Delivering Strategies

Winchester District Local Development Framework Transport Assessment

Stage 2 Report

Final Report for Winchester City Council

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Summary

Transport is a fundamental consideration of the Local Development Framework (LDF) process. The movement of people and goods is an essential function of established communities and new development sites. If a more sustainable future is to be achieved then the mix and location of development needs to be carefully planned so that, as far as possible, it helps reduce the overall demand for travel and encourages travel by more sustainable modes. In many instances, reconciling development aspirations and transport needs can be difficult and there are naturally concerns about the impact of development sites, particularly for road traffic.

This Transport Assessment has been prepared to ensure that proper consideration is given to the transport issues that arise from the LDF process. It has collated a range of data sources to build up a picture of current transport activity across Winchester District and considered how proposed development could affect existing movement and how transport networks could be changed to meet additional demands when development is in place. The Assessment is presented in two reports.

The Stage 1 report formed part of the evidence base for Winchester City Council's Core Strategy Preferred Option that was published for consultation in May 2009. Stage 1 involved a wide-ranging review of all the proposed locations for development in Winchester District to assess the transport implications of each. This took into account the locations suggested and the transport problems and potential solutions associated with them. The transport assessment was one element of the City Council's process to determine the most suitable locations for development given the requirements set out in the South East Plan. While transport is not the only consideration, it clearly has a strong influence on how new development will function and how sites can be integrated with established settlements.

This Stage 2 report takes forward the key sites identified in the Preferred Option to investigate in more detail both the expected transport impacts and how demand management and other mitigation measures should be introduced as an integral part of the development strategy to reduce transport impacts, notably additional car movements. Comments made through the ongoing dialogue with the Highways Agency have also been picked up.

The number of trips that could be expected to be generated from each site has been calculated and consideration given to how these would be assigned to the highway network and the public transport networks. The extent to which trips could be minimised in number and transferred to sustainable modes – walking, cycling and bus and rail use – has also been investigated.

The expected traffic impacts have been calculated in accordance with Highways Agency advice. This takes trip rates determined from a reliable source and applies them to the quantum of development. This is then split by mode based on Census data and distributed according to observed data.

Across the District, 60% of journeys to work have destinations in the District with Southampton, Eastleigh and Portsmouth attracting workers; for Winchester city, 70% of journeys to work are to destinations in the District. For Whiteley, local data has been used which shows that South Hampshire destinations feature more strongly as would be expected.

The numbers of trips have been assigned to routes by mode to give an indication of the likely impacts of the larger sites. The generated trips are then added to observed traffic data to assess the impacts on link flows, taking background growth to 2026 into account.

The analysis demonstrates the importance of locating a broad range of land uses in close proximity and providing strong walk, cycle and public transport connections between them. Containment of trips might be achieved by either placing a mix of uses on one site (e.g. Barton Farm) or by linking a site into adjoining areas that provide complimentary facilities (e.g. Whiteley).

The analysis also identifies the potential for a comprehensive package of Smarter Travel measures to support sustainable travel and reduce excessive car use. In new developments, people's travel habits will not be entrenched from the outset and it may be possible to influence mode choice at an early stage so that walking, cycling, bus and car sharing become the modes of choice. The car would obviously still play a sizable role but this could be reduced. A number of measures which are already being implemented throughout the UK are identified as offering the potential to bring about these changes including: behavioural change brought about by travel planning; more home working, car sharing and car clubs and site design to support sustainable modes.

In terms of traffic generation the analysis indicates that sites in Winchester town will have a marginal impact on the A34(T) but will add to traffic at M3 Junction 11 and motorway flows to the south of Winchester at peak times. The M3 is expected to experience further congestion in future years due to traffic growth as well as generated traffic and capacity will be exceeded. Roads within the city will have higher traffic levels and additional traffic on the B3420 Andover Road from the Barton Farm site into the city centre is expected to cause congestion at peak times. This can be relieved by a strong emphasis on sustainable modes to the site.

Additional traffic from Whiteley at M27 Junction 9 will exacerbate existing problems and compound difficulties of background traffic growth and the traffic generated by large development sites including the North/North East Hedge End Strategic Development Area (SDA) and the North Fareham SDA. The proposed South Hampshire Strategic Employment Zone at Eastleigh will also be expected to add to traffic using the motorways.

The scale of development expected in Winchester District and neighbouring planning authorities will require improvements funded through the development process, but not all problems can be dealt with by the development market. It is therefore apparent that the Government has a key role in helping to fill gaps in infrastructure provision through a mixture of funding sources at local, regional and national level.

Glossary

ATM	Active Traffic Management (applied to motorways)
CIF	Community Infrastructure Fund (associated with development sites)
FTE	Full Transport Evaluation (as specified by the Highways Agency)
GVA	Gross Value Added
LDF	Local Development Framework
LTP	Local Transport Plan
MDA	Major Development Area
NRTF	National Road Traffic Forecasts
PUSH	Partnership for South Hampshire
RFA	Regional Funding Allocation
RFC	Ratio of flow to capacity
RSS	Regional Spatial Strategy – the South East Plan
RTE	Reduced Transport Evaluation (as specified by the Highways Agency)
RTS	Regional Transport Strategy
SDA	Strategic Development Area
SHSEZ	South Hampshire Strategic Employment Zone
SRN	Strategic Road Network
SWOT	Strengths, Weaknesses, Opportunities, Threats
TEMPRO	Department for Transport's trip end forecasting program
TfSH	Transport for South Hampshire
TRICS	Database to determine trip rates from development sites

1 Introduction

1.1 Previous Analysis

1.1.1 Stage 1 of the study involved a wide-ranging review of all the proposed locations for development in Winchester District to assess the transport implications of each. This took into account the locations suggested and the transport problems and potential solutions associated with them. The number of trips that could be expected to be generated from each site was calculated and consideration was given to how these would be assigned to the highway network and the public transport networks. For the larger sites in particular, the extent to which trips could be minimised in number and transferred to sustainable modes – walking, cycling and bus and rail use – was outlined.

1.1.2 The transport assessment was one element of the City Council's process to determine the most suitable locations for development given the requirements set out in the South East Plan. While transport is not the only consideration, it clearly has a strong influence on how new development will function and how sites can be integrated with established settlements.

1.1.3 The Stage 1 report was published as part of the evidence base to support the consultation phase of the Core Strategy Preferred Options which ended on 3rd July 2009.

1.2 This Report

1.2.1 This Stage 2 report takes forward selected sites from the LDF process to investigate in more detail both the expected transport impacts and how demand management and other mitigation measures should be introduced as an integral part of the development strategy to reduce transport impacts, notably additional car movements. Comments made through the ongoing dialogue with the Highways Agency have also been picked up.

1.2.2 The selected sites have been agreed in discussion with Winchester City Council with particular reference to the Winchester Core Strategy Preferred Options Report published May 2009 which identified Barton Farm for 2,000 dwellings and Bushfield Camp as a 'knowledge park'.

1.2.3 More detailed consideration has been given to development at North Whiteley and the West of Waterlooville Major Development Area (MDA), the majority of which is within the District. For completeness, and specifically in response to a request from with the Highways Agency, consideration has also been given to other major developments in south Hampshire including:

- North Hedge End SDA
- Cumulative development impacts from Portsmouth, Gosport, Fareham and Havant.
- Cumulative development impacts from Southampton

1.2.4 Selected data has been made available from local authorities and other consultants' studies to inform this analysis. Transport Assessments for some sites have also been provided. Varying methods and assumptions have been made to underpin this separate work and we have attempted to rationalise the outputs to provide a consistent platform from which to

complement our analysis. Where this was not possible, we have made informed assumptions and explain these in the text as appropriate.

1.2.5 The following development parameters have been agreed for the purposes of this study:

Table 1.1 Winchester LDF Development Parameters

Development Area	Dwellings	Commercial Floorspace
Barton Farm	2,000	Food retail – 2,000 sq m Local retail – 2,000 sq m
Bushfield Camp	-	40,000 sq m B1 Business Park
North Whiteley	3,000	Assumed local centre comprising 2000 sqm retail and 500 sq m community use
West of Waterlooville	1,000	-
Major Developments outside Winchester District included in assessment		
Hedge End	6,000	46,000 sq m B1 8,000 sq m B2 20,000 Sq m B8
North Fareham	10,000	72,000 sq m B1 16,000 sq m B2 33,000 sq m B8

1.2.6 The analysis has included outputs extracted from a draft report assessing transport impacts arising from the impact of development around Portsmouth harbour (Portsmouth, Fareham and Gosport administrative areas), including the proposed Strategic Development Area at North Fareham.

