mulfords Hill and Silchester Road	40
11	BAS092	Aldermaston Road Triangle	300
12	BAS093	A339 Newbury Road 'Trumpet' Junction	130
13	BAS095	Land north of Park Prewett	750
		Total Households (>= 40)	**2,948**

Table 8.7: Small Reference Residential Development with less than 40 Dwellings

No.	Ref	Development	Number of Dwellings
1	-	Harrow Garage	27
2	-	11-19 Greytown House, Wote St	24
3	-	1 New St and 12 Cross St	12
4	-	Brook House	30
5	-	Maldive/Faroe Close	35
6	-	Broadview, Woods Lane.	10
7	-	Land adj to 85 Birches Crescent	11
8	-	Harwood Court	16
9	-	Outstanding Small site Commitments	174[15]
		Total Households (< 40)	**339**

[15] This represents a group of small sites which all have less than 40 dwellings.

Table 8.8: Total Reference Residential Development

Category	Number of HHs	%
Total dwelling in large residential sites	2,948	90%
Total dwellings in small residential sites	339	10%
Total number of dwellings	**3,287**	**100%**

8.3.4 It can be concluded from the previous tables that the majority of the total increase, 3,807 jobs and 2,948 dwellings (illustrated in Figure 8.2), are large sites which will be accounted for as individual developments. The forecasting process, i.e. trip generation and distribution, is reported in further detail in the rest of Section 8.3 from Paragraph 8.3.6.

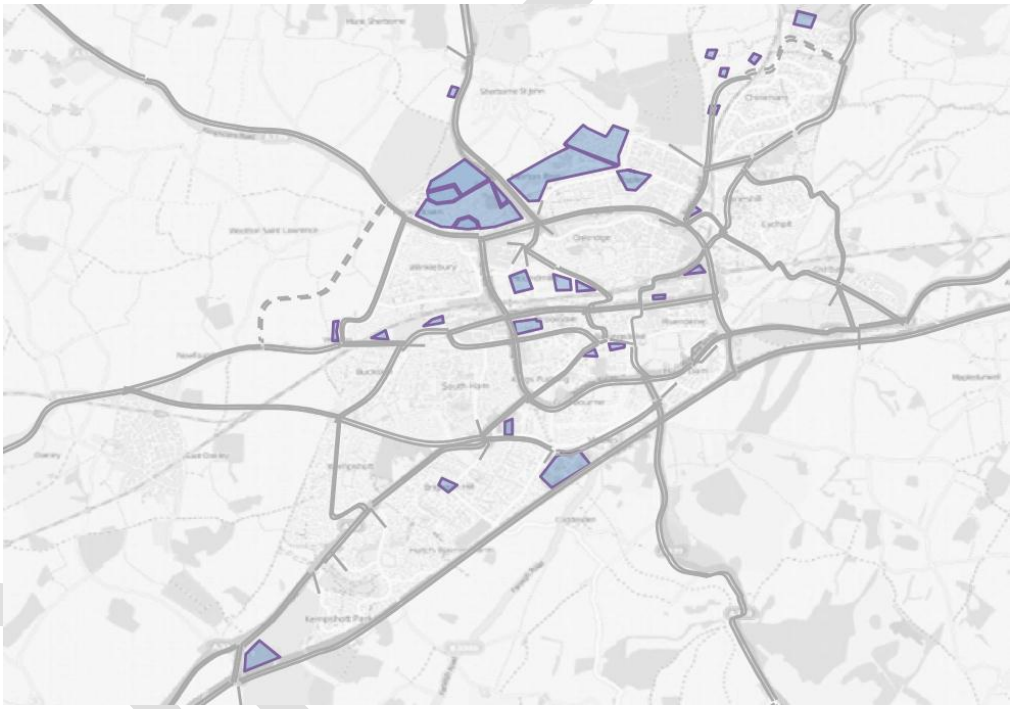


Figure 8.2: Illustration of Large Development Sites in 2029 Reference Case

8.3.5 The remainder of the increase, 337 jobs and 339 dwellings, is represented using area wide traffic growth factors as they are either too small to be considered as individual sites or their exact locations are not definitive as this stage. These growth factors, shown in Table 8.9, were derived using the 'alternative planning data' function in TEMPRO. They were applied on top of the background growth factors presented in Table 8.2.

Table 8.9: Small Development Growth Factor

Description	AM	PM
Small Residential, Commercial and Retail Sites	1.00412	1.00409

Trip Generation

8.3.6 This process quantifies the number of trips to and from each development site. Typically, trip generation is based on the identification of suitable (person or vehicle) trip rates. A range of industry standard trip rate database tools are available that contain national, or more local, trip rates measured for typical land use sites.

8.3.7 TRICS was used to determine residential trip rates within Basingstoke by extracting trip rates for a number of similar sites from the database. Sites consisting of privately owned houses and flats were selected in suburban or edge of town locations in the South East of the UK. In total, 31 sites were selected.

8.3.8 After discussion with the BDBC and HCC, a power function was determined for trips arriving and departing in the AM and PM periods using the data extracted from TRICS. Each power function defines the relationship between the number of dwellings on the site and the number of trips produced by / attracted to the site. The power functions were determined as follows;

AM arrivals = 0.233 x number of dwellings$^{0.8939}$

AM departures = 0.4543 x number of dwellings$^{0.9667}$

PM Arrivals = 0.3624 x number of dwellings$^{0.9997}$

PM departures = 0.2225 x number of dwellings$^{0.9931}$

8.3.9 A power of less than 1 indicates that a larger development will produce slightly less trips per dwelling. This accounts for the increased level of self-containment for larger developments. As a result, the trip rate for each development differs slightly dependent on the number of dwellings. When applied to the committed residential developments the power functions produce the following average trips rates shown in Table 8.10.

Table 8.10: Average trip rates for committed developments

	AM arrivals	AM departures	AM total	PM arrivals	PM departures	PM total
Trip rate	0.139	0.403	**0.542**	0.362	0.260	**0.622**

8.3.10 To determine trip rates for commercial developments, trip rates for sites with similar land uses were extracted from the TRICS database in the South East of the UK and averaged. The types of land use covered by the sites extracted from TRICS include shopping centre, retail park, individual non-food superstores, business park, office, industrial unit, industrial estate, warehousing (commercial) and hotels. The trip rates established are shown in Table 8.11.

Table 8.11: Commercial trip rates

Land use	AM arrivals	AM departures	PM arrivals	PM departures
Office (B1)	1.12	0.11	0.06	0.90
Mixed Commercial (B1, B2, B8)	0.60	0.21	0.07	0.57
Hotel	0.68	0.47	0.78	0.70
Retail	3.25	2.98	3.66	4.02

8.3.11 Another point to consider during the trip generation process in this study is the internalisation of trips within large mixed use developments and short trips that may not get onto the modelled highway network. This has been estimated using the 2001 Census Journey to Work data. A sector system was prepared based on Census wards or their aggregation. The total amount of work trips leaving and arriving each sector were then derived using this Census data. Among these work trips, those that remain in the same sector were separated as proportions of the total number of journeys made.

8.3.12 It is also considered that the reduction of the generated trips to account for short trips and trip internalisation should only apply where developments are large and/or they contain a good mix of land use. After consideration of location of proposed developments and discussion with the BDBC, this method has only been applied to the following developments in 2029 Reference:

- John Hunt School
- North of Popley / Merton Rise

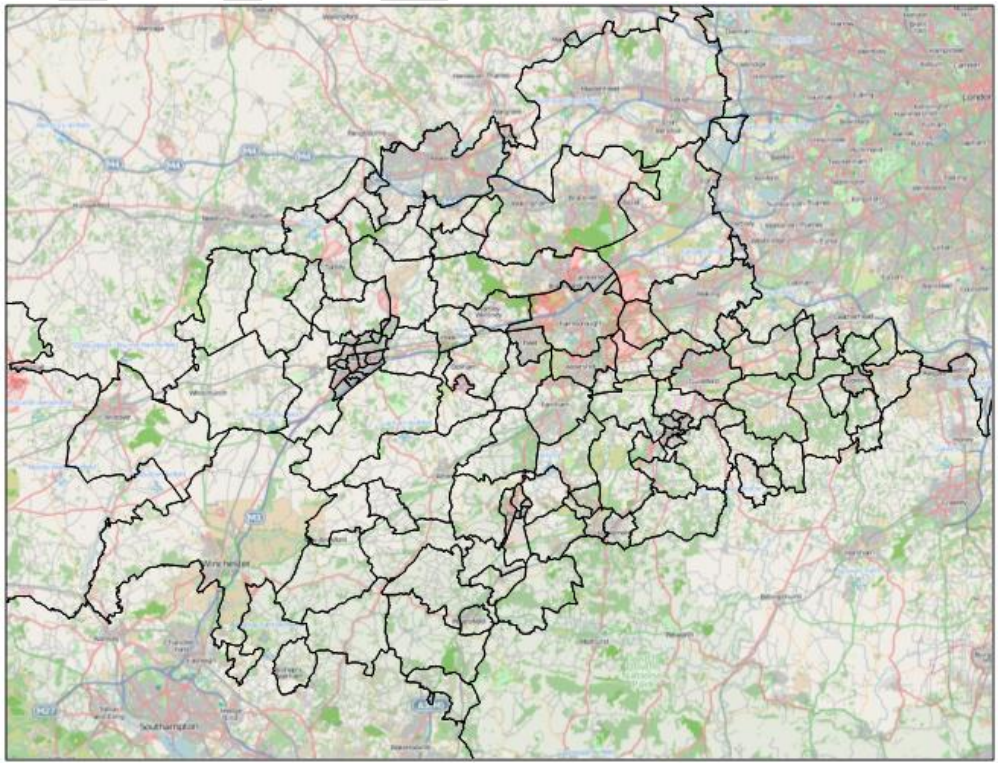


Figure 8.3: A Sector Map based on Aggregated Census Wards

8.3.13 Each development in the list above has been allocated to one of the sectors shown in Figure 8.3. The relevant proportions of trips to/from the allocated sector were analysed in order to estimate the short trips to / from the specific development that would not access the modelled network.

8.3.14 The development trips calculated for each large residential and employment site following the aforementioned method are summarised in Table 8.12 through to Table 8.19. The first four tables illustrate the residential trip generations, and the second four demonstrate the final employment trip generation. The external factor is the proportion of trips that will access the modelled network from individual developments.

Table 8.12: AM Arrivals to Large Residential Sites in 2029 Reference

Development	Dwellings	Trip Rate	Trips	External	Modelled Trips
Park Prewett	132	0.139	18	100%	18
North Of Popley/ Merton Rise	784	0.115	90	80%	72
Taylors Farm /Sherfield Park	257	0.129	33	100%	33
Boundary Hall	115	0.141	16	100%	16
John Hunt School Site, Popley	164	0.136	22	100%	22
West Ham Lane (And To Moniton Estate)	50	0.154	8	100%	8
Beech Down Pre School	70	0.148	10	100%	10
Kempshott Park Industrial Estate	62	0.150	9	100%	9
Webbers Garage, New Road	94	0.144	14	100%	14
Land between Mulfords Hill and Silchester Road	40	0.158	6	100%	6
Aldermaston Road Triangle	300	0.127	38	100%	38
A339 Newbury Road 'Trumpet' Junction	130	0.139	18	100%	18
Land north of Park Prewett, former golf course	750	0.115	87	100%	87
Total Arrivals					352

Table 8.13: AM Departures from Large Residential Sites in 2029 Reference

Development	Dwellings	Trip Rate	Trips	External	Modelled Trips
Park Prewett	132	0.386	51	100%	51
North Of Popley/ Merton Rise	784	0.364	285	51%	146
Taylors Farm /Sherfield Park	257	0.378	97	100%	97
Boundary Hall	115	0.388	45	100%	45
John Hunt School Site, Popley	164	0.383	63	53%	33
West Ham Lane (And To Moniton Estate)	50	0.399	20	100%	20
Beech Down Pre School	70	0.394	28	100%	28
Kempshott Park Industrial Estate	62	0.396	25	100%	25
Webbers Garage, New Road	94	0.391	37	100%	37
Land between Mulfords Hill and Silchester Road	40	0.402	16	100%	16
Aldermaston Road Triangle	300	0.376	113	100%	113
A339 Newbury Road 'Trumpet' Junction	130	0.386	50	100%	50
Land north of Park Prewett, former golf course	750	0.364	273	100%	273
Total Departures					933