1.2.7 The structure of this report is as follows:

- Chapter 2 provides a strategic overview in terms of sustainable transport interventions and mitigation measures;
- Chapter 3 investigates transport impacts within Winchester;
- Chapter 4 investigates transport impacts at Whiteley;
- Chapter 5 investigates transport impacts at West of Waterlooville;
- Chapter 6 looks at potential cumulative impacts and mitigation measures particularly on the Strategic Road Network; and
- Chapter 7 offers conclusions.

2 Strategic Interventions

2.1 Context

2.1.1 Development of the scale proposed within the District will inevitably raise concerns over transport impact in already congested areas, the role of infrastructure in meeting additional demands and potential alternatives to car travel, particularly public transport.

2.1.2 Of the wide range of potential development sites that were investigated in the Stage 1 report, many are located in rural areas where public transport is generally not a feasible alternative due to low service frequency and lengthy journey times and where walking and cycling trips are impractical due to the distances involved in reaching larger settlements. Concentration of development within established urban areas, Winchester and Whiteley within the District and urban extensions within the remainder of the PUSH area, has the greatest potential to create more sustainable travel patterns.

2.1.3 This approach may, however, exacerbate existing traffic congestion problems within those settlements unless appropriate mitigation measures are planned. Within Winchester, new infrastructure is constrained by environmental impact concerns on the historic fabric of the city. Elsewhere, infrastructure must be targeted towards areas of concern on the strategic road network as well as providing opportunities to facilitate improved public transport access.

2.1.4 New developments themselves create substantial opportunities to reduce traffic impacts through design, by integration of an appropriate mix of uses within the site and introduction of sustainable 'Smarter Travel' measures from the outset. The Stage 1 report recognises this potential and sets out a range of options for promoting smarter travel, including measures to boost public transport. This report takes a closer look at that strategy, extends the range of forecasts and sets out a wider scope of interventions to mitigate the effects of development.

2.1.5 Having confirmed the locations of development as Barton Farm, Bushfield Camp, North Whiteley and West of Waterlooville, we also provide commentary on the impact that appropriate land use mix has in ensuring these developments are sustainable and minimise their impacts on the transport network.

2.2 Potential Impacts of Smarter Travel

2.2.1 The public is becoming increasingly aware and concerned about the transport impacts on climate change, congestion and the environmental impact of new infrastructure. A particular concern in relation to development on the scale envisaged across the District is the effective management and mitigation of travel demand, especially in an area where the highway network is already subject to peak period congestion.

2.2.2 It is no longer acceptable for a large development simply to provide pieces of infrastructure such as cycle routes and / or subsidised bus services with the hope that the services will be used. All too often the developer funded bus service subsidy runs out with too few passengers to operate a viable service, and the consequences that bus services are cut and more people need to use cars.

2.2.3 Although infrastructure and services are an important component in supporting sustainable travel, they need to be complemented by a range of initiatives that encourage positive behavioural change, for example by creating opportunities for home-working or car-sharing, reducing the need to travel in the first place.

2.2.4 Collectively this is referred to as Smarter Travel or Travel Demand Management (TDM). TDM measures are in their infancy in development terms, with their longevity and efficiency yet to be proven. However, several of those initiatives, such as travel planning and car sharing are in widespread use and a knowledge base of associated methods and performance is building over time. The projected timescale for delivering most of the development is post-2016, by which time it can be expected that a substantial body of evidence will have accumulated about the effectiveness of individual measures and their collective applications.

2.2.5 We draw upon published research and our own experience as active practitioners in this field to assess the applicability and likely contribution of these measures in reducing the need to travel and promoting travel mode shift to non-car modes.

2.2.6 The following principles underpin our approach:

- The developments will be greenfield sites which offer the opportunity to integrate measures and services that create a sustainable environment from the outset, making it easier for the site's population to make more sustainable travel choices;
- measures such as good public transport services to interchanges and good pedestrian and cycling facilities are built into the site prior to occupation to allow the Smarter Travel measures to take full advantage of the 'Change Opportunity'[1] and further improve the likelihood of success;
- Where developments are extensions to existing communities, such as North Whiteley or West of Waterlooville, the 'Change Opportunity' applies to new residents and is supported by new smarter travel interventions that will also encourage sustainable travel by existing residents;
- Designing in the advantages of a Smarter Travel choice by making them overtly visible, acting as a reminder to those who have made the choice to travel by sustainable mode that they are valued and have a visible advantages, also acting as an advertising and reinforcement mechanism to those using non sustainable modes that there may be a better option;
- Parking management policies are in place that offer a hierarchy of car parking solutions. This ideally would be based on promoting the use of park & ride where appropriate, pool cars, car sharing and car clubs.

2.2.7 TDM techniques can be designed to specifically target business users, education journeys or residential journeys. The techniques are designed for each target market although there is some overlap. Table 2.1 below identifies potential TDM techniques for each journey type.

[1] The 'Change Opportunity' is a psychological theory that is used in all behaviour change programmes. When individuals are going through a process of intense psychological change such as: moving house, relocation of workplace or a new job, they are more open to the possibility of changing other aspects of their behaviour such as travel. This principle means that the entire population of these strategic allocations in theory should be more predisposed to change.

Table 2.1 Potential TDM Interventions

Technique	Employment / Business	Educational	Residential
Workplace Travel Plans	■		
Car Sharing	■	■	
Car Clubs	■		■
Personalised Travel Planning[2]		■	■
Area Based (Cluster) Travel Plans[3]	■	■	
School Travel Plans		■	
Real time publicity	■	■	■
Home delivery			■
Cycle Hire	■		■
Off-peak servicing	■		

2.3 Potential Reduction in Travel Demand

2.3.1 In new developments, people's travel habits will not be entrenched from the outset and it may be possible to influence mode choice at an early stage so that walking, cycling, bus and car sharing become the modes of choice. The car would obviously still play a sizable role but this could be reduced.

2.3.2 Here we review the potential for a number of measures to support sustainable travel, reduce excessive car use and the need to travel generally. A number of measures, which are already being implemented throughout the UK, have been identified as offering the potential to bring about these changes and they are:

- behavioural change brought about by travel planning;
- more home working;
- car clubs – successful examples exist in Southampton and elsewhere in the south; consideration should be given to re-introducing the Winchester car club

[2] Personal travel planning involves the direct marketing of travel planning tailored to the individual's current travel patterns and options for changing their travel. It has been implemented overseas since the 1980s and was first introduced in the UK in the early 2000s.

[3] Area based travel planning involves the use of a mixture of travel planning approaches often used to complement infrastructural changes in order to improve the traffic problems within an area. Workplace, school and personal travel planning can be included and should help increase the number of people in the area using sustainable travel modes. It is also likely to involve the advertising of sustainable travel options.

- car sharing;
- containment within the site with the availability of employment within walk/cycle distance; and
- site design to support sustainable modes.

2.3.3 'Smarter choices' have, over the last five years, become more widespread, due to a number of studies showing the potential of changing mode choice. For example, research carried as part of the DfT 'Sustainable Towns' initiatives in Darlington, Peterborough and Worcester, found out that:

- 39-52% of car trips were used for subjective reasons only (i.e. a bus was available, or the trip was short enough to walk or cycle);
- 35-48% of trips a car was used because no alternative was available; and
- 13-15% of trips required a car because of practical constraints.

2.3.4 'Smarter choices' are therefore primarily aimed at the 39-52% of car-based journeys that could be undertaken by public transport, walking, cycling or not at all (i.e. home working). A comprehensive piece of research, reviewing the potential impact of 'smarter choices' on travel habits and traffic levels, was published by the Department for Transport in 2005[4].

2.3.5 While travel plans can help reduce car trips, it is clear that the effectiveness of travel plans varies greatly between different organisations, individuals and places. From the **workplace travel plan** case studies reviewed, the most significant factor that brought about reductions in car trips was when an organisation addressed staff parking, either by restricting the availability of spaces or introducing parking charges.

2.3.6 **Personalised travel planning** focuses on a variety of trips made by individuals that include work, shopping and leisure journeys. A number of studies have been carried out in Australia (Perth) and the UK (Frome and Gloucester). In Perth, a before and after study showed that vehicle kilometres were reduced by 17%. Follow-up monitoring a year later showed that this has been sustained. In Frome and Gloucester, car driver trips reduced by 6% and 9% respectively.

2.3.7 **Residential travel plans** are concerned with reducing the number and length of car trips generated by a residential development, as well as supporting more sustainable modes of travel and reducing the overall need to travel. Compared to other travel plans they are slightly different in that they are concerned with journeys to multiple and changing destinations. Residential travel plans are relatively new; guidance for them was published in 2005[5], so there is currently no evidence available to demonstrate their effectiveness. From case studies it was evident that developers are prepared to engage in the travel planning process and fund measures which promote sustainable travel. However, generous parking standards at some of the sites have led to high car ownership levels. Again, parking provision is seen as a key determinant of mode choice and travel patterns.