Table 8.14: PM Arrivals to Large Residential Sites in 2029 Reference

Development	Dwellings	Trip Rate	Trips	External	Modelled Trips
Park Prewett	132	0.362	48	100%	48
North Of Popley/ Merton Rise	784	0.362	284	51%	145
Taylors Farm /Sherfield Park	257	0.362	93	100%	93
Boundary Hall	115	0.362	42	100%	42
John Hunt School Site, Popley	164	0.362	59	53%	31
West Ham Lane (And To Moniton Estate)	50	0.362	18	100%	18
Beech Down Pre School	70	0.362	25	100%	25
Kempshott Park Industrial Estate	62	0.362	22	100%	22
Webbers Garage, New Road	94	0.362	34	100%	34
Land between Mulfords Hill and Silchester Road	40	0.362	14	100%	14
Aldermaston Road Triangle	300	0.362	109	100%	109
A339 Newbury Road 'Trumpet' Junction	130	0.362	47	100%	47
Land north of Park Prewett, former golf course	750	0.362	271	100%	271
Total Arrivals					900

Table 8.15: PM Departures from Large Residential Sites in 2029 Reference

Development	Dwellings	Trip Rate	Trips	External	Modelled Trips
Park Prewett	132	0.215	28	100%	28
North Of Popley/ Merton Rise	784	0.213	167	80%	133
Taylors Farm /Sherfield Park	257	0.214	55	100%	55
Boundary Hall	115	0.215	25	100%	25
John Hunt School Site, Popley	164	0.215	35	100%	35
West Ham Lane (And To Moniton Estate)	50	0.217	11	100%	11
Beech Down Pre School	70	0.216	15	100%	15
Kempshott Park Industrial Estate	62	0.216	13	100%	13
Webbers Garage, New Road	94	0.216	20	100%	20
Land between Mulfords Hill and Silchester Road	40	0.217	9	100%	9
Aldermaston Road Triangle	300	0.214	64	100%	64
A339 Newbury Road 'Trumpet' Junction	130	0.215	28	100%	28
Land north of Park Prewett, former golf course	750	0.213	159	100%	159
Total Departures					596

Table 8.16: AM Arrivals to Large Employment Sites in 2029 Reference

Development	Land Use	Jobs	Trip Rate	Trips	External	Modelled Trips
120-122 Worting Road	Retail trade	28	3.25	90	100%	90
16-18 Winchester Road	Business	11	1.12	13	100%	13
Adjacent Alberto Culver	Business	20	1.12	22	100%	22
Airkix*	Recreation & sport	0		13	100%	13
Armstrongs Yard	Business	6	1.12	0	100%	0
Avenue Nurseries	Retail trade	9	3.25	29	100%	29
Boundary Hall	Residential	9	1.12	11	100%	11
Elderwood	Business	22	1.12	24	100%	24
Former Mod Site	Business	6	0.60	4	100%	4
Former Victoria And Eli Lilley Sites	Business	32	0.60	19	100%	19
J Sainsburys Plc	Industry, construction & transport	114	0.60	69	100%	69
Kempshott Park Industrial Estate	Residential	146	1.12	164	100%	164
Land At Gresley Road	Business	101	0.60	60	100%	60
Land At Jays Close	Business	135	1.12	151	100%	151
Land At North Of Popley Way	Retail trade	15	3.25	49	100%	49
Land At Winchester Road	Retail trade	90	3.25	292	100%	292
Larchwood	Business	105	1.12	118	100%	118
Park Prewett Hospital	Retail trade	10	3.25	31	100%	31
Redwood	Business	51	1.12	58	100%	58
The Annexe	Retail trade	1	0.68	1	100%	1
The White Building	Retail trade	2	0.68	1	100%	1
Unit A, Rutherford Road	Business	19	0.60	11	100%	11
Worting Park	Business	-3	1.12	-4	100%	-4
Total Arrivals						1226

Table 8.17: AM Departures from Large Employment Sites in 2029 Reference

Development	Land Use	Jobs	Trip Rate	Trips	External	Modelled Trips
120-122 Worting Road	Retail trade	28	2.98	83	100%	83
16-18 Winchester Road	Business	11	0.11	1	100%	1
Adjacent Alberto Culver	Business	20	0.11	2	100%	2
Airkix*	Recreation & sport	0		9	100%	9
Armstrongs Yard	Business	6	0.11	0	100%	0
Avenue Nurseries	Retail trade	9	2.98	26	100%	26
Boundary Hall	Residential	9	0.11	1	100%	1
Elderwood	Business	22	0.11	2	100%	2
Former Mod Site	Business	6	0.21	1	100%	1
Former Victoria And Eli Lilley Sites	Business	32	0.21	7	100%	7
J Sainsburys Plc	Industry, construction & transport	114	0.21	24	100%	24
Kempshott Park Industrial Estate	Residential	146	0.11	16	100%	16
Land At Gresley Road	Business	101	0.21	21	100%	21
Land At Jays Close	Business	135	0.11	15	100%	15
Land At North Of Popley Way	Retail trade	15	2.98	45	100%	45
Land At Winchester Road	Retail trade	90	2.98	268	100%	268
Larchwood	Business	105	0.11	12	100%	12
Park Prewett Hospital	Retail trade	10	2.98	29	100%	29
Redwood	Business	51	0.11	6	100%	6
The Annexe	Retail trade	1	0.47	1	100%	1
The White Building	Retail trade	2	0.47	1	100%	1
Unit A, Rutherford Road	Business	19	0.21	4	100%	4
Worting Park	Business	-3	0.11	0	100%	0
Total Departures						573

Table 8.18: PM Arrivals to Large Employment Sites in 2029 Reference

Development	Land Use	Jobs	Trip Rate	Trips	External	Modelled Trips
120-122 Worting Road	Retail trade	28	3.66	102	100%	102
16-18 Winchester Road	Business	11	0.06	1	100%	1
Adjacent Alberto Culver	Business	20	0.06	1	100%	1
Airkix*	Recreation & sport	0		27	100%	27
Armstrongs Yard	Business	6	0.06	0	100%	0
Avenue Nurseries	Retail trade	9	3.66	32	100%	32
Boundary Hall	Residential	9	0.06	1	100%	1
Elderwood	Business	22	0.06	1	100%	1
Former Mod Site	Business	6	0.07	0	100%	0
Former Victoria And Eli Lilley Sites	Business	32	0.07	2	100%	2
J Sainsburys Plc	Industry, construction & transport	114	0.07	8	100%	8
Kempshott Park Industrial Estate	Residential	146	0.06	9	100%	9
Land At Gresley Road	Business	101	0.07	7	100%	7
Land At Jays Close	Business	135	0.06	8	100%	8
Land At North Of Popley Way	Retail trade	15	3.66	55	100%	55
Land At Winchester Road	Retail trade	90	3.66	329	100%	329
Larchwood	Business	105	0.06	6	100%	6
Park Prewett Hospital	Retail trade	10	3.66	35	100%	35
Redwood	Business	51	0.06	3	100%	3
The Annexe	Retail trade	1	0.78	1	100%	1
The White Building	Retail trade	2	0.78	1	100%	1
Unit A, Rutherford Road	Business	19	0.07	1	100%	1
Worting Park	Business	-3	0.06	0	100%	0
Total Arrivals						632

Table 8.19: PM Departures from Large Employment Sites in 2029 Reference

Development	Land Use	Jobs	Trip Rate	Trips	External	Modelled Trips
120-122 Worting Road	Retail trade	28	4.02	112	100%	112
16-18 Winchester Road	Business	11	0.90	10	100%	10
Adjacent Alberto Culver	Business	20	0.90	18	100%	18
Airkix	Recreation & sport	0		26	100%	26
Armstrongs Yard	Business	6	0.90	0	100%	0
Avenue Nurseries	Retail trade	9	4.02	35	100%	35
Boundary Hall	Residential	9	0.90	9	100%	9
Elderwood	Business	22	0.90	20	100%	20
Former Mod Site	Business	6	0.57	4	100%	4
Former Victoria And Eli Lilley Sites	Business	32	0.57	18	100%	18
J Sainsburys Plc	Industry, construction & transport	114	0.57	65	100%	65
Kempshott Park Industrial Estate	Residential	146	0.90	132	100%	132
Land At Gresley Road	Business	101	0.57	57	100%	57
Land At Jays Close	Business	135	0.90	121	100%	121
Land At North Of Popley Way	Retail trade	15	4.02	60	100%	60
Land At Winchester Road	Retail trade	90	4.02	362	100%	362
Larchwood	Business	105	0.90	95	100%	95
Park Prewett Hospital	Retail trade	10	4.02	39	100%	39
Redwood	Business	51	0.90	46	100%	46
The Annexe	Retail trade	1	0.70	1	100%	1
The White Building	Retail trade	2	0.70	1	100%	1
Unit A, Rutherford Road	Business	19	0.57	11	100%	11
Worting Park	Business	-3	0.90	-3	100%	-3
Total Departures						1238

Trip Distribution

8.3.15 This process identifies origins / destinations of trips to / from individual developments. This was estimated on a sector by sector basis following the definition shown in Figure 8.3. Main origins / destinations for trips to / from each sector were identified using the 2001 Census Journey to Work data. Each development was then allocated to a single sector and the relevant development traffic was distributed across a number of origins and destinations following the proportions identified in the Census data.

Trip Assignment

8.3.16 For each traffic movement identified from the above trip generation and distribution processes, a route has been established using online route planner tools and engineering judgement. This method is in line with the HA's Evaluation of Transport Impact (ETI) Advice Note, which sets out their suggested approach to construct a simple link-based spreadsheet model. The developed model also provides a development route tree function to visualise the assignment routes for selected developments so these assumptions can be illustrated graphically and revisited where appropriate before the start of development testing.

8.4 Impacts from Neighbouring Districts

8.4.1 The cumulative impacts from LDF developments in neighbouring districts are also considered in this study to give a more realistic representation of future traffic conditions in the modelled network. Seven areas at immediate proximity to Basingstoke that are covered by the following councils have been considered:

- West Berkshire Council
- Hart District Council
- East Hampshire District Council
- Winchester City Council
- Test Valley Borough Council
- Reading Borough Council
- Wokingham Borough Council

8.4.2 Increases in traffic to and from Basingstoke relating to development growth in each of the above seven areas is estimated using TEMPRO and Census data. Firstly the total traffic growth from each area over the same forecasting period (2012 to 2029) is extracted from TEMPRO. Alternative planning assumptions are used where appropriate if more up-to-date LDF total growth is available. The Census journey-to-work data is then interrogated to derive the number of work trips travelling to Basingstoke from each area as a proportion of the total number of departures from the same place. This proportion is then applied to the total growth to estimate trips that would arrive at Basingstoke. This process is illustrated in Table 8.20 and Table 8.21.

Table 8.20: Derivation of Development Trips to Neighbouring Areas

Neighbouring areas	Journey to work arrivals			AM		PM	
	From UK	From B'stoke	Prop. Of trips from B'stoke*	LDF trips - arrivals	Trips from B'stoke	LDF trips - arrivals	Trips from B'stoke
Winchester	39,910	872	2%	5,203	114	4,159	91
West Berkshire	50,801	5,992	12%	7,213	851	9,106	1,074
Test Valley	32,957	993	3%	2,889	87	1,727	52
Hart	23,645	2,145	9%	2,682	243	3,290	298
East Hampshire	24,828	503	2%	2,490	50	3,202	65
Wokingham	57,922	1,532	2.64%	4,875	110	9,331	282
Reading	54,481	1,458	2.68%	5,518	124	5,973	185

* via the modelled highway network

Table 8.21: Derivation of Development Trips from Neighbouring Areas

Neighbouring areas	Journey to work departures			AM		PM	
	To UK	To B'stoke	Prop. Of trips to B'stoke*	LDF trips - departures	Trips to B'stoke	LDF trips - departures	Trips to B'stoke
Winchester	31,241	1,534	5%	3,157	155	5,771	283
West Berkshire	46,951	1,786	4%	7,513	286	8,806	335
Test Valley	33,129	1,689	5%	727	37	3,206	163
Hart	30,106	2,126	7%	2,771	196	3,208	227
East Hampshire	33,928	1,323	4%	2,167	85	3,237	126
Wokingham	62,025	898	1.45%	8,672	144	6,316	78
Reading	45,533	601	1.32%	5,696	87	5,977	67

* via the modelled highway network

8.4.3 The inclusion of neighbouring district trips estimated from their respective LDF growth may lead to some double counting traffic growth in the future. This generally involves trips between new developments in Basingstoke and the above seven neighbouring areas. For example work trips from new homes in Reading to workplaces in Basing View would be accounted for twice in the forecasting process when traffic growth was estimated based on individual new development on either end of the journeys. Detailed investigation was undertaken to ascertain the scale and origin / destination of potential double counting. After liaison with HCC, a disaggregated approach was agreed to remove such double counting based on movements between each neighbouring areas and individual Wards in Basingstoke. This is considered a robust method and was subsequently implemented in the mode covering all neighbouring district arrivals and departures in the AM and PM peaks following a similar principle. This resulted in reductions in numbers presented in Table 8.20 and Table 8.21. The reduced volume of traffic is presented in Table 8.22 and Table 8.23. This process was implemented for the 2029 Reference Case and Local Plan scenarios separately due to their distinctive land use patterns.

Table 8.22: Adjusted Development Trips to / from Neighbouring Areas in 2029 Reference Case

Neighbouring areas	AM		PM	
	To Basingstoke	From Basingstoke	To Basingstoke	Rom Basingstoke
Winchester	36	111	278	19
West Berkshire	206	794	254	806
Test Valley	15	87	162	19
Hart	83	179	157	133
East Hampshire	12	44	124	9
Wokingham	63	82	57	127
Reading	35	104	46	87
Total	**450**	**1401**	**1078**	**1202**

Table 8.23: Adjusted Development Trips to / from Neighbouring Areas in Local Plan Scenarios

Neighbouring areas	AM		PM	
	To Basingstoke	From Basingstoke	To Basingstoke	Rom Basingstoke
Winchester	15	101	278	9
West Berkshire	183	672	206	765
Test Valley	5	62	162	8
Hart	71	102	85	114
East Hampshire	11	44	124	9
Wokingham	52	47	32	106
Reading	26	69	26	79
Total	**362**	**1096**	**913**	**1089**

8.5 Local Plan Developments in Basingstoke

8.5.1 In addition to the 2029 Reference forecasting scenario, four Local Plan development scenarios have also been constructed in the model following information provided by BDBC. These four Local Plan scenarios, as listed below, include all developments assumed in the Reference case and also contain proposed developments of varying quantum and spatial distribution.

- Spatial Distribution Scenario 1 - Cabinet suggested sites
- Spatial Distribution Scenario 2 - Cabinet agreed sites
- Spatial Distribution Scenario 3 - Western Focus
- Spatial Distribution Scenario 4 - Eastern Focus

8.5.2 The traffic forecasting process for these Local Plan scenarios is similar to that used for the Reference case following the same principles. Any development with over 40 dwellings or 30 jobs was explicitly modelled while the others were incorporated into an area wide growth factor.

Table 8.24 through to

8.5.3 Table 8.31 present the large residential developments proposed in different Local Plan scenarios and the number of trips to and from individual developments and their cumulative totals. It is noted that development trips reported in these tables are in addition to the growth that has already been assumed for the 2029 Reference scenario.

Table 8.24: AM Arrivals to Large Residential Sites in Local Plan Scenarios

Development	HHs	Trip Rates	Total Trips	External	Actual Trips	LP Scenarios			
						1	2	3	4
Area N, Beggarwood	130	0.14	18	100%	18	✓	✓	✓	✓
Aurum Site	150	0.14	21	100%	21	✓	✓	✓	✓
Basingstoke Golf Club	1000	0.11	112	94%	105	✓	✓	✓	
Bramley	200	0.13	27	100%	27		✓	✓	✓
East of the Knowlings, Whitchurch	200	0.13	27	100%	27	✓			
Former Victoria and Eli Lilley Sites, Kingsclere Rd	472	0.12	57	100%	57	✓	✓	✓	✓
Hounsome Fields	1000	0.11	112	100%	112			✓	
Kennel Farm	250	0.13	32	100%	32	✓	✓	✓	✓
Kingsclere	50	0.15	8	100%	8	✓	✓	✓	✓
Land at Tavener Close and Freemantle Close	98	0.14	14	100%	14	✓	✓	✓	✓
Land East of Basingstoke	1050	0.11	117	100%	117		✓		✓
	900	0.11	102	100%	102	✓			
Land lying off Winchester Road, Whitchurch	200	0.13	27	100%	27	✓			
Land North of Churchill Way	45	0.16	7	100%	7	✓	✓	✓	✓
Land north of Court Farm	35	0.16	6	100%	6	✓			
Land South of Bloswood Lane	100	0.14	14	100%	14	✓	✓	✓	✓
Lodge Farm	1000	0.11	112	100%	112				✓
Manor Farm	50	0.15	8	100%	8	✓	✓	✓	✓
Manydown – Southern	750	0.12	87	94%	81	✓	✓	✓	✓
Manydown – Northern	2330	0.10	238	100%	238	✓	✓	✓	✓
North of Popley Fields	450	0.12	55	80%	44	✓	✓	✓	✓
Oakley	200	0.13	27	100%	27	✓	✓	✓	✓
Overton	150	0.14	21	100%	21		✓		
Overton Hill, London Road	120	0.14	17	100%	17	✓	✓	✓	✓
Playing Field, Pack Lane	100	0.14	14	100%	14	✓	✓	✓	✓
Razors Farm	420	0.12	52	100%	52	✓	✓	✓	✓
Swing Swang Lane	100	0.14	14	100%	14	✓	✓	✓	✓
Two Gate Lane	150	0.14	21	100%	21	✓		✓	✓
Upper Cufaude Farm	390	0.12	48	100%	48	✓	✓	✓	✓
Whitchurch	200	0.13	27	100%	27		✓	✓	✓

Table 8.25: Total AM Arrivals to Large Residential Sites in Local Plan Scenarios

Summary	Local Plan Scenarios			
	1	2	3	4
Total number of dwellings	11020	11135	11085	11135
Total trips generated	1024	1033	1028	1033
Total trips modelled	1000	1010	1005	1017

Table 8.26: AM Departures from Large Residential Sites in Local Plan Scenarios

Development	HHs	Trip Rates	Total Trips	External	Actual Trips	LP Scenarios			
						1	2	3	4
Area N, Beggarwood	130	0.39	50	100%	50	✓	✓	✓	✓
Aurum Site	150	0.38	58	100%	58	✓	✓	✓	✓
Basingstoke Golf Club	1000	0.36	361	93%	336	✓	✓	✓	
Bramley	200	0.38	76	100%	76		✓	✓	✓
East of the Knowlings, Whitchurch	200	0.38	76	100%	76	✓			
Former Victoria and Eli Lilley Sites, Kingsclere Rd	472	0.37	175	100%	175	✓	✓	✓	✓
Hounsome Fields	1000	0.36	361	100%	361			✓	
Kennel Farm	250	0.38	94	100%	94	✓	✓	✓	✓
Kingsclere	50	0.40	20	100%	20	✓	✓	✓	✓
Land at Tavener Close and Freemantle Close	98	0.39	38	100%	38	✓	✓	✓	✓
Land East of Basingstoke	1050	0.36	378	100%	378		✓		✓
	900	0.36	326	100%	326	✓			
Land lying off Winchester Road, Whitchurch	200	0.38	76	100%	76	✓			
Land North of Churchill Way	45	0.40	18	100%	18	✓	✓	✓	✓
Land north of Court Farm	35	0.40	14	100%	14	✓			
Land South of Bloswood Lane	100	0.39	39	100%	39	✓	✓	✓	✓
Lodge Farm	1000	0.36	361	100%	361				✓
Manor Farm	50	0.40	20	100%	20	✓	✓	✓	✓
Manydown – Southern	750	0.36	273	88%	240	✓	✓	✓	✓
Manydown – Northern	2330	0.35	818	100%	818	✓	✓	✓	✓
North of Popley Fields	450	0.37	167	83%	139	✓	✓	✓	✓
Oakley	200	0.38	76	100%	76	✓	✓	✓	✓
Overton	150	0.38	58	100%	58		✓		
Overton Hill, London Road	120	0.39	46	100%	46	✓	✓	✓	✓
Playing Field, Pack Lane	100	0.39	39	100%	39	✓	✓	✓	✓
Razors Farm	420	0.37	156	100%	156	✓	✓	✓	✓
Swing Swang Lane	100	0.39	39	100%	39	✓	✓	✓	✓
Two Gate Lane	150	0.38	58	100%	58	✓		✓	✓
Upper Cufaude Farm	390	0.37	145	100%	145	✓	✓	✓	✓
Whitchurch	200	0.38	76	100%	76		✓	✓	✓

Table 8.27: Total AM Departures from Large Residential Sites in Local Plan Scenarios

Summary	Local Plan Scenarios			
	1	2	3	4
Total number of dwellings	11020	11135	11085	11135
Total trips generated	3183	3221	3204	3221
Total trips modelled	3097	3135	3117	3160

Table 8.28: PM Arrivals to Large Residential Sites in Local Plan Scenarios

Development	HHs	Trip Rates	Total Trips	External	Actual Trips	LP Scenarios			
						1	2	3	4
Area N, Beggarwood	130	0.36	47	100%	47	✓	✓	✓	✓
Aurum Site	150	0.36	54	100%	54	✓	✓	✓	✓
Basingstoke Golf Club	1000	0.36	362	93%	337	✓	✓	✓	
Bramley	200	0.36	72	100%	72		✓	✓	✓
East of the Knowlings, Whitchurch	200	0.36	72	100%	72	✓			
Former Victoria and Eli Lilley Sites, Kingsclere Rd	472	0.36	171	100%	171	✓	✓	✓	✓
Hounsome Fields	1000	0.36	362	100%	362			✓	
Kennel Farm	250	0.36	90	100%	90	✓	✓	✓	✓
Kingsclere	50	0.36	18	100%	18	✓	✓	✓	✓
Land at Tavener Close and Freemantle Close	98	0.36	35	100%	35	✓	✓	✓	✓
Land East of Basingstoke	1050	0.36	380	100%	380		✓		✓
	900	0.36	325	100%	325	✓			
Land lying off Winchester Road, Whitchurch	200	0.36	72	100%	72	✓			
Land North of Churchill Way	45	0.36	16	100%	16	✓	✓	✓	✓
Land north of Court Farm	35	0.36	13	100%	13	✓			
Land South of Bloswood Lane	100	0.36	36	100%	36	✓	✓	✓	✓
Lodge Farm	1000	0.36	362	100%	362				✓
Manor Farm	50	0.36	18	100%	18	✓	✓	✓	✓
Manydown – Southern	750	0.36	271	88%	238	✓	✓	✓	✓
Manydown – Northern	2330	0.36	842	100%	842	✓	✓	✓	✓
North of Popley Fields	450	0.36	163	83%	135	✓	✓	✓	✓
Oakley	200	0.36	72	100%	72	✓	✓	✓	✓
Overton	150	0.36	54	100%	54		✓		
Overton Hill, London Road	120	0.36	43	100%	43	✓	✓	✓	✓
Playing Field, Pack Lane	100	0.36	36	100%	36	✓	✓	✓	✓
Razors Farm	420	0.36	152	100%	152	✓	✓	✓	✓
Swing Swang Lane	100	0.36	36	100%	36	✓	✓	✓	✓
Two Gate Lane	150	0.36	54	100%	54	✓		✓	✓
Upper Cufaude Farm	390	0.36	141	100%	141	✓	✓	✓	✓
Whitchurch	200	0.36	72	100%	72		✓	✓	✓

Table 8.29: Total PM Arrivals to Large Residential Sites in Local Plan Scenarios

Summary	Local Plan Scenarios			
	1	2	3	4
Total number of dwellings	11020	11135	11085	11135
Total trips generated	3143	3185	3167	3185
Total trips modelled	3058	3099	3081	3124