2.3.8 Employees are increasingly being given greater opportunities to **work from home** and undertake more flexible working patterns. This has been helped by the advancement of technology which allows people to access information from home and at other locations,

[4] Department for Transport (July 2004) *Smarter choices – changing the way we travel.*

[5] Making residential travel plans work: guidance for new developments, DfT, October 2005

rather than the normal workplace. In 2005, around 3.1 million people worked mainly in their home or different places using home as a base (an increase from 2.3 million in 1997). Of these, 2.4 million used a telephone or computer to carry out their work (teleworker). Almost two thirds of teleworkers are self-employed, whilst only one in three are employees.

2.3.9 Data shows that teleworkers participate in managerial and professional occupations. The scope for growth in teleworking is therefore likely to be confined to these groups and therefore is not applicable to around 50% of the UK workforce (typically administrators, personal services, customer services, process, plant and machinery workers).

2.3.10 In over a decade, the growth in **car club** membership has increased significantly in the UK from 500 in 2002 to 23,000 members currently belonging to a total of 42 car clubs across the UK[6]. A number of studies in European cities including towns in Switzerland and Holland have assessed the effects of car clubs on car use. These demonstrated that members who give up their car when joining a car club reduce their car mileage by 60-70%. Members who do not give up their car appear not to alter their travel patterns. In terms of its impact on traffic levels, DfT suggests that car clubs could cut car mileage in urban areas by 0.03%-0.06% and potentially up to 3% in the long term (no long term date is specified).

2.3.11 There are a number of **car sharing** schemes throughout the UK and these have tended to focus on journeys associated with the workplace. A study for the DfT looking at the wider impact of workplace travel plans[7] concluded that 'The data available show that, of 14 companies with schemes that enable them to identify formally registered, active sharers, on average, 14% of staff have become active car sharers'.

2.3.12 The Smarter Choices report shows the potential contribution of each travel plan measure, under high and low intensity scenarios, in reducing overall traffic levels. A high intensity scenario represents local and national policies supporting widespread implementation of soft measures, whereas a low intensity scenario would be less widespread. The biggest contribution come from measures targeted at the journey to work as shown in Table 2.2.

Table 2.2 Contribution of Travel Planning Measures, National Averages

Initiative	High Intensity Scenario	Low Intensity Scenario
Work place travel plan	5.4%	1.4%
Car sharing	2.0%	0.1%
Teleworking	2.2%	0.6%
Personalized travel planning	1.9%	0.4%
School travel plans	0.02%	0.01%

Source: Smarter Choice study report, 2005.

[6] www.carplus.org.uk.

[7] Cairns et al, 2002.

2.3.13 The Hampshire LTP quotes DfT estimates of the potential benefits of smarter choices measures as shown in Table 2.3. It is pointed out that these represent the most optimistic scenarios where conditions are particularly favourable and that the realities will produce much lower (but worthwhile) figures.

Table 2.3 Potential Benefit of Smarter Choices Measures

Initiative	Impact
Workplace travel planning	Reduce car use by up to 25%
School travel planning	Reduce school run traffic by up to 15%
Personalised travel planning	Reduce car use by up to 15% in urban areas
Awareness campaigns	Up to 40% of residents influenced
Car clubs	Reduction in car mileage of up to 3,600 km per annum per participant
Car sharing	Reduction in car mileage of up to 4,500 km per annum per participant
Teleworking	Reduction in business mileage of up to 10%
Home shopping	70-80% reduction in mileage for grocery shopping by those participating

Source: Hampshire LTP

Demonstration Towns

2.3.14 In 2004, Worcester, Darlington and Peterborough were selected by the Department for Transport to take part in the 'Sustainable Travel Demonstration Town Project'. The aim of the project was to demonstrate the effect of 'smarter choices' interventions and improvements in a relatively small area over a sustained period. Starting in April 2004 the project is set to run until March 2009. A total of £10 million was awarded between the three towns.

2.3.15 Each town has set out a strategy to introduce a variety of 'hard' measures (aimed at worsening the cost or convenience of car use) and 'soft' measures (aimed at improving alternative modes) to promote walking, cycling and bus use. Improved public transport and personalised travel planning have also been key components to the projects. Headline results of the study findings so far indicate that in **Darlington -** where the focus has been on high quality travel information, education and training and a marketing strategy - even the non-targeted population, but who have been exposed to general marketing, are changing their travel habits. Car trips have decreased by 6.6% and walking and cycling have increased by 8.3% and 54% respectively.

2.3.16 Personalised marketing has also been central to **Peterborough's** project, with 12,000 households having received personalised travel information packs. The packs have been

provided along with incentives to help residents try out walking, cycling, bus and car sharing. Results show growth in all sustainable travel modes which have been attributed to the individualised marketing programme.

2.3.17 The **Worcester** project also used individualised marketing and the most significant change has been an increase in the number of bus users. Individualised marketing was not the only reason for growth in bus use however. The promotion of a new bus service which linked to an existing park and ride site, the city centre and target area, made significant contribution (and perhaps bigger contribution given that growth in bus use was much higher compared to increases in walking and cycling).

2.3.18 Site self-containment will be in influence on travel, particularly at peak times when most journeys to work take place. Indications are that while this is a helpful aspiration, there is little evidence to support long term containment.

2.4 Smarter Choices

2.4.1 MVA Consultancy's own recent research, including data extracted from i-Trace and TfL monitoring statistics suggests that there is evidence that reductions in car use can be as high as 35% as a result of workplace travel interventions, with an average figure of around 15%. School travel plan interventions could result in reductions of up to 20% and residential based schemes, such as car clubs, show reductions in car use of up to 16% suggests.

2.4.2 Outside London, however, there is presently not enough evidence to validate these figures. Travel conditions are also very different, with transport choices often much more limited except within central urban areas. The table below summarises case study examples from across the UK describing the potential effects and costs of smarter travel interventions.

Table 2.4 Potential Effectiveness of Travel Planning Measures

TDM Measure	Potential Impact		Potential Cost	
	Case study results	Overall effect	Case study results	Overall cost
Workplace Travel Planning	0-35% reduction in car use observed with 14% average (12% London average)	High	0.5 to 1.0 pence/ vehicle km cut	Low
School Travel Planning	4-20% reduction in car use possible	Med	2.9 or 5.4 pence/ vehicle km cut on average	Med to high
Personal Travel Planning	In urban areas 7% to 15% reduction in car use	Med	Average 2.2 pence/ vehicle km cut	Med
Area Based Travel Planning	NA	Med to high		Med
Car Sharing	Mileage reduction of 0.6% or 11%	Med	Average 2 pence/ vehicle km cut	Low to med
Car Clubs	DfT suggest 0.3% to 0.6% reduction in mileage. Case study suggests 3% to 16% possible where implemented	Low to med	5 pence/ vehicle km cut on average	High
Cycle Hire Schemes	Paris example suggests most users switch from taxi, public transport and walk not car use	Low	High initial outlay with ongoing running and maintenance	High
Flexible hours/ teleworking	Teleworking can reduce car mileage 3% to 12%	Med	Low cost to borough since private investment needed	Low
Off-peak servicing		Low		Med
Real Time PT opportunities	0.6% to 2.6% reduction in mileage for London	Low to med	4.25 pence/ vehicle km cut on average	High
Car free development		Low to med		Med
Home Delivery	70% to 80% reduction in grocery miles for users. Nottingham trial 72% reduction in car mileage for local post office collection	Low to med (high for users)	Mostly private investment needed. Relatively low cost of Nottingham collection trial	Low
Taxi Hire		Low		Low

2.4.3 All of these interventions should be considered within a development-based comprehensive travel planning package. Delivery of travel planning is only now approaching maturity, and some components of travel planning, such as car clubs and technology benefits, are still in growth phases. The LDF is looking forward to 2026, by which time we can realistically expect a much greater understanding of the most effective travel planning measures. It is also a realistic expectation that take up of travel planning measures at a population level will be greater than at present, due to the effects of increased congestion, higher awareness and acceptance of climate change issues and increases in fuel / oil costs. Historic evidence shows that travel planning has become increasingly effective over time, as the above issues gain a stronger foothold within individuals, organisations and society.

2.4.4 Experience shows that large scale implementation of multiple smarter measures within a community is likely to magnify the result of these measures and create a result which is greater than the sum of its parts. Studies have shown that individuals and organisations that have already experienced change are more willing and able to adopt other changes to their behaviour, for instance a car driver who has changed to PT usage is more likely to be open to the concept of trying cycling and walking, if they can see the possible advantage to them.

2.4.5 Looking forward, we consider that TDM measures will have an increasingly important role as the impact of climate change, economics and congestion have a stronger influence on public perception and behaviour. The rate of change of travel behaviour is difficult to predict and is in turn influenced by many external variables, such as Government investment in alternative technologies, the price and economics surrounding oil supply and changing climate conditions influencing travel behaviour and social attitudes towards travel.

2.4.6 With current evidence suggesting the best travel plans today can achieve modal shift of up to 35% away from solo car use and travel plan effectiveness increasing over time, we have no reason to believe that this trend will alter going forward. We therefore consider that it is appropriate for forecasting purposes, to set out ambitious but achievable targets for development-based car travel reductions.

2.4.7 For the purpose of this assessment, and taking into account the discussion above regarding cumulative effect and likely future impact of TDM measures which will become more effective over the next 10-15 years, we consider three alternative scenarios for reductions in car use:

- High Level Intervention – 30% Reduction in car travel (Do Maximum)
- Medium Level Intervention – 20% Reduction in car travel (not reported)
- Low level Intervention – 10% Reduction in car travel (Do Something)

2.4.8 The individual development proposals described in this report have been tested against Do Maximum and Do Something demand management scenarios in the following chapters. These offer a range of forecasts that reflect the ability to invest in and success of Smarter Travel interventions within the new development areas. Detailed assumptions are made regarding mode switching from car to alternatives and these are set out in the relevant chapters.

2.5 Land Use Mix

2.5.1 At this early stage in defining development areas, the boundaries, layout and land use mix of the proposed developments have not been closely defined in most cases. Assumptions regarding proposed land use mix are given in Table 1.1 above. It can be seen that all Core Strategy developments within Winchester District are single use developments, i.e. all housing or all employment. In the cases of Whitelely and West of Waterlooville, the new residential developments are building on existing mixed use areas.

2.5.2 The ability for these developments to internally contain trips within the immediate confines of development is limited, but the developments seek to assist self-sufficiency of the community / settlements they are adding to. This has been considered when assessing impact on the highway network. There are two mitigating factors:

- Within Winchester, the development of Barton Farm in parallel with Bushfield Camp creates opportunities for commuting trips to be contained within Winchester (albeit cross-town) rather than leak onto the strategic road network. Consideration should be given to provision of cross-town public transport connections that facilitate non-car access between these developments;
- An extensive employment zone already exists within Whiteley which is available for new North Whiteley residents. Currently, internal commuting at Whiteley is amongst the lowest in the PUSH area (14%). Consideration should be given to marketing North Whiteley dwellings to existing Whiteley in-commuters perhaps with incentives such as free or discounted travel to work (bus travel / free cycle etc) to increase the proportion of internal trips and mitigate strategic network impacts.

2.5.3 Furthermore, additional jobs will be created locally in each development area through creation of schools, local shopping facilities and leisure / community uses that have the potential for employing residents within the development areas.

2.5.4 To achieve the twin objectives of creating sustainable communities and reducing transport impacts, development needs to maximise the amount of transport internalisation that takes place. Traditionally this has primarily been concerned with creating jobs within a development area (or in close proximity) aligned with an expectation that these will employ a proportion of development area residents. Lessons from Whiteley and elsewhere show a number of other factors that influence internalisation of employment trips:

- Creation of jobs that are aligned with the skills and salary expectations of new residents;
- Competition from neighbouring employment centres, increasingly at edge of centre / motorway fringe business parks away from public transport connections;
- Ability for residents to relocate job and home simultaneously – a complete lifestyle change – to take advantage of home / work proximity;
- The influence of school location on combined education / commuting trips, particularly where parents have a wide choice of schools available

2.5.5 The design of the proposed development should, as far as possible, take account of these factors during its development to reduce transport impacts.

2.6 Infrastructure Interventions

2.6.1 The Core Strategy developments are not being built in isolation and external 'pull' factors could also influence travel patterns. These include development of a Strategic Employment Area at Eastleigh Riverside and creation of jobs at other major developments at Fareham, Waterloovile and Hedge End.

2.6.2 Development pressures within Winchester District and across the PUSH area have led to the publication of 'Towards Delivery – Transport for South Hampshire Statement[8]' which identified principles of Reduce – Manage – Invest to underpin the strategic approach to transport infrastructure. The statement points out that all three principles need to be applied in parallel to ensure the transport networks are fit for purpose. Under the 'Reduce' heading,

[8] Transport for South Hampshire, April 2008

smarter travel initiatives and land use planning such as those described above are identified. 'Manage' describes highway management, bus priority, parking policies including Park & Ride and identifies a role for freight and technology to maximise efficiency of transport networks. Under 'Invest', the key principle is targeting investment where the chances of achieving funding, particularly from the Regional Funding Allocations, are to be gained.

2.6.3 In this context, a range of transport interventions are planned that are relevant to development within Winchester District, in that they will help to alleviate impact and / or alter travel patterns across the sub-region. The delivery and prioritisation of these schemes is the responsibility of PUSH / TfSH and it can be expected that some of the Winchester Core Strategy developments will contribute to their delivery as identified in the mitigation section of subsequent chapters. The following list describes schemes that could be delivered by 2026 that are relevant to Winchester district, subject to further studies / funding:

- **Active Traffic Management** and selected Motorway Junction Improvements / Widening at M3 Jn 9 to Southampton and on M27 corridor;
- **Park & Ride** at Windhover M27 Jn 8
- **Link Road** from N/NE Hedge End SDA to M27 Jn 8
- **Botley Bypass**
- **Improved Bus Networks** linking Winchester, Hedge End, Southampton and Fareham / Gosport including Premium Bus Network and Bus Rapid Transit at selected locations;
- **Rail Improvements** including Botley Line double tracking and Eastleigh Rail Chord
- **Chickenhall Lane Link Road** providing access to Eastleigh Riverside employment area

2.6.4 Although the delivery of the above schemes is by no means certain, many are progressing through regional and national funding programmes with the intention that delivery will be achieved alongside development across south Hampshire and within Winchester district.

2.6.5 Other schemes, such as Whiteley Way extension or changes to M27 Jn 10 arise from major development schemes are likely to be largely delivered through the development planning process.

2.6.6 For those parts of Winchester district outside the PUSH are that are subject to development pressures, a number of other initiatives are relevant, including Winchester Access & Movement Strategy, South Winchester Park & Ride at M3 Jn 11 (due to be operational 2010) and local traffic management improvements.

2.6.7 At present, a range of funding sources exist depending on the particular circumstances of the development or transport scheme. These include:

- Local Transport Plan – DfT / HCC
- Regional Funding Allocation – SEEDA / SEERA[9]
- Regional Infrastructure Fund – SEEDA

[9] South East Regional Assembly (SEERA) is now formally dissolved as at 1st April 2009. The South East England Partnership Board is undertaking the functions formally completed by SEERA.

- New Growth Point – DCLG
- Community Infrastructure Fund (CIF) – DCLG
- S106 Funding – Developers
- Community Infrastructure Levy – as an alternative to S106 in the medium term

2.6.8 The Government is considering introduction of a Community Infrastructure Levy (CIL) and has published draft regulations for consultation. This could generate additional funding for infrastructure through pooling of development contributions towards major infrastructure projects as an alternative to S106 contributions towards transport schemes. Consultation of the Regulations closed in October 2009, but Local Planning Authorities will only be able to charge it if they have an up-to-date LDF Core Strategy and an approved Charging Schedule.

2.6.9 The following chapters go on to explain the methodology behind the assessments undertaken, and identify the transport impact and potential mitigation measures associated with each major development allocation in the Winchester Core Strategy Preferred Options. The mitigation measures should be seen as additional and complementary to those listed above.

3 Travel Forecasting Methodology

3.1 Introduction

3.1.1 This report builds on the previous analysis presented within the Stage 1 report, and applies the same approach when considering the chosen development options described in chapter one. This chapter serves to outline the methodology in further detail.

3.2 Highways Agency Reduced Transport Evaluation

3.2.1 A Reduced Transport Evaluation (RTE) approach was adopted for this study, with key issues that the Highways Agency wished to see addressed including the location of development to avoid commuting on the trunk road network. Other issues include:

- Determining both AM and PM Peak analysis with separate arrivals and departures data;
- Defining the TRICS trip generation data applied;
- Using a base year and forecasting for 2026 using TEMPRO and/or NRTF growth rates; and
- Detailing the methodology for determining the capacity of the Strategic Road Network.

3.2.2 In the RTE, there is also a requirement for a strong evidence base including the following:

- Accident rates;
- **Trip generation** estimates based on the 85th percentile TRICS trip rates or a reasonable alternative;
- **Trip distribution** based on:
  - Census journey to work data supplemented by local knowledge;
  - Operational capacities and deficiencies (links, pinch points and junctions) within and beyond the District;
  - Network stress mapping produced by the Agency;
- **Modal split** based on comparable local developments and considering measures to influence travel behaviour;
- **Trip assignment** based on:
  - Census journey to work data;
  - Disaggregated specific sites and the cumulative impacts of several sites;
  - TEMPRO to determine background growth;
  - Possible high and low growth scenarios; and
- **Mitigation measures** with the aim of describing how impacts on the network can be reduced or avoided.