Table 8.30: PM Departures from Large Residential Sites in Local Plan Scenarios

Development	HHs	Trip Rates	Total Trips	External	Actual Trips	LP Scenarios			
						1	2	3	4
Area N, Beggarwood	130	0.22	28	100%	28	✓	✓	✓	✓
Aurum Site	150	0.21	32	100%	32	✓	✓	✓	✓
Basingstoke Golf Club	1000	0.21	212	94%	199	✓	✓	✓	
Bramley	200	0.21	43	100%	43		✓	✓	✓
East of the Knowlings, Whitchurch	200	0.21	43	100%	43	✓			
Former Victoria and Eli Lilley Sites, Kingsclere Rd	472	0.21	101	100%	101	✓	✓	✓	✓
Hounsome Fields	1000	0.21	212	100%	212			✓	
Kennel Farm	250	0.21	54	100%	54	✓	✓	✓	✓
Kingsclere	50	0.22	11	93%	10	✓	✓	✓	✓
Land at Tavener Close and Freemantle Close	98	0.22	21	100%	21	✓	✓	✓	✓
Land East of Basingstoke	1050	0.21	223	100%	223		✓		✓
	900	0.21	191	100%	191	✓			
Land lying off Winchester Road, Whitchurch	200	0.21	43	100%	43	✓			
Land North of Churchill Way	45	0.22	10	100%	10	✓	✓	✓	✓
Land north of Court Farm	35	0.22	8	100%	8	✓			
Land South of Bloswood Lane	100	0.22	22	100%	22	✓	✓	✓	✓
Lodge Farm	1000	0.21	212	100%	212				✓
Manor Farm	50	0.22	11	100%	11	✓	✓	✓	✓
Manydown – Southern	750	0.21	159	94%	149	✓	✓	✓	✓
Manydown – Northern	2330	0.21	491	100%	491	✓	✓	✓	✓
North of Popley Fields	450	0.21	96	80%	77	✓	✓	✓	✓
Oakley	200	0.21	43	100%	43	✓	✓	✓	✓
Overton	150	0.21	32	100%	32		✓		
Overton Hill, London Road	120	0.22	26	100%	26	✓	✓	✓	✓
Playing Field, Pack Lane	100	0.22	22	100%	22	✓	✓	✓	✓
Razors Farm	420	0.21	90	100%	90	✓	✓	✓	✓
Swing Swang Lane	100	0.22	22	100%	22	✓	✓	✓	✓
Two Gate Lane	150	0.21	32	100%	32	✓		✓	✓
Upper Cufaude Farm	390	0.21	83	100%	83	✓	✓	✓	✓
Whitchurch	200	0.21	43	100%	43		✓	✓	✓

Table 8.31:Total PM Departures from Large Residential Sites in Local Plan Scenarios

Summary	Local Plan Scenarios			
	1	2	3	4
Total number of dwellings	11020	11135	11085	11135
Total trips generated	1849	1873	1862	1873
Total trips modelled	1806	1830	1819	1843

It is clear from Table 8.24 through to

8.5.4 Table 8.31 that a small reduction on the total trips generated for individual development has been applied to account for short trips and trip internalisation. This only occurs where developments are large and/or they contain a good mix of land uses. After consideration of location of proposed developments and discussion with the BDBC, this adjustment has only been applied to the following three developments in the Local Plan scenarios:

- BAS098 Manydown (Phase 2 development)
- BAS132 Basingstoke Golf Club (Phase 2 development)
- BAS104 North of Popley Fields (Phase 2 development)

8.5.5 Table 8.32 through Table 8.35 present the modelled trips from the only employment development assumed in Local Plan scenarios. The assumption is consistent across all four future scenarios. The development trips reported in these tables are in addition to the growth that has already been assumed for the 2029 Reference scenario.

Table 8.32: AM Arrivals to Basing View in Local Plan Scenarios

Land Use Types	GFA in 100 sqm	Trip Rates	Total Trips	External	Actual Trips
Office	232	1.45	337	100%	337
Retail	33	2.83	92	100%	92
Leisure	14	2.83	40	100%	40
Hotel	1140	0.21	239	100%	239
Residential	93	0.10	10	100%	10
Total	**1511**		**717**		**717**

Table 8.33: AM Departures from Basing View in Local Plan Scenarios

Land Use Types	GFA in 100 sqm	Trip Rates	Total Trips	External	Actual Trips
Office	232	0.12	28	100%	28
Retail	33	1.53	50	100%	50
Leisure	14	1.53	21	100%	21
Hotel	1140	0.33	376	100%	376
Residential	93	0.29	27	100%	27
Total	**1511**		**502**		**502**

Table 8.34: PM Arrivals to Basing View in Local Plan Scenarios

Land Use Types	GFA in 100 sqm	Trip Rates	Total Trips	External	Actual Trips
Office	232	0.13	30	100%	30
Retail	33	6.15	200	100%	200
Leisure	14	6.15	86	100%	86
Hotel	1140	0.24	273	100%	273
Residential	93	0.31	29	100%	29
Total	**1511**		**619**		**619**

Table 8.35: PM Departures from Basing View in Local Plan Scenarios

Land Use Types	GFA in 100 sqm	Trip Rates	Total Trips	External	Actual Trips
Office	232	1.15	267	100%	267
Retail	33	6.09	198	100%	198
Leisure	14	6.09	85	100%	85
Hotel	1140	0.17	194	100%	194
Residential	93	0.17	16	100%	16
Total	**1511**		**760**		**760**

8.5.6 As described in Paragraph 8.5.2, all the small residential developments (below 40 dwellings) are represented using area wide traffic growth factors as they are either too small to be considered as individual sites or their exact locations are not definitive as this stage. These individual sites are listed in Table 8.36 below and they are consistent between all local Plan scenarios.

Table 8.36: Small Reference Residential Development with less than 40 Dwellings

No.	Ref	Development	Number of Dwellings
1	BAS016	Carpenters Down	24
2	BAS088	Land north of Great Binfields School	12
3	BAS142	Land at QMC, Cliddesden Road	6
4	BAS143	Barn at Park Prewett	20
5	WHIT019	Land at Testbourne Community School	8
6	BAS021	The Hampshire Court Hotel, Great Binfields Road	16
7	BAS056	Church, Wessex Close	9
8	BAS059	Land East of Ringway West	25
9	BAS064	Castons Car Park, South of New Road	30
10	BAS067	Grove Road	12
11	BAS070	Newman Bassett House, Warwick Road, Basingstoke	10
12	BAS083	Brinkletts Car Park, Basingstoke	20
13	BAS144	Hillacre and Hilltop, Reading Road	9
14	BAS146	Park Hall Park Prewett	20
15	BRAM007	British Legion Club / Car Park	20
16	TAD005	30 Mount Pleasant	9
17	TAD007	38 New Road	7
18	TAD003	Burpham Copse Infant School	40
19	BAS084	Central Car Park	40
Total Households (< 40)			**337**

8.5.7 To include these developments in the model a Local Plan factor was derived using the 'alternative planning data' function in TEMPRO. This factor is applied to the base year traffic instead of, not as well as, the factor determined for the 2029 Reference scenario in Table 8.9. As well as the Local Plan developments listed in Table 8.36, the Local Plan factor incorporates the impact of committed developments that are less than 40 dwellings or 30 jobs, windfall sites and neighbourhood development plans that have not been allocated a specific site. The quantum of development represented by the factor is listed in Table 8.37. Scenario 1 has a slightly higher factor since it contains 300 dwellings for 'other neighbourhood plans' compared to 150 dwellings in all other scenarios.

Table 8.37: Developments contributing to Local Plan scenario growth factor

		Scenario 1		Scenarios 2, 3 & 4	
Ref	**Development**	**Number Dwellings**	**Number jobs**	**Number Dwellings**	**Number jobs**
Committed developments	Residential developments (<40 dwellings)	339		339	
	Commercial developments (<30 jobs)		337		337
Local Plan developments	Unallocated or Non-committed residential developments (<40 dwellings)	337		337	
	Windfall developments	350		350	
	Other neighbourhood plans	300		150	
Total		**1326**	**337**	**1176**	**337**

8.5.8 The factors determined are shown in Table 8.38 below. As with the background growth factor, influences from changes in car ownership, income and fuel prices are included using growth factors determined from NTEM dataset 6.2 and relevant guidance in WebTAG 3.15.2. These are shown in Table 8.2.

Table 8.38: Small Development Growth Factor for Local Plan Scenarios

Description	Scenario 1		Scenarios 2, 3 & 4	
	AM	PM	AM	PM
Small developments Local Plan factor	1.075148	1.083427	1.07408	1.082305

APPENDICES

APPENDIX A

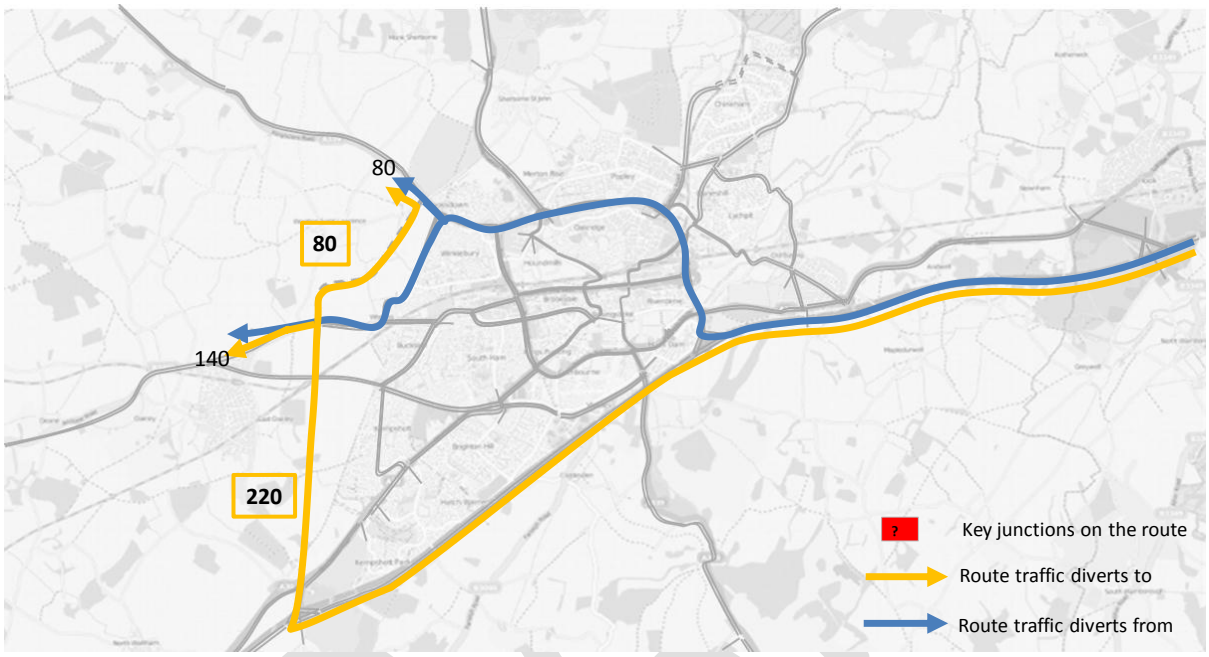
LOCATION OF DEVELOPMENT IN FORECASTING SCENARIOS

APPENDIX B

TRAFFIC IMPACTS FROM THE WESTERN BYPASS

Key Diversions on Northbound in the AM

The following high level analysis demonstrates that up to 420 vehicles will utilise the southern part of the link road to travel north (between M3 Junction 7 and the B3400) during the AM Peak. It is anticipated that 110 vehicles will utilise the northern part of the link road to travel north (between B3400 and the A339) during the AM Peak, in addition to the traffic generated from the Local Plan allocations'.

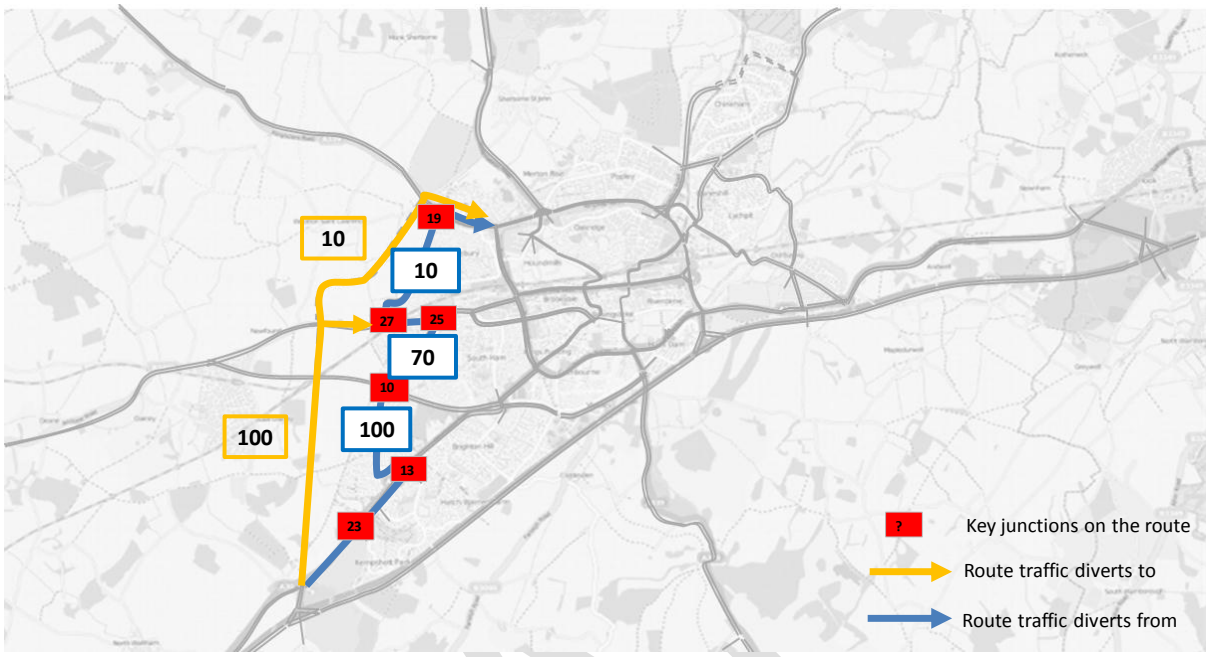


Diversion to the Western Bypass Northbound from M3 Junction 6 and Ringway

It is anticipated that approximately 220 movements may divert from using Junction 6 of the M3 and the Ringway and utilise the full western bypass to access the B3400 and A339

Diversion to the Western Bypass Northbound from B3400 Eastbound

It is anticipated that approximately 100 movements may divert from B3400 to M3 eastbound mainline and western bypass via Junction 7. The majority of these movements travel to destinations near Basingstoke Golf Centre, whilst the rest carry on further north.