3.3 Trip Generation

Residential Trips

3.3.1 The number of generated trips has been determined from the TRICS database with reference to comparative sources. TRICS is generally regarded as the most appropriate source in that it uses observed data from development sites and has over 2,800 datasets.

3.3.2 Car driver and all-mode trip rates have been determined from TRICS as shown in Table 3.1. These are based on large housing developments in Southern England, supplemented by data from other parts of the country to provide a suitable sample.

Table 3.1 All Modes Trip Rates per Dwelling

RESIDENTIAL CAR TRIPS	AM Peak 0800-0900			PM Peak 1700-1800			Daily		
	depart	arrive	total	depart	arrive	total	depart	arrive	total
all houses	0.41	0.13	0.54	0.20	0.35	0.55	3.10	3.08	6.18
all flats	0.21	0.08	0.29	0.07	0.14	0.21	1.12	0.96	2.08
Mean	**0.31**	**0.11**	**0.42**	**0.14**	**0.25**	**0.38**	**2.11**	**2.02**	**4.13**

RESIDENTIAL ALL MODES	AM Peak 0800-0900			PM Peak 1700-1800			Daily		
	depart	arrive	total	depart	arrive	total	depart	arrive	total
all houses	0.94	0.19	1.13	0.35	0.58	0.93	4.32	3.91	8.23
all flats	0.52	0.13	0.65	0.16	0.33	0.49	2.53	2.09	4.62
Mean	**0.73**	**0.16**	**0.89**	**0.26**	**0.46**	**0.71**	**3.43**	**3.00**	**6.43**

Source: TRICS

3.3.3 The figures have been compared with those produced for the Strategic Development Areas planned for South Hampshire at North/North East Hedge End and North Fareham, extracted from initial transport assessments of the sites. These indicate that car driver AM Peak trip rates are similar (0.40 departures compared with 0.42 here).

3.3.4 The trip rates have then been applied to proposed sites based on the number of each type of dwelling for each site. This produces the total number of generated trips for each individual site and in combination.

Non-Residential Trips

3.3.5 Some sites contain an element of employment land which can contribute towards providing local jobs for local residents and to address commuting imbalances. TRICS has been used for determining trip rates as shown in Table 3.2

Table 3.2 All Modes Non-Residential Trip Rates per 100sqm GFA

TOTAL TRIPS NON-RESIDENTIAL	AM Peak 0800-0900			PM Peak 1700-1800			Daily		
	depart	arrive	total	depart	arrive	total	depart	arrive	total
B1 Business Services	0.12	1.74	1.86	1.46	0.10	1.56	6.46	6.77	13.23
B2 Manufacturing	0.23	0.51	0.74	0.44	0.15	0.59	4.00	4.07	8.07
B8 Warehousing	0.24	0.74	0.98	0.66	0.19	0.85	4.59	4.95	9.54
B1 (b) R+D, Science Park, Studios	0.18	1.71	1.89	1.36	0.17	1.53	6.00	6.42	12.42
A1 Local Retail	9.11	9.62	18.72	9.28	8.60	17.87	112.13	109.37	221.50
A1 Food Retail	3.85	5.62	9.46	14.10	12.96	27.06	149.28	150.17	299.45
D2 Community Centre	0.06	0.15	0.20	0.10	0.63	0.73	4.72	4.46	9.18

Source: TRICS

3.4 Mode Share

Residential Mode Share

3.4.1 Mode share has been determined from 2001 Census Journey to Work data for the District. For comparison, figures for the region and England are included suggesting that the District overall has poor use of buses and cycling but relatively high walking and working at home. Winchester city has a high proportion of rail users and an encouraging number of bus users with a correspondingly low proportion of car drivers; walking compares favourably. Figures for Whiteley residents demonstrate high levels of car dependency and very few bus users; Whiteley daytime population data shows that 89% of journeys to work are made by car.

Table 3.3 Residential Mode Share

	England	South East Region	Winchester District	Whiteley (Resident)	Whiteley (Daytime)	Winchester City	Waterlooville (Modified Winchester District)
Work at home	9.20%	9.98%	12.07%	10.52%	2.99%	10.05%	12.33%
Train	7.43%	5.89%	4.22%	3.21%	1.47%	5.93%	2.11%
Bus/minibus	7.55%	4.38%	3.25%	0.49%	1.90%	5.46%	3.32%
Taxi/minicab	0.52%	0.41%	0.21%	0.00%	0.26%	0.31%	0.21%
Car driver	56.29%	60.61%	60.19%	75.68%	82.81%	50.16%	61.52%
Car passgr	6.14%	5.68%	4.95%	3.28%	6.80%	5.56%	5.06%
Cycle	2.84%	3.08%	1.91%	1.60%	1.80%	2.37%	1.95%
Walk	10.04%	9.96%	13.20%	5.23%	1.96%	20.17%	13.49%

Source: Census 2001 adjusted for 'not currently working' and 'other' categories.

3.4.2 In this analysis, Winchester city proportions have been used for the Barton Farm development. Whiteley resident data has been applied to the North Whiteley site and modified District figures to the West of Waterlooville development in recognition of the lack of immediate rail services.

Non-Residential Mode Share

3.4.3 Similar figures have been used for non-residential trips having been re-based to exclude working at home.

3.4.4 Additional mode share proportions were generated for the Bushfield Camp site to reflect its location on the edge of town in close proximity to a motorway junction. Further description is provided in the following chapter.

Table 3.4 Non-Residential Mode Share

	England	South East Region	Winchester District	Whiteley (Resident)	Whiteley (Daytime)	Winchester City	Bushfield Camp
Train	8.18%	6.54%	4.80%	3.58%	1.51%	6.59%	2.66%
Bus/minibus	8.31%	4.86%	3.70%	0.55%	1.96%	6.07%	5.20%
Taxi/minicab	0.57%	0.46%	0.24%	0.00%	0.27%	0.35%	0.35%
Car driver	61.99%	67.33%	68.45%	84.58%	85.37%	55.76%	83.17%
Car passgr	6.76%	6.31%	5.63%	3.66%	7.01%	6.18%	4.63%
Cycle	3.13%	3.43%	2.17%	1.79%	1.86%	2.63%	2.40%
Walk	11.05%	11.07%	15.01%	5.84%	2.02%	22.42%	1.58%

Source: Census 2001 adjusted for 'not currently working', 'other' and 'working from home' categories.

3.5 Trip Distribution

3.5.1 Distribution has been based on Census Journey to Work data as shown in Table 3.5.

Table 3.5 Destination of Journeys to Work

Winchester District		Winchester City		Whiteley	
Destination	**%**	**Destination**	**%**	**Destination**	**%**
Winchester	59.8	Winchester	69.8	Winchester	31.2
Southampton UA	5.2	Southampton	4.5	Fareham	16.1
Eastleigh	5.1	Basingstoke	4.0	Southampton	11.6
Portsmouth UA	4.0	Eastleigh	3.5	Portsmouth	11.5
Basingstoke and	3.4	Test Valley	3.3	Eastleigh	9.1
Fareham	2.8	Westminster	1.3	Basingstoke	2.8
Test Valley	2.6	East	1.1	Gosport	2.4
East Hampshire	2.1	City of	0.9	Havant	2.4
Havant	2.1	West	0.8	Test Valley	1.3
Westminster	1.1	New Forest	0.8	East	0.9
New Forest	0.8	Hart	0.8	Hillingdon	0.9
City of London	0.8	Portsmouth	0.7	Rushmoor	0.9
Hart	0.7	Fareham	0.6	Salisbury	0.9
Gosport	0.6	Other	8.0	Hart	0.7
West Berkshire UA	0.5			New Forest	0.7
Rushmoor	0.5			Other	6.0
Other	8.0				

Source: Census 2001

3.5.2 The number of trips has been determined by mode according to the destinations indicated above to reflect current travel patterns. While data on other trip purposes is lacking, the journey to work distribution gives a reasonable picture of AM Peak movements; education trips are also expected to take place in the AM Peak but many are contained within larger development sites or can be undertaken by means other than car. And hence are not included. Shopping trips can also take place locally but for higher order facilities, destinations include Southampton, Portsmouth, Basingstoke and other centres as well as Winchester, Eastleigh, Hedge End etc and generally take place at off peak periods.

3.5.3 The levels of internalisation applied to each site have been developed to take into account site specific factors likely to influence travel behaviour. In the case of Barton Farm we have taken forward assumptions from the developers transport assessment with regards non-residential trips, and determined the likely proportion of residential trips that would be made internally by mode. The North Whiteley and West of Waterlooville developments assume 25% internalisation, with elements of local retail and community facilities incorporated within the in North Whiteley site, and considerable local employment in the adjoining West of Waterlooville MDA, which is effectively treated as a single site in this study.

3.6 Assignment by Mode

3.6.1 Based on the distribution, trips have been assigned to walk, cycle, bus and rail where available based on the options available for each location. For each of the destinations indicated by the distribution figures, trips have been assigned to rail, bus, taxi, car driver, and car passenger based on the options available for each location. This allows for local travel opportunities and circumstances rather than applying a uniform approach so, for example, where no direct rail service exists then the most appropriate route is selected. For journeys beyond the immediate area in question, cycle and walk trips are excluded and the remaining trips are redistributed by proportion to the other modes. The proportion of work at home trips is summarised in the internal trips matrix.

3.7 Highway Assignment

Growth Factors

3.7.1 Growth factors have been applied to the total trip number to provide an indication of possible low and high growth scenarios. These factors are based on National Road Traffic Forecasts (NRTF) 1997 for total traffic. Unlike TEMPRO (DfT's national trip end model), NRTF does not include allocated development trips and hence double counting is avoided. Table 3.6 shows the factors applied.

Table 3.6 Traffic Growth Factors

	Cars			Total Traffic		
	Low	Central	High	Low	Central	High
2008	1.122	1.212	1.302	1.131	1.222	1.313
2016	1.219	1.355	1.491	1.238	1.376	1.514
change	**1.086**	**1.118**	**1.145**	**1.095**	**1.126**	**1.153**
2008	1.122	1.212	1.302	1.131	1.222	1.313
2026	1.278	1.475	1.671	1.324	1.528	1.732
change	**1.139**	**1.217**	**1.283**	**1.171**	**1.250**	**1.319**

Source: NRTF 1997

Stress Factors

3.7.2 The Highways Agency has published stress factors as shown in Table 3.7 indicating where there are problems on the trunk road network.

Table 3.7 Highways Agency Stress Factors 2006

Location		Daily Stress
M3 north of Winchester	Both directions	0-90%
A34(T) north of Winchester	Both directions	0-90%
M3 southbound	South of Winchester	110-130%
M3 southbound	Eastleigh area	100-110%
M3 northbound	M27 Junction 14 to Winchester	110-130%
M27 Junctions 4 to 8	Both directions	110-130%
M27 Junctions 8 to 9	Both directions	100-110%
M27 Junctions 9 to 10	Both directions	90-100%
M27 Junctions 10 to 11	Both directions	100-110%
M27 Junctions 11 to 12	Eastbound	110-130%
M27 Junctions 11 to 12	Westbound	90-100%
A3(M)	Both directions	0-90%

Source: Highways Agency

3.7.3 A similar approach has been taken to assess the impact on the local road network in Winchester city based on CRF values but again applying local knowledge to assess whether generated traffic can be accommodated satisfactorily.

3.7.4 Table 3.8 shows the capacity used of the main radial routes in the city with background traffic growth included.

Table 3.8 Capacity of City Radial Routes in 2026

Location	Capacity	2008	2026 low	2026 high	2026 high Capacity
B3049 Stockbridge Road	16,771	6,043	7,076	7,971	47.5%
B3420 Andover Road	17,156	10,265	12,020	13,540	78.9%
C465 Worthy Road	16,991	7,288	8,534	9,613	56.6%
C3404 Alresford Road	17,540	5,801	6,793	7,652	43.6%
C465 Easton Lane	16,576	9,905	11,599	13,065	78.8%
B3330 Chesil Street	16,349	9,018	10,560	11,895	72.8%
B3335 St Cross Road	16,974	10,499	12,294	13,848	81.6%
B3040 Romsey Road	17,536	9,708	11,368	12,805	73.0%

3.7.5 The base year is 2008 on the basis that traffic data for the city and motorway network has been obtained for the first half of the year and other count data can be adjusted as required. Future year is 2026 and growth until then is based on NRTF factors. High and low growth scenarios are considered.

4 Winchester Town

4.1 Development Options

4.1.1 Several locations for development in and around Winchester town were reviewed in Stage 1. For the 'Step Change' options, the transport assessment showed that the size of the sites presented was sufficient to have a considerable impact on the local highway network and the M3 motorway, there was also scope to promote widespread use of sustainable modes. Winchester is the main settlement in the District and is the focus for employment with an extensive catchment area; bringing further housing could help to reduce the current imbalance between local jobs and local residents and encourage more people to both live and work in the city.

4.1.2 Refinement of development options has identified two major sites; Barton Farm and Bushfield Camp as previously outlined. These are provisionally allocated as residential and employment sites respectively, located on opposite sides of Winchester.

4.1.3 Barton Farm is located on Andover Road at the northern edge of Winchester and is within walking and cycling distance of the town centre. Proposals for development are reasonably well advanced and formal proposals have previously been submitted to the District Council. Extracts from a previous Transport Assessment have been supplied to support this study, although no current planning application exists for this site. The proposal parameters used for this study are 2,000 dwellings and some 4,000 sq m of retail, of which 2,000 sq m is identified for food retail.

4.1.4 Bushfield Camp is a former army base to the south of Winchester adjacent to Badger Farm Road. The previously occupied part of the site has been identified as a Knowledge Park, covering up to 20ha of land. No firm proposals are currently available and we understand that a preferred developer has not yet been identified. We have assumed that 20% of the available land, now classified as a Greenfield site, will be converted to developable area, creating 40,000 sq m of B1 Business Park use.

4.1.5 The principle of a Knowledge Park is to attract high-end / research employment within Winchester to reduce out commuting. For transport assessment purposes, we have assumed that the development will perform similarly to other business parks close to motorway interchanges, such as Solent Business Park (Whiteley) and Chilworth Business Park (Southampton). These employment centres are characterised by high car mode share and long commuting distances. However, a range of features and interventions are available to reduce car dominance, including maximising trips originating in Winchester.

4.1.6 A new Park & Ride site, South Winchester, is under construction to the south of Bushfield Roundabout adjacent to M3 Jn 11 sliproads. Planning consent has been granted for an 864 space Park & Ride site with associated ancillary buildings and it is understood that it will be operational in 2010. The co-location of the Park & Ride and Bushfield Camp Knowledge Park present an opportunity to run the high frequency buses linking the Park and Ride site to the City centre and railway station via the proposed Knowledge Park. This should serve to make the route more attractive to operators and enable a higher frequency of service to operate than may otherwise have been the case, whilst also enabling targeted bus priority measures to be introduced on the Romsey Road route to the benefit of both sites.

4.1.7 If the new Park and Ride site is as successful as the existing sites at Bar End have proven to be, it is likely to be operating at close to capacity throughout much of the working year.

4.1.8 This Chapter sets out potential traffic impacts of each development site, before describing the combined affects of the development proposals on Winchester. We also analyse the potential for Smarter Travel interventions to reduce travel demand, particularly on the strategic road network and investigate opportunities to provide connectivity between Barton Farm and Bushfield Camp to further reduce traffic impacts.

4.2 Barton Farm

4.2.1 There is significant local interest regarding development at Barton Farm. Planning applications have previously been submitted for Barton Farm and our assessment has drawn from past transport assessments. Given the history of the site, its allocation in the Core Strategy Preferred Options document and its close proximity to the town centre, we consider it likely that a development similar to that proposed in the Core Strategy will be approved in due course, subject to a planning application going through the normal planning channels. Our assessment is based on the Core Strategy proposals for 2,000 dwellings and up to 4,000 sq m of retail floorspace.

Potential Impacts

4.2.2 Estimates for traffic impacts arising from Barton Farm have been developed from first principles, based on comparable trips rates and trip distribution according to 2001 Census Journey to Work profiles. This has been compared with data supplied by the District Council from the Barton Farm Transport Assessment, and found to offer a strong match. We have made similar assumptions regarding trip internalisation, mode share and route assignment.

4.2.3 Table 4.1 below shows internal and external person trips by mode for Barton Farm with no Smarter Travel Interventions.