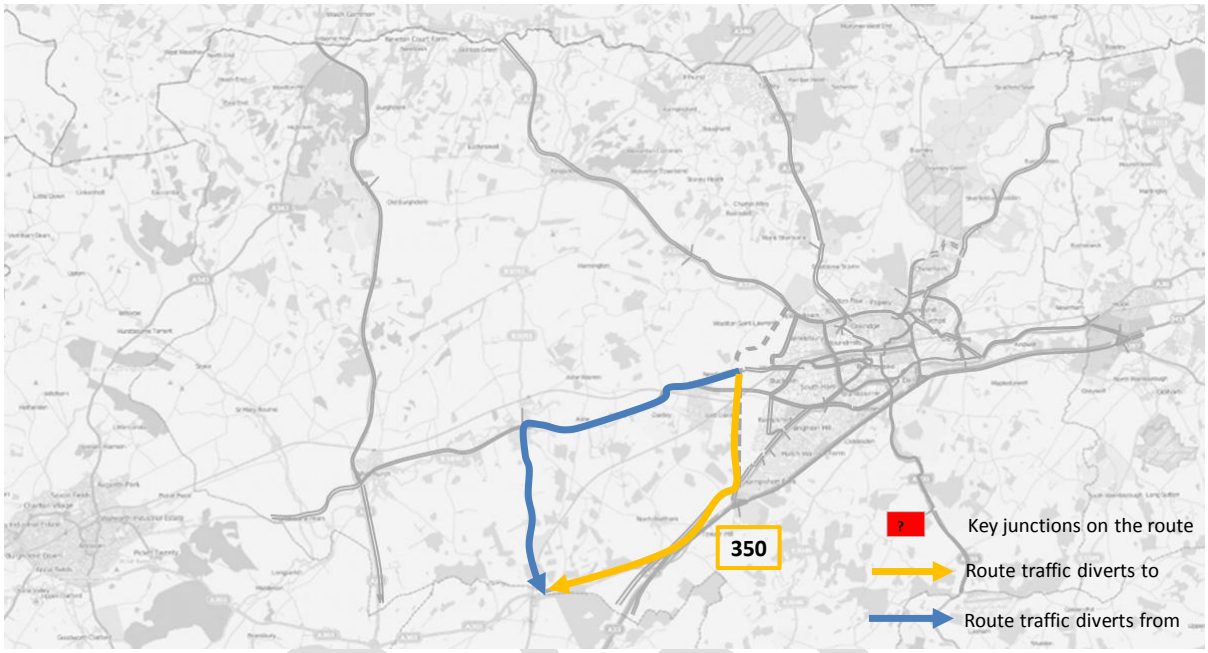


Diversion to the Western Bypass Northbound from M3 Junction 7 and Ringway

It is anticipated that approximately 100 northbound movements may divert from Kempshott Lane and Roman Road to the western bypass.

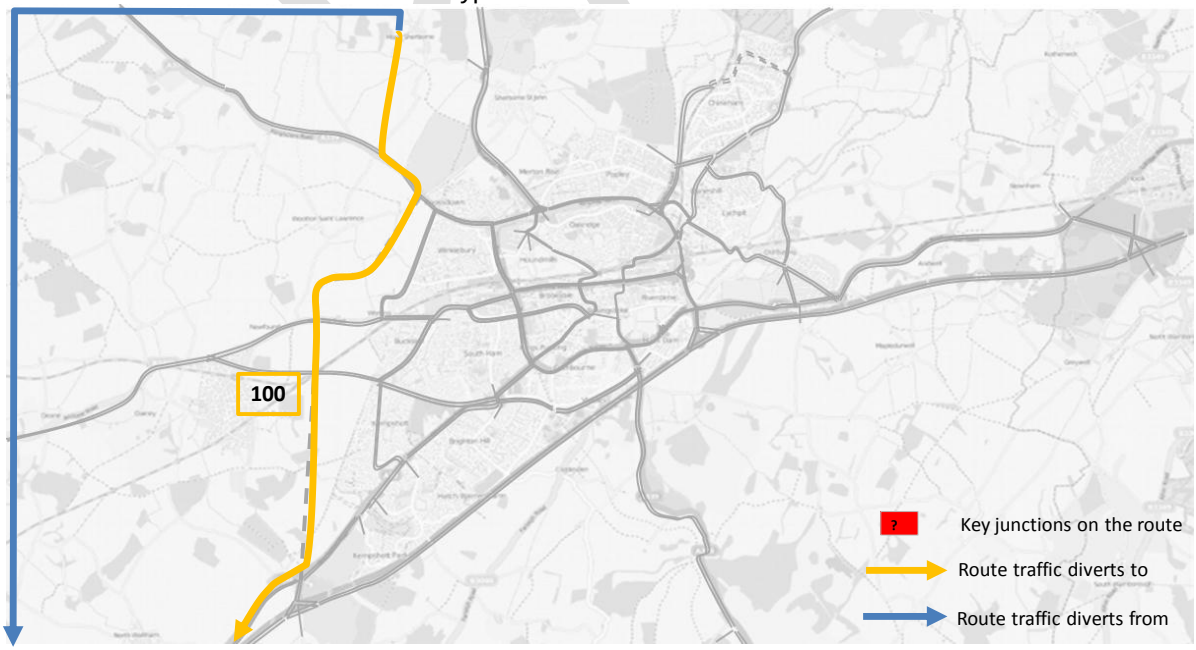
Key Diversions on Southbound in the AM

The following high level analysis demonstrates that up to 750 vehicles will utilise the southern part of the link road to travel south (between M3 Junction 7 and the B3400) during the AM Peak. It is anticipated that 250 vehicles will utilise the northern part of the link road to travel south (between B3400 and the A339) during the AM Peak, in addition to the traffic generated from the Local Plan allocations'.



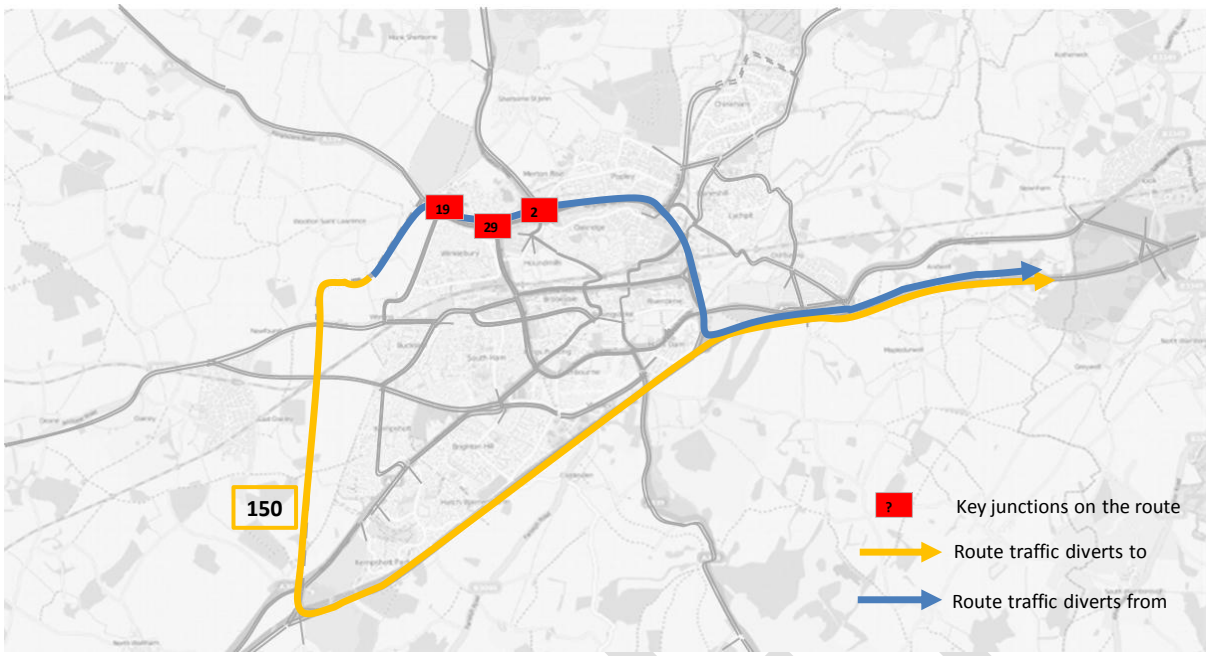
Diversion to the Western Bypass Southbound from B3400 Westbound

It is anticipated that approximately 350 southbound movements may divert from using B3400 and utilise the southern section of western bypass to access areas near the A303.



Diversion to the Western Bypass Southbound from areas north of Basingstoke

It is anticipated that approximately 100 movements from areas north to south of Basingstoke will divert to utilise the full western bypass.



Diversion to the Western Bypass Southbound from Ringway and M3 Junction 6

It is anticipated that approximately 150 eastbound movements may divert from using Ringway and M3 Junction 6 and utilise the full western bypass to access M3 east of Basingstoke.

Diversion to the Western Bypass Southbound from Oakley

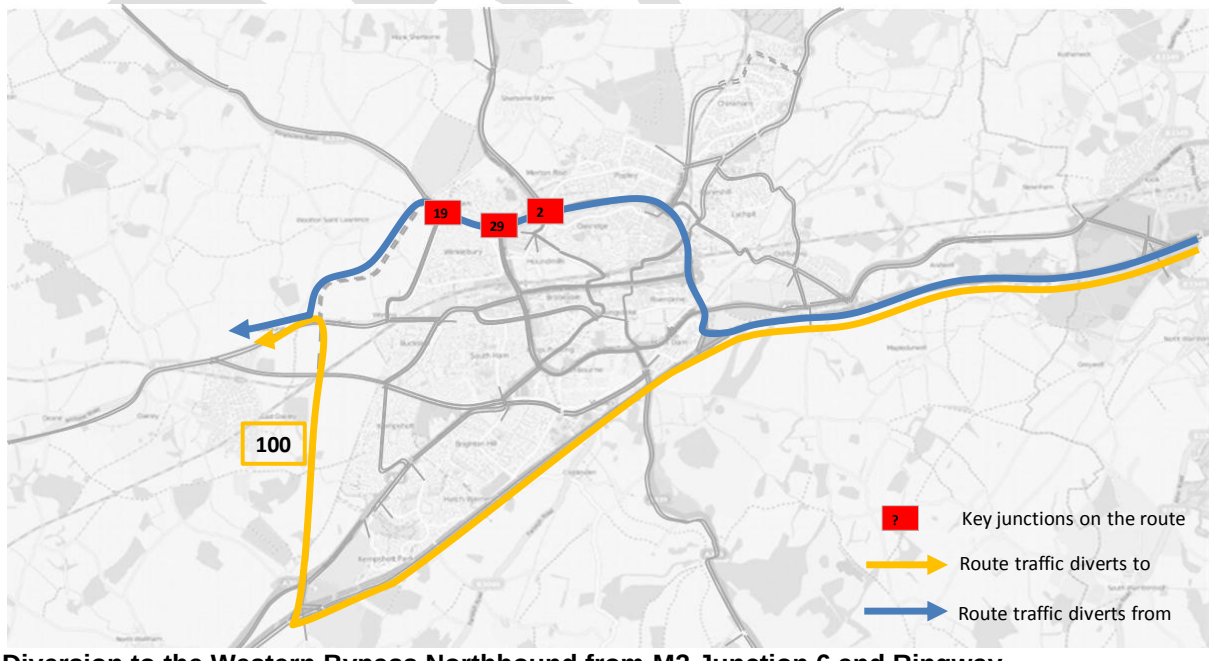
It is anticipated that approximately 150 southbound movements from Oakley may divert to use the southern section of the full western bypass to access the M3.