Table 4.1 Barton Farm Trip Generation by Mode - Base

Barton Farm TOTAL EXTERNAL	AM depart	AM arrive	AM total	PM depart	PM arrive	PM total	DAY depart	DAY arrive	DAY total
Work at home	-	-	0	-	-	0	-	-	0
Train	114	40	154	66	88	154	793	741	1,534
Bus/minibus	99	35	135	57	77	135	694	648	1,342
Taxi/minicab	6	2	8	3	5	8	42	39	81
Car driver	903	322	1,225	521	702	1,224	6,308	5,893	12,201
Car passgr	100	36	136	58	78	136	699	653	1,352
Cycle	29	11	40	17	23	40	206	192	398
Walk	46	17	63	27	36	63	324	302	626
Total	1,298	463	1,761	749	1,009	1,758	9,065	8,469	**17,533**

Barton Farm TOTAL INTERNAL	AM depart	AM arrive	AM total	PM depart	PM arrive	PM total	DAY depart	DAY arrive	DAY total
Work at home	-	-	198	-	-	160	-	-	1,437
Bus/minibus	5	2	7	3	4	7	37	34	71
Car driver	58	21	78	33	45	78	403	376	779
Car passgr	6	2	9	4	5	9	45	42	86
Cycle	16	6	22	9	12	21	111	104	214
Walk	340	121	461	196	264	461	2,374	2,218	4,593
Total	425	151	775	245	330	736	2,969	2,774	**7,180**

Barton Farm EXTERNAL+INTERNAL	AM depart	AM arrive	AM total	PM depart	PM arrive	PM total	DAY depart	DAY arrive	DAY total
Work at home	-	-	198	-	-	160	-	-	1,437
Train	114	40	154	66	88	154	793	741	1,534
Bus/minibus	105	37	142	60	81	142	730	682	1,413
Taxi/minicab	6	2	8	3	5	8	42	39	81
Car driver	961	342	1,303	555	747	1,302	6,710	6,269	12,980
Car passgr	106	38	144	61	83	144	743	695	1,438
Cycle	45	16	62	26	35	61	317	296	612
Walk	386	138	524	223	300	523	2,698	2,521	5,219
Total	1,723	614	2,536	995	1,340	2,495	12,033	11,242	**24,713**

4.2.4 The analysis shows that around 30% of peak period trips are internalised to Barton Farm based on assumptions within the draft TA supplied[10]. A large proportion of these are retail related using the local facilities. This is also reflected in the number of counter-peak movements.

4.2.5 Based on existing travel patterns and trip rates, around 71% of external trips are made by car drivers (around 52% of total trips). Relatively few trips are made by cycle (about 2% of the total). The number of walk trips and local bus trips could be improved to help reduce the impact of car trips. Rail trips will use another mode to access station, not included in the above analysis. One of the main determinants of access mode is availability and pricing of car parking at the station, both of which are known to be constrained. Access mode will therefore be spread across bus, walk and cycle with a small proportion of car trips; all modes are therefore slightly under-represented.

4.2.6 Trip distribution has been based on 2001 Census data. Assignment has taken place manually based on analysis of distribution flows, local knowledge of available routes and trip paths and understanding of available bus services. Base assignment, without Smarter Travel interventions, is shown in Table 4.2 below.

[10] Barton Farm Transport Assessment assumes 50% of the Food Retail trips generated are made internally from within the development site, and a 90% internalisation of Local Retail trips.

Table 4.2 Barton Farm Base Assignment by Mode

Base Assignment		AM			PM			DAY		
EXTERNAL TRIPS		Depart	Arrive	Total	Depart	Arrive	Total	Depart	Arrive	Total
Work at home		-	-	0	-	-	0	-	-	0
Train										
	to/from North	14	5	19	8	11	19	99	93	192
	to/from East	0	0	0	0	0	0	0	0	0
	to/from South	100	35	135	57	77	135	695	649	1,344
	to/from West	0	0	0	0	0	0	0	0	0
		114	**41**	**154**	**66**	**88**	**154**	**794**	**742**	**1,536**
Bus/minibus										
	to/from City centre	61	22	83	35	48	83	429	401	830
	to/from North	10	3	13	6	8	13	69	64	133
	to/from East	6	2	8	3	5	8	41	38	78
	to/from South	20	7	27	11	15	26	137	128	264
	to/from West	4	2	6	3	3	6	31	29	60
		101	**36**	**137**	**58**	**79**	**137**	**706**	**660**	**1,365**
Taxi/minicab										
	local	6	2	8	3	5	8	42	39	81
Car driver										
	to/from City centre	307	109	416	177	239	416	2,143	2,002	4,146
	to/from North	140	50	191	81	109	190	981	916	1,897
	to/from East	148	53	200	85	115	200	1,031	963	1,994
	to/from South	242	86	328	140	188	328	1,691	1,580	3,270
	to/from West	85	30	115	49	66	115	594	555	1,149
		922	**329**	**1,251**	**532**	**717**	**1,249**	**6,440**	**6,016**	**12,456**
Car passgr										
	to/from City centre	34	12	46	20	26	46	237	222	459
	to/from North	16	6	21	9	12	21	109	102	210
	to/from East	16	6	22	9	13	22	114	107	221
	to/from South	27	10	36	15	21	36	187	175	362
	to/from West	9	3	13	5	7	13	66	61	127
		102	**36**	**139**	**59**	**79**	**138**	**713**	**667**	**1,380**
Cycle		21	7	28	12	16	28	144	134	278
Walk		32	12	44	19	25	44	226	211	437
Total		**1,298**	**463**	**1,761**	**749**	**1,009**	**1,758**	**9,065**	**8,469**	**17,533**

4.2.7 On the local road network up to 416 additional vehicles are forecast to pass through the city centre during each of the peak periods, some of which will use the City Road junction. This junction already experiences considerable peak period congestion and its ability to accommodate this level of additional demand is limited without remedial measures being put in place. However, our assumption that most 'local' traffic uses City Road junction may, in practice, over-simplify actual traffic routing and the impact on this junction may be lower than forecast. Alternative routes along Chilbolton Avenue and Romsey Road offer an alternative route to M3 Jn 11 avoiding the city centre.

4.2.8 More strategically, an estimated additional 600 vehicles will use the M3 motorway from Barton Farm in each peak period (see Table 4.5). Just over one third of this demand is north/eastbound and is assumed to be using M3 Jn 9. The remainder, travelling east and south, is forecast to use Jns 10 & 11, with a higher proportion using Junction 11 avoiding access routes through the city centre[11].

4.2.9 We consider the impacts of this demand of the motorway network in combination with Bushfield Camp described below.

[11] Assumes that 70% of car drivers arriving from/departing to the North do so via the M3 through Jn 9 and 90% of car drivers arriving from/departing to the South do so via M3-J11. With 60% of car drivers arriving from/departing to the East via the M3-J9 and 25% via the M3-J10.

4.3 Bushfield Camp

4.3.1 Development at Bushfield Camp has been proposed, as described previously, for a Knowledge Park comprising 20ha of land. For assessment purposes we have assumed that this translates into 40,000 sq m of B1(b) business use, which specifically comprise of developments such as R+D units, TV Studios and Science Parks rather than typical B1 office use.

4.3.2 The site is in close proximity to the South Winchester Park & Ride adjacent to M3 Jn 11, for which planning consent has been granted for 864 spaces and construction is underway.

4.3.3 Concerns have been expressed by the Highways Agency in relation to this development regarding its potential impact on the strategic road network, particularly M3 Jn 11. The business park style development that is proposed may be heavily car orientated based on our understanding of similar business parks at Whiteley and Chilworth.

4.3.4 In deciding on detailed transport policies for Bushfield Camp, considerable thought should be given to parking policy at the site. Parking availability is one of the key determinants of transport mode choice and a plentiful supply of parking will encourage high car usage. Experience at Solent Business Park and Chilworth demonstrates some of the problems associated with this approach in relation to peak period congestion and high traffic volumes seeking to gain access to the strategic road network. However, providing a reasonable parking supply is crucial to the viability of the Knowledge Park to attract hi-tech companies that draw demand from a wide catchment where transport choice may be limited. Moreover, attracting hi-tech companies to Winchester is designed to discourage out-commuting from the city, thereby reducing impact on the wider transport network.

4.3.5 Bushfield Camp can benefit from the experience gained at Whiteley and Chilworth by designing in measures from the outset that seek to reduce demand for car travel, particularly on the strategic road network. These would create a choice of access mode from the outset allied with some demand restraint measures in place to encourage mode shift.

4.3.6 The adjacent Park & Ride provides an opportunity for Bushfield Camp to be served by a high frequency bus connection to the mainline railway station and city centre. Cross town bus routes could also be provided or enhanced to encourage local commuting by sustainable modes.

4.3.7 Demand restraint can take many forms, including the smarter travel measures identified below. A parking restraint policy is perhaps the most effective and most controversial measure to restrict car usage. However the proximity of the nearby South Winchester Park & Ride may draw commuters to Bushfield Camp to park there if demand exceeds supply within the development itself, but the Park & Ride is not designed to accommodate demand from Bushfield Camp. Steps will need to be taken to ensure that such parking does not prevent its use by town centre commuters as intended.

4.3.8 Other mitigation measures will still be required to offset travel demand as identified in Section 4.8 below. The site benefits from being close to a proposed National Cycle Network route and a network of footpaths / bridleways, frequent bus links operating to Badger Farm and some bus priority measures in place. These provide a reasonable platform from which to build a mitigation strategy.

4.3.9 Our initial assessment describes traffic impacts assuming that South Winchester P&R is operational and accommodating modest demand from Bushfield Camp.