Key Diversions on Northbound in the PM

The following high level analysis demonstrates that up to 600 vehicles will utilise the southern part of the link road to travel north (between M3 Junction 7 and the B3400) during the PM Peak. Long distance movements that utilise the northern part of the link road to travel north (between B3400 and the A339) are relatively minor during the PM Peak and not illustrated separately in the diagrams below.

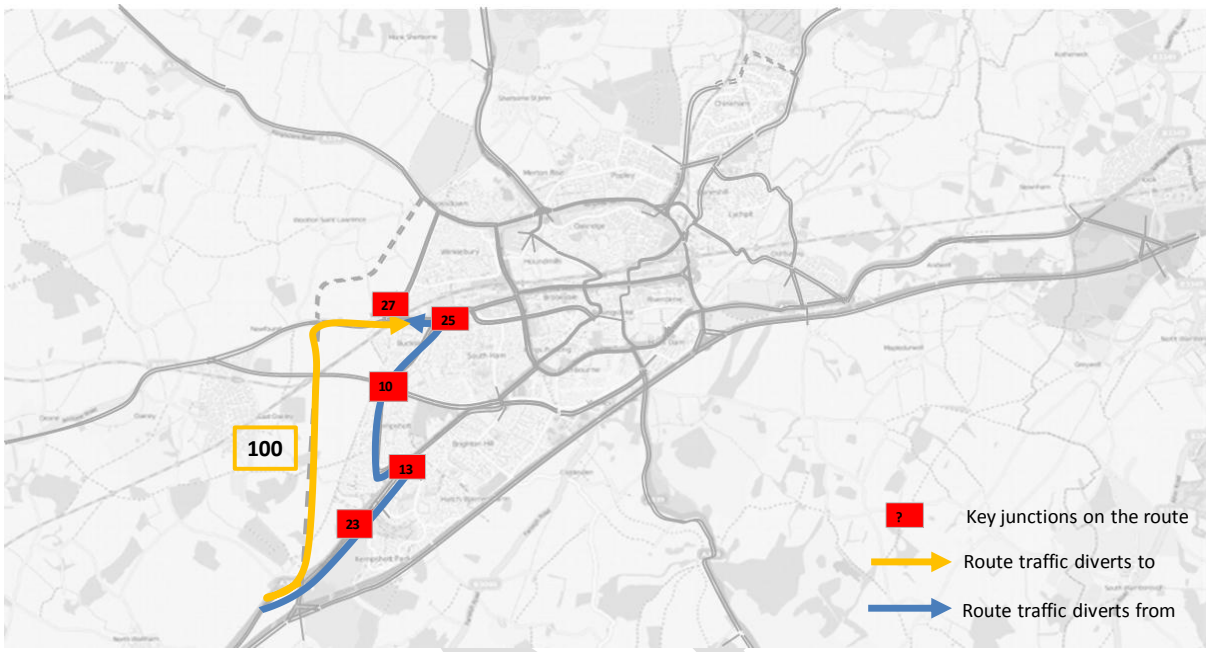
Diversion to the Western Bypass Northbound from B3400 Eastbound

It is anticipated that approximately 250 movements may divert from using B3400 and utilise the western bypass to travel north.



Diversion to the Western Bypass Northbound from M3 Junction 6 and Ringway

It is anticipated that approximately 100 westbound movements may divert to use M3 and the southern section of the full western bypass to access B3400.



Diversion to the Western Bypass Northbound from M3 Junction 7 and Ringway

It is anticipated that approximately 100 northbound movements may divert from Kempshott Lane and Buckskin Lane to the southern section of western bypass.

Diversion to the Western Bypass Northbound from M3 Junction 7 and Oakley

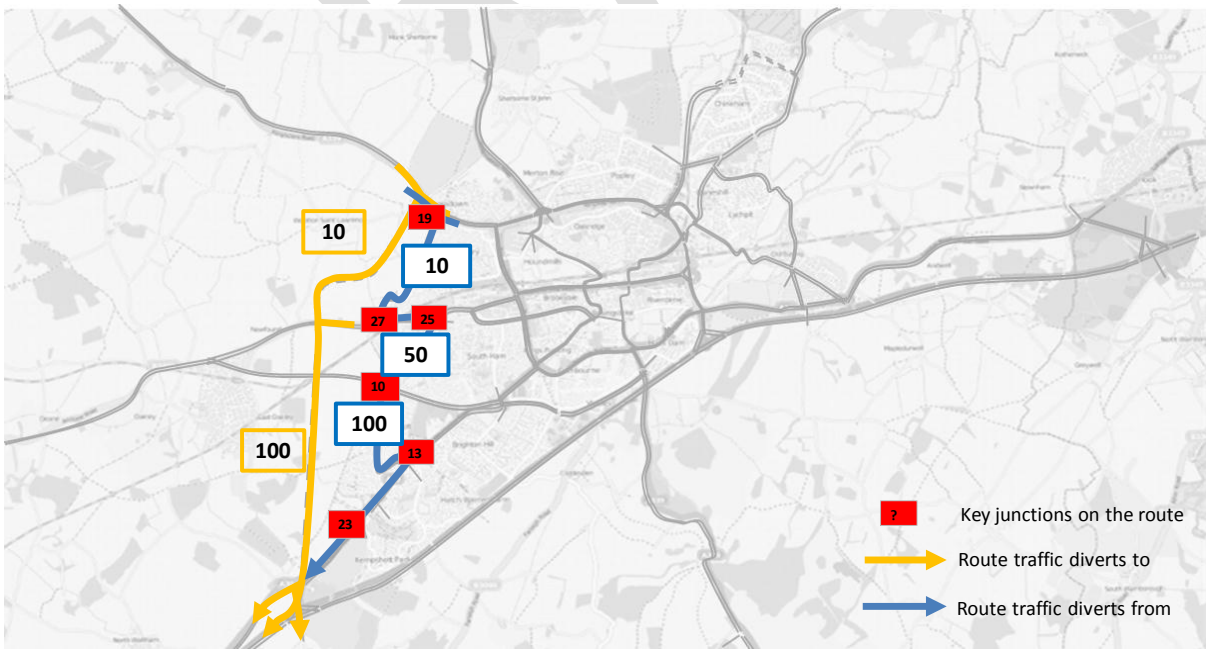
It is anticipated that approximately 150 northbound movements may divert to use the southern section of the full western bypass to access Oakley.

Key Diversions on Southbound in the PM

The following high level analysis demonstrates that up to 750 vehicles will utilise the southern part of the link road to travel south (between M3 Junction 7 and the B3400) during the PM Peak. It is anticipated that 160 vehicles will utilise the northern part of the link road to travel south (between B3400 and the A339) during the PM Peak, in addition to the traffic generated from the Local Plan allocations'.

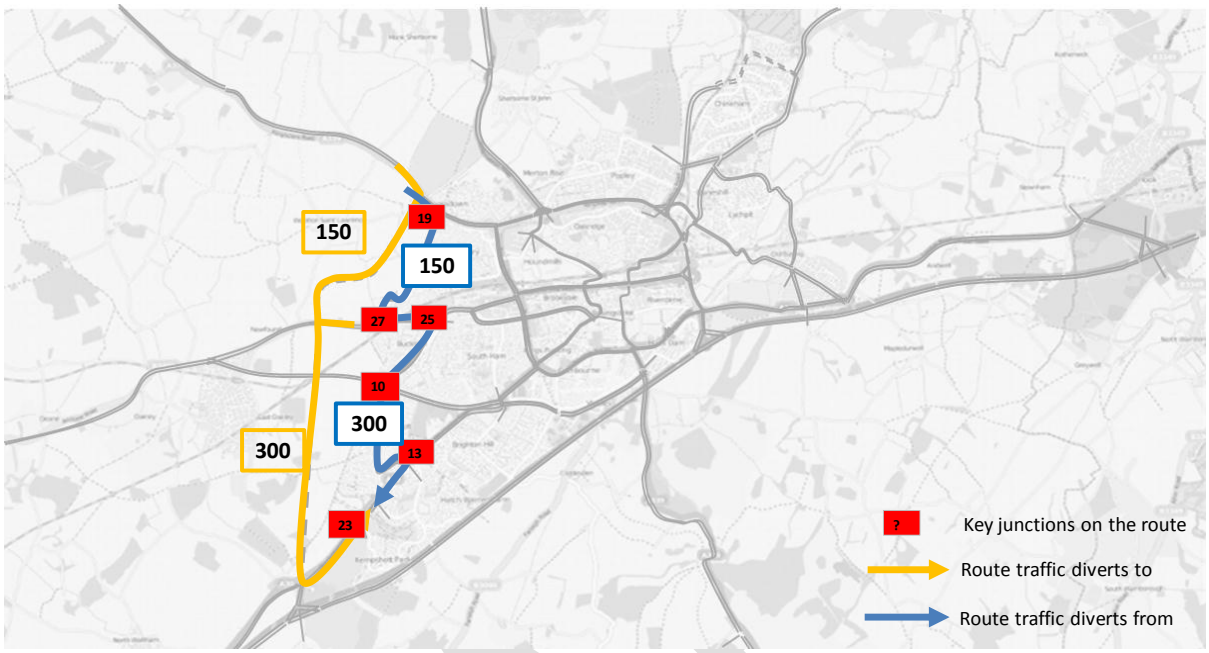
Diversion to the Western Bypass Southbound from B3400 Westbound

It is anticipated that approximately 350 movements may divert from using B3400 and utilise the western bypass to travel south.



Diversion to the Western Bypass Southbound from Roman Road and Kempshott Lane

It is anticipated that approximately 100 southbound movements may divert from Kempshott Lane and Roman Road to the western bypass and travel further south.



Diversion to the Western Bypass Southbound from Roman Road and Kempshott Lane

It is anticipated that approximately 300 southbound movements may divert from Kempshott Lane and Roman Road to the western bypass.

APPENDIX C

MODELLED QUEUING AND DELAY AT JUNCTIONS WHERE MITIGATION IS REQUIRED

A33 / BRAMLEY ROAD ROUNDABOUT

Modelled Queue at Each Entry at A33 / Bramley Road Roundabout

Time	Arms	2029 Reference Case (PCUs)	Local Plan without mitigation (PCUs)	Local Plan with mitigation (PCUs)
AM	Arm A – A33 North	113	445	13
	Arm B – A33 South	8	505	21
	Arm C - Bramley Road	1	1	7
PM	Arm A – A33 North	135	798	186
	Arm B – A33 South	20	540	20
	Arm C - Bramley Road	0	1	3

Modelled Average Delay per Vehicle at Each Entry at A33 / Bramley Road Roundabout

Time	Arms	2029 Reference Case (sec)	Local Plan without mitigation (sec)	Local Plan with mitigation (sec)
AM	Arm A – A33 North	261	1023	15
	Arm B – A33 South	24	1115	28
	Arm C - Bramley Road	7	11	25
PM	Arm A – A33 North	296	1742	253
	Arm B – A33 South	60	1239	26
	Arm C - Bramley Road	6	7	13

A33 / GAIGER AVENUE JUNCTION

Modelled Delay per Vehicle on Each Entry of A33 / Gaiger Avenue

Time	Arms	2029 Reference Case (sec)	Local Plan without mitigation (sec)	Local Plan with mitigation (sec)
AM	Arm A – A33 North	954	1836	25
	Arm B – Access Road	N/A	6	24
	Arm C – A33 South	6	61	9
	Arm D – Gaiger Ave	5	8	23
PM	Arm A – A33 North	882	2512	208
	Arm B – Access Road	N/A	5	22
	Arm C – A33 South	462	1451	357
	Arm D – Gaiger Ave	8	8	23

Modelled Mean Max Queue on Each Entry of A33 / Gaiger Avenue

Time	Arms	2029 Reference Case (PCUs)	Local Plan without mitigation (PCUs)	Local Plan with mitigation (PCUs)
AM	Arm A – A33 North	360	695	20
	Arm B – Access Road	N/A	0	2
	Arm C – A33 South	2	26	8
	Arm D – Gaiger Ave	1	0	2
PM	Arm A – A33 North	N/A	953	155
	Arm B – Access Road		0	1
	Arm C – A33 South	243	760	272
	Arm D – Gaiger Ave	1	0	2

A33 / THORNHILL WAY JUNCTION

Modelled Delay per Vehicle at Each Entry of Thornhill Way / A33 Junction

Time	Arms	2029 Reference Case (sec)	Local Plan without mitigation (sec)	Local Plan with mitigation (sec)
AM	Arm A – Thornhill Way	59	161	91
	Arm B – A33 East	342	168	37
	Arm C – Lilymill Chine	29	244	63
	Arm D - A33 West	55	85	31
PM	Arm A – Thornhill Way	316	966	119
	Arm B – A33 East	40	169	47
	Arm C – Lilymill Chine	37	50	47
	Arm D - A33 West	255	988	65

Modelled Mean Max Queue Each Entry of Thornhill Way / A33 Junction

Time	Arms	2029 Reference Case (PCUs)	Local Plan without mitigation (PCUs)	Local Plan with mitigation (PCUs)
AM	Arm A – Thornhill Way	6	17	7
	Arm B – A33 East	101	86	20
	Arm C – Lilymill Chine	3	42	15
	Arm D - A33 West	22	55	17
PM	Arm A – Thornhill Way	53	158	15
	Arm B – A33 East	23	85	28
	Arm C – Lilymill Chine	1	7	7
	Arm D - A33 West	105	470	32

BINFIELDS ROUNDABOUT

Modelled Queue Length at Each Entry at Binfields Roundabout – Signalised Roundabout Option A

Time	Arms	2029 Reference Case (PCUs)	Local Plan without mitigation (PCUs)	Local Plan with mitigation (PCUs)
AM	Arm A – A33 East	238	585	9
	Arm B – Chineham District Centre	49	54	2
	Arm C – Great Binfields Road	3	39	4
	Arm D – A33 West	21	268	15
	Arm E – Reading Road	40	91	5
PM	Arm A – A33 East	112	528	22
	Arm B – Chineham District Centre	176	235	8
	Arm C – Great Binfields Road	107	390	8
	Arm D – A33 West	579	959	17
	Arm E – Reading Road	2	2	2

Modelled Average Delay per Vehicle at Each Entry at Binfields Roundabout – Signalised Roundabout Option A

Time	Arms	2029 Reference Case (sec)	Local Plan without mitigation (sec)	Local Plan with mitigation (sec)
AM	Arm A – A33 East	369	863	18
	Arm B – Chineham District Centre	510	564	20
	Arm C – Great Binfields Road	19	171	33
	Arm D – A33 West	39	420	42
	Arm E – Reading Road	171	425	25
PM	Arm A – A33 East	180	771	87
	Arm B – Chineham District Centre	1494	2190	39
	Arm C – Great Binfields Road	409	1444	41
	Arm D – A33 West	980	1657	50
	Arm E – Reading Road	15	18	24

Modelled Queue Length at Each Entry at Binfields Roundabout – 'Through-about' Option B

Time	Arms	2029 Reference Case (PCUs)	Local Plan without mitigation (PCUs)	Local Plan with mitigation (PCUs)
AM	Arm A – A33 East	238	585	9
	Arm B – Chineham District Centre	49	54	3
	Arm C – Great Binfields Road	3	39	3
	Arm D – A33 West	21	268	7
	Arm E – Reading Road	40	91	2
PM	Arm A – A33 East	112	528	11
	Arm B – Chineham District Centre	176	235	6
	Arm C – Great Binfields Road	107	390	6
	Arm D – A33 West	579	959	17
	Arm E – Reading Road	2	2	4

Modelled Average Delay per Vehicle at Each Entry at Binfields Roundabout – 'Through-about' Option B

Time	Arms	2029 Reference Case (sec)	Local Plan without mitigation (sec)	Local Plan with mitigation (sec)
AM	Arm A – A33 East	369	863	14
	Arm B – Chineham District Centre	510	564	25
	Arm C – Great Binfields Road	19	171	22
	Arm D – A33 West	39	420	13
	Arm E – Reading Road	171	425	14
PM	Arm A – A33 East	180	771	23
	Arm B – Chineham District Centre	1494	2190	26
	Arm C – Great Binfields Road	409	1444	21
	Arm D – A33 West	980	1657	45
	Arm E – Reading Road	15	18	42

CROCKFORD ROUNDABOUT

Modelled Queue Length at Each Entry at Crockford Roundabout

Time	Arms	2029 Reference Case (PCUs)	Local Plan without mitigation (PCUs)	Local Plan with mitigation (PCUs)
AM	Arm A – Crockford Lane	1	3	7
	Arm B – A33 East	655	1220	131
	Arm C – A33 South	1571	1827	91
	Arm D – Carpenter's Down	3	83	9
PM	Arm A – Crockford Lane	10	193	52
	Arm B – A33 East	912	1413	161
	Arm C – A33 South	1515	2130	136
	Arm D – Carpenter's Down	1	2	6

Modelled Average Delay per Vehicle at Each Entry at Crockford Roundabout

Time	Arms	2029 Reference Case (sec)	Local Plan without mitigation (sec)	Local Plan with mitigation (sec)
AM	Arm A – Crockford Lane	4	11	41
	Arm B – A33 East	1267	2808	271
	Arm C – A33 South	3995	4004	235
	Arm D – Carpenter's Down	25	464	57
PM	Arm A – Crockford Lane	33	510	293
	Arm B – A33 East	2210	3616	383
	Arm C – A33 South	3783	4821	307
	Arm D – Carpenter's Down	10	16	53

A30 / WALLOP DRIVE ROUNDABOUT

Modelled Average Delay per Vehicle at Each Entry at A30 / Wallop Drive Roundabout

Time	Arm	2029 Reference Case (sec)	Local Plan without mitigation (sec)	Local Plan with mitigation (sec)
AM	Arm A - A30 E	6	6	32
	Arm B - Wallop Drive	5	5	30
	Arm C - A30 W	8	254	42
PM	Arm A - A30 E	16	613	77
	Arm B - Wallop Drive	7	11	155
	Arm C - A30 W	17	31	136

Modelled Queue at Each Entry at A30 / Wallop Drive Roundabout

Time	Arm	2029 Reference Case (PCUs)	Local Plan without mitigation (PCUs)	Local Plan with mitigation (PCUs)
AM	Arm A - A30 E	2	2	16
	Arm B - Wallop Drive	1	1	8
	Arm C - A30 W	3	169	28
PM	Arm A - A30 E	7	369	53
	Arm B - Wallop Drive	1	2	31
	Arm C - A30 W	7	15	24

KEMPSHOTT ROUNDABOUT

Modelled Queue at Each Entry at Kempshott Roundabout

Time	Arm	2029 Reference Case (PCUs)	Local Plan without mitigation (PCUs)	Local Plan with mitigation (PCUs)
AM	Arm A – A30 North	2	2	4
	Arm B – Woodbury Rd	5	6	8
	Arm C –A30 South	470	1234	162
	Arm D – Heather Way	2	2	9
PM	Arm A – A30 North	248	1040	309
	Arm B – Woodbury Rd	1	1	3
	Arm C –A30 South	259	330	10
	Arm D – Heather Way	1	3	10

Modelled Average Delay per Vehicle at Each Entry at Kempshott Roundabout

Time	Arm	2029 Reference Case (sec)	Local Plan without mitigation (sec)	Local Plan with mitigation (sec)
AM	Arm A – A30 North	6	7	8
	Arm B – Woodbury Rd	20	25	20
	Arm C –A30 South	1580	4149	200
	Arm D – Heather Way	10	10	35
PM	Arm A – A30 North	511	2362	397
	Arm B – Woodbury Rd	6	8	26
	Arm C –A30 South	733	918	9
	Arm D – Heather Way	5	11	21

BRIGHTON HILL ROUNDABOUT

Modelled Queue at Each Entry a Brighton Hill Roundabout

Time	Arm	2029 Reference Case (PCUs)	Local Plan without mitigation (PCUs)	Local Plan with mitigation (PCUs)
AM	Arm A – A30 North	3	3	76
	Arm B –Harrow Way	2	2	14
	Arm C – Brighton Way	263	292	28
	Arm D – A30 South	516	1107	50
	Arm E – Winchester Rd	169	186	17
	Arm F – Western Way	227	227	15
PM	Arm A – A30 North	3	1207	153
	Arm B –Harrow Way	2	311	33
	Arm C – Brighton Way	292	600	31
	Arm D – A30 South	1107	1	8
	Arm E – Winchester Rd	186	1	56.8
	Arm F – Western Way	227	135	16.6

Modelled Average Delay per Vehicle at Each Entry at Brighton Hill Roundabout

Time	Arm	2029 Reference Case (sec)	Local Plan without mitigation (sec)	Local Plan with mitigation (sec)
AM	Arm A – A30 North	9	7	213
	Arm B –Harrow Way	8	8	25
	Arm C – Brighton Way	1099	1265	30
	Arm D – A30 South	1243	2611	58
	Arm E – Winchester Rd	1569	1603	57
	Arm F – Western Way	-	-	260
PM	Arm A – A30 North	874	7	290
	Arm B –Harrow Way	1271	8	64
	Arm C – Brighton Way	21062	1265	126
	Arm D – A30 South	3	2611	27
	Arm E – Winchester Rd	5	1603	268.9
	Arm F – Western Way	1044	-	276.8

HACKWOOD ROUNDABOUT

Modelled Queue Length at Each Entry at Hackwood Roundabout

Time	Arm	2029 Reference Case (PCUs)	Local Plan without mitigation (PCUs)	Local Plan with mitigation (PCUs)
AM	Arm A – A30 Ringway E	36	131	9
	Arm B – A339	786	996	72
	Arm C –A30 Ringway W	496	654	35
	Arm D – Hackwood Rd	2	2	7
PM	Arm A – A30 Ringway E	9	213	11
	Arm B – A339	88	293	21
	Arm C –A30 Ringway W	408	451	15
	Arm D – Hackwood Rd	297	782	24

Modelled Average Delay per Vehicle at Each Entry at Hackwod Roundabout

Time	Arm	2029 Reference Case (sec)	Local Plan without mitigation (sec)	Local Plan with mitigation (sec)
AM	Arm A – A30 Ringway E	67	212	12
	Arm B – A339	2078	2717	141
	Arm C –A30 Ringway W	1529	2092	55
	Arm D – Hackwood Rd	16	16	33
PM	Arm A – A30 Ringway E	23	400	23
	Arm B – A339	212	756	44
	Arm C –A30 Ringway W	1366	1371	17
	Arm D – Hackwood Rd	1904	5027	47

VICTORY ROUNDABOUT

Modelled Queue Length at Each Entry at Victory Roundabout

Time	Arms	2029 Reference Case (PCUs)	Local Plan without mitigation (PCUs)	Local Plan with mitigation (PCUs)
AM	Arm A – A3010 East	1	1	1
	Arm B – Timberlake Road	1	1	1
	Arm C – A3010 West	177	792	152
	Arm D – Alencon Link	3	58	103
PM	Arm A – A3010 East	2	3	3
	Arm B – Timberlake Road	3	61	95
	Arm C – A3010 West	1	1	1
	Arm D – Alencon Link	8	113	7

Modelled Average Delay per Vehicle at Each Entry at Victory Roundabout

Time	Arms	2029 Reference Case (sec)	Local Plan without mitigation (sec)	Local Plan with mitigation (sec)
AM	Arm A – A3010 East	3	4	4
	Arm B – Timberlake Road	3	4	4
	Arm C – A3010 West	313	1403	195
	Arm D – Alencon Link	20	270	502
PM	Arm A – A3010 East	6	7	8
	Arm B – Timberlake Road	9	132	205
	Arm C – A3010 West	3	4	2
	Arm D – Alencon Link	28	335	21

A339 / RINGWAY WEST ROUNDABOUT

Modelled Average Delay at Each Entry at A339 / Ringway West Roundabout

Time	Arms	2029 Reference Case (sec)	Local Plan without mitigation (sec)	Local Plan with mitigation (sec)
AM	Arm A – A339 RW N	3	4	11
	Arm B – A340 RW	28	552	38
	Arm C – A339	999	1727	24
PM	Arm A – A339 RW N	10	134	14
	Arm B – A340 RW	94	492	33
	Arm C – A339	25	363	18

Modelled Queue Length at Each Entry for A339 / Ringway West Roundabout

Time	Arms	2029 Reference Case (PCUs)	Local Plan without mitigation (PCUs)	Local Plan with mitigation (PCUs)
AM	Arm A – A339 RW N	3	4	12
	Arm B – A340 RW	14	327	31
	Arm C – A339	684	1221	24
PM	Arm A – A339 RW N	11	178	15
	Arm B – A340 RW	48	267	22
	Arm C – A339	14	264	13

A339 / ROMAN ROAD JUNCTION

Modelled Average Delay at Each Entry at A339 / Roman Road Junction

Time	Arms	2029 Reference Case (sec)	Local Plan without mitigation (sec)	Local Plan with mitigation (sec)
AM	Arm A – Rooksdown Lane	6	6	133
	Arm B – A339 East	6	7	35
	Arm C - Roman Road	10	13	311
	Arm D - A339 West	706	1817	290
PM	Arm A – Rooksdown Lane	5	6	100
	Arm B – A339 East	441	739	30
	Arm C - Roman Road	6	6	92
	Arm D - A339 West	23	457	30

Modelled Queue Length at Each Entry at A339 / Roman Road Junction

Time	Arms	2029 Reference Case (PCUs)	Local Plan without mitigation (PCUs)	Local Plan with mitigation (PCUs)
AM	Arm A – Rooksdown Lane	1	1	8
	Arm B – A339 East	2	3	15
	Arm C - Roman Road	2	3	89
	Arm D - A339 West	287	736	115
PM	Arm A – Rooksdown Lane	1	1	13
	Arm B – A339 East	276	467	27
	Arm C - Roman Road	1	1	92
	Arm D - A339 West	8	225	30

B3400 WORTING ROAD / ROMAN WAY ROUNDABOUT

Modelled Queue Length at Each Entry at B3400 Worting Road / Roman Way Roundabout

Time	Arms	2029 Reference Case (PCUs)	Local Plan without mitigation (PCUs)	Local Plan with mitigation (PCUs)
AM	Arm A – Roman Way	22	45	1
	Arm B – B3400 Worting Rd (E)	17	314	18
	Arm C – B3400 Worting Rd (W)	339	600	72
PM	Arm A – Roman Way	459	552	24
	Arm B – B3400 Worting Rd (E)	7	230	28
	Arm C – B3400 Worting Rd (W)	4	316	3

Modelled Average Delay per Vehicle at Each Entry at B3400 Worting Road / Roman Way Roundabout

Time	Arms	2029 Reference Case (sec)	Local Plan without mitigation (sec)	Local Plan with mitigation (sec)
AM	Arm A – Roman Way	154	321	7
	Arm B – B3400 Worting Rd (E)	75	1064	52
	Arm C – B3400 Worting Rd (W)	2159	3377	202
PM	Arm A – Roman Way	2830	4596	89
	Arm B – B3400 Worting Rd (E)	36	787	88
	Arm C – B3400 Worting Rd (W)	33	1522	10

WORTING ROAD ROUNDABOUT

Modelled Queue Length at Each Entry at Worting Road Roundabout

Time	Arms	2029 Reference Case (PCUs)	Local Plan without mitigation (PCUs)	Local Plan with mitigation (PCUs)
AM	Arm A – Worting Road	0	0	0
	Arm B – B3400 Worting Road (E)	1	1	1
	Arm C – Buckskin Lane	1	5	3
	Arm D – B3400 Worting Road (W)	4	188	10
PM	Arm A – Worting Road	0	0	0
	Arm B – B3400 Worting Road (E)	2	131	33
	Arm C – Buckskin Lane	0	5	3
	Arm D – B3400 Worting Road (W)	0	4	2

Modelled Average Delay per Vehicle at Each Entry at Worting Road Roundabout

Time	Arms	2029 Reference Case (sec)	Local Plan without mitigation (sec)	Local Plan with mitigation (sec)
AM	Arm A – Worting Road	1	1	1
	Arm B – B3400 Worting Road (E)	3	4	4
	Arm C – Buckskin Lane	6	18	10
	Arm D – B3400 Worting Road (W)	18	578	32
PM	Arm A – Worting Road	1	1	1
	Arm B – B3400 Worting Road (E)	11	247	66
	Arm C – Buckskin Lane	5	26	15
	Arm D – B3400 Worting Road (W)	5	15	6

WEST HAM ROUNDABOUT

Modelled Queue Length at Each Entry at West Ham Roundabout

Time	Arm	2029 Reference Case (PCUs)	Local Plan without mitigation (PCUs)	Local Plan with mitigation (PCUs)
AM	Arm A - B3400 Churchill Way	1	2	1
	Arm B - Grafton Way	0	0	0
	Arm C - Worting Rd	4	10	2
	Arm D - West Ham Close	0	0	0
	Arm E - B3400 Worting Rd	28	378	68
	Arm F - Uskirchen Way	0	0	1
PM	Arm A - B3400 Churchill Way	78	509	36
	Arm B - Grafton Way	1	1	4
	Arm C - Worting Rd	6	14	3
	Arm D - West Ham Close	0	0	0
	Arm E - B3400 Worting Rd	2	13	3
	Arm F - Uskirchen Way	0	0	0

Modelled Average Delay per Vehicle at Each Entry at West Ham Roundabout

Time	Arm	2029 Reference Case (sec)	Local Plan without mitigation (sec)	Local Plan with mitigation (sec)
AM	Arm A - B3400 Churchill Way	5	8	4
	Arm B - Grafton Way	5	5	6
	Arm C - Worting Rd	17	48	7
	Arm D - West Ham Close	7	9	9
	Arm E - B3400 Worting Rd	80	910	138
	Arm F - Uskirchen Way	8	8	13
PM	Arm A - B3400 Churchill Way	173	1057	63
	Arm B - Grafton Way	13	13	48
	Arm C - Worting Rd	37	92	21
	Arm D - West Ham Close	11	13	42
	Arm E - B3400 Worting Rd	9	42	9
	Arm F - Uskirchen Way	5	7	7

FIVEWAYS JUNCTION

Modelled Queue Length at Each Entry at Fiveways Junction

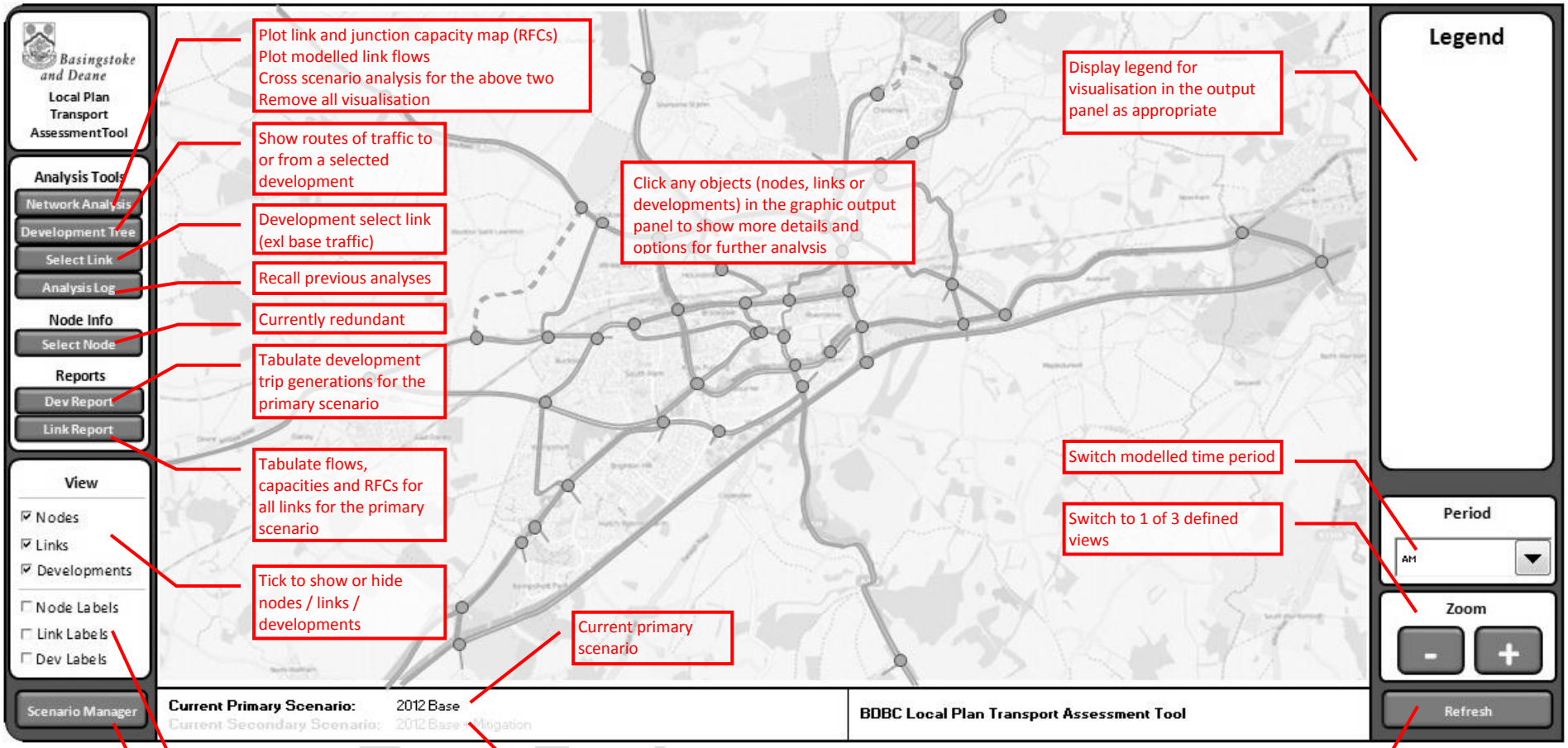
Time	Arms	2029 Reference Case (PCUs)	Local Plan without mitigation (PCUs)	Local Plan with mitigation (PCUs)
AM	Arm A – Buckskin Lane	89	143	59
	Arm B – Pack Lane (East)	81	187	63
	Arm C – Kempshott Lane	198	343	162
	Arm D – Pack Lane (West)	36	86	8
PM	Arm A – Buckskin Lane	395	464	381
	Arm B – Pack Lane (East)	174	325	184
	Arm C – Kempshott Lane	262	282	211
	Arm D – Pack Lane (West)	9	235	12

Modelled Average Delay per Vehicle at Each Entry at Fiveways Junction

Time	Arms	2029 Reference Case (sec)	Local Plan without mitigation (sec)	Local Plan with mitigation (sec)
AM	Arm A – Buckskin Lane	545	902	374
	Arm B – Pack Lane (East)	551	892	398
	Arm C – Kempshott Lane	540	867	424
	Arm D – Pack Lane (West)	246	391	24
PM	Arm A – Buckskin Lane	1003	1076	933
	Arm B – Pack Lane (East)	1013	1100	910
	Arm C – Kempshott Lane	1028	1072	846
	Arm D – Pack Lane (West)	41	1097	28

APPENDIX D

SPREADSHEET MODEL USERS GUIDE


Basingstoke and Deane
Local Plan Transport AssessmentTool
Analysis Tools
Network Analysis
Development Tree
Select Link
Analysis Log
Node Info
Select Node
Reports
Dev Report
Link Report
View
Nodes
Links
Developments
Node Labels
Link Labels
Dev Labels
Scenario Manager
Plot link and junction capacity map (RFCs)
Plot modelled link flows
Cross scenario analysis for the above two
Remove all visualisation
Show routes of traffic to or from a selected development
Development select link (exl base traffic)
Recall previous analyses
Currently redundant
Tabulate development trip generations for the primary scenario
Tabulate flows, capacities and RFCs for all links for the primary scenario
Tick to show or hide nodes / links / developments
Tick to show or hide labels
Click to set primary and secondary scenario(s)
Click any objects (nodes, links or developments) in the graphic output panel to show more details and options for further analysis
Current primary scenario
Current secondary scenario
Current Primary Scenario: 2012 Base
Current Secondary Scenario: 2012 Base + Mitigation
BDBC Local Plan Transport Assessment Tool
Display legend for visualisation in the output panel as appropriate
Switch modelled time period
Switch to 1 of 3 defined views
Try this if the visualisation in the output panel does not make sense.
Legend
Period
AM
Zoom
-
+
Refresh