Potential Impacts

4.3.10 Estimates for traffic impacts arising from Bushfield Camp have been developed from first principles, based on comparable trips rates and trip distribution according to 2001 Census Journey to Work profiles. No site-specific traffic forecasts have been produced by others for this site, so we have compared trip generation and mode share data with that available at Solent Business Park and Chilworth Research Park. A range of possible trip rates were derived from the TRICs database for B1(b) type land uses. A variety of combinations was considered, some of which include sites near motorway junctions, some with B1(b) land use elements specifically referenced, others because they are sited on edge of town type locations. Levels of public transport access varied between sites. Trips rates from the 85th percentile range of sites were used to assess impact.

4.3.11 Table 4.3 below shows trip generation for Bushfield Camp by mode with no Smarter Travel interventions. As this development is destination-only, it is assumed that there are no internal trips.

Table 4.3 Bushfield Camp Base Trip Generation by Mode

Bushfield Camp		AM			PM			DAY	
TOTAL EXTERNAL	depart	arrive	total	depart	arrive	total	depart	arrive	total
Work at home	-	-	0	-	-	0	-	-	0
Train	2	18	20	14	2	16	64	68	132
Bus/minibus	4	36	39	28	4	32	125	134	258
P+R	15	151	166	119	15	134	527	563	1,091
Taxi/minicab	0	2	3	2	0	2	8	9	17
Car driver	43	420	463	332	42	374	1,470	1,571	3,042
Car passgr	3	32	35	25	3	28	111	119	230
Cycle	2	16	18	13	2	15	58	62	119
Walk	1	11	12	9	1	10	38	41	79
Total	70	686	756	542	68	611	2,401	2,567	**4,968**

4.3.12 Car mode share at the development is estimated to be around 66% (including car passenger). Park & Ride arrivals at the site account for approximately 22% of trips. However, as the P&R site is almost adjacent to the site, it is reasonable to include these trips in the overall car mode share for Bushfield Camp, which rises to 88%. This is broadly consistent with evidence from Whiteley and Chilworth, and demonstrates the very strong car orientation of this development with no interventions to promote alternatives.

4.3.13 The base analysis shows an additional 629 and 508 car based movements in the AM and PM peaks generated by the development. We have assumed that car passenger trips are spread amongst the existing car driver trips, and so do not generate any further car trips. The majority of car based trips to or from Bushfield Camp are likely to pass through M3 Jn11. The table below shows base assignment flows.

Table 4.4 Bushfield Camp Base Assignment

Base Assignment		AM			PM			DAY		
EXTERNAL TRIPS		depart	arrive	total	depart	arrive	total	depart	arrive	total
Work at home		-	-	**0**	-	-	**0**	-	-	**0**
Train										
	to/from North	0	1	1	1	0	1	3	4	7
	to/from East	0	0	0	0	0	0	0	0	0
	to/from South	2	17	19	14	2	15	60	65	125
	to/from West	0	0	0	0	0	0	0	0	0
		2	**18**	**20**	**14**	**2**	**16**	**64**	**68**	**132**
Bus/minibus										
	to/from City centre	2	16	17	12	2	14	55	59	114
	to/from North	0	2	2	1	0	2	6	7	13
	to/from East	0	2	3	2	0	2	8	9	18
	to/from South	1	14	16	11	1	13	49	53	102
	to/from West	0	2	2	1	0	1	6	6	12
		4	**36**	**39**	**28**	**4**	**32**	**125**	**134**	**258**
P+R	local	**15**	**151**	**166**	**119**	**15**	**134**	**527**	**563**	**1,091**
Taxi/minicab	local	**0**	**2**	**3**	**2**	**0**	**2**	**8**	**9**	**17**
Car driver										
	to/from City centre	10	102	112	81	10	91	357	382	739
	to/from North	4	38	42	30	4	34	133	142	276
	to/from East	6	60	66	47	6	53	209	223	432
	to/from South	19	187	206	148	19	166	653	698	1,352
	to/from West	3	33	37	26	3	30	117	125	243
		43	**420**	**463**	**332**	**42**	**374**	**1,470**	**1,571**	**3,042**
Car passgr										
	to/from City centre	1	8	9	6	1	7	27	29	56
	to/from North	1	5	5	4	0	4	17	18	36
	to/from East	0	5	5	4	0	4	16	17	33
	to/from South	1	12	13	10	1	11	42	45	88
	to/from West	0	3	3	2	0	2	9	9	18
		3	**32**	**35**	**25**	**3**	**28**	**111**	**119**	**230**
Cycle		**2**	**16**	**18**	**13**	**2**	**15**	**58**	**62**	**119**
Walk		**1**	**11**	**12**	**9**	**1**	**10**	**38**	**41**	**79**
Total		**70**	**686**	**756**	**542**	**68**	**611**	**2,401**	**2,567**	**4,968**

4.3.14 The base assignment analysis shows the overall number of additional vehicles generated by the site. A varying proportion of the trips arrive from/depart to North, South and East M3 Jn 11.[12] During the AM peak an additional 445 vehicles are forecast to pass through M3 Jn 11, (Table 4.5) dropping to 318 in the PM peak.

4.3.15 Even with Park & Ride in place, it is Junction 11 that will bear the main impact of development at Bushfield Camp. The ability of the junction to accommodate additional traffic, especially when considered alongside additional developments at Barton Farm, elsewhere in PUSH and background traffic growth forecasts, needs to be considered carefully in conjunction with the Highways Agency. Potential mitigation measures are considered in Section 4.7 below.

4.4 Winchester Combined Impacts

4.4.1 Having analysed each development separately, we now assess the combined impact of development within Winchester and on the strategic road network. The impact of Smarter Travel interventions is also shown.

4.4.2 Analysis of the route assignments by mode reveal forecast car trips on M3 Junctions 9, 10 & 11 and non-motorway bound traffic heading Northbound on route such as Andover Road and

[12] Assumes 95% of car drivers arriving from/departing to the North doing so via the M3-J11 and 95% of car drivers arriving from/departing to the South (inc P&R) do so via the M3-J11. With 95% of car drivers arriving from, and 90% departing to the East via the M3-J11.

Westbound on Stockbridge Road as shown on Table 4.5 below. Localised car trips are also forecast which it is assumed will be retained within Winchester urban area.

4.4.3 A small proportion of car trips departing from Barton Farm will be destined for employment at Bushfield Camp. This will create some double counting in the local road flows, as the volume of trips for each site are estimated independently as 'departing' from Barton Farm and 'arrivals' at Bushfield Camp. For a small proportion of trips there may be some overlap between 'departing' and 'arrival' trips (i.e. they are the same trip counted twice) but given the strategic level of this assessment the numerical significance will be negligible.

Table 4.5 Combined Base Assignment by Mode – AM Peak

AM peak (base) Winchester Combined Development		**Barton Farm**			**Bushfield Camp**			
Car driver		depart	arrive	**total**	depart	arrive	**total**	**Cumulative impact**
Motorway impact	M3 J9	187	67	**254**	6	34	**40**	**294**
	M3 J10	37	13	**50**	0	3	**3**	**53**
	M3 J11	218	78	**296**	41	403	**445**	**740**
Local roads	City/Local	307	109	**416**	10	102	**112**	**529**
	north: Andover Rd/A34	140	50	**191**	4	38	**42**	**232**
	west: Stockbridge Rd	85	30	**115**	3	33	**37**	**152**
Bus	city: local network	61	22	**83**	2	16	**17**	**101**
Cycle	local	21	7	**28**	2	16	**18**	**46**
Walk	local	32	12	**44**	1	11	**12**	**56**

4.4.4 It can be seen that combined impacts of developments on the strategic network are significant in the AM Peak, with potentially an addition 740 vehicles travelling through M3 Jn 11, of which 60% are related to Bushfield Camp.

4.4.5 The dominance of car travel at Bushfield Camp in comparison with Barton Farm is clearly demonstrated, with only 47 non-car trips forecast to Bushfield Camp, in contrast to 155 non-car trips forecast for Barton Farm.

4.5 Smarter Travel Measures

4.5.1 We have reviewed the options for introducing remedial measures associated with the developments so that the negative transport impacts are reduced. Essentially this focuses on reducing the number of car trips associated with each development by providing acceptable alternatives. While experience suggests that reducing car dependency can be difficult to achieve, there are circumstances in which individuals can be affected by a range of constraints and opportunities to change their travel behaviour. This is described by the 'Change Opportunity' identified in Chapter 2. This will apply to all new residents and new employees of both developments – up to 7,500 individuals (2,000 dwellings with average adult occupancy of 1.2 plus 40,000 sq m office employment at a rate of 15 sqm per employee) – and therefore the potential for behavioural change is considerable.

4.5.2 In addition, the limited road space available in Winchester city centre can be turned to advantage with measures such as wider park and ride availability with less central area parking (or higher cost parking), better bus services with new services designed to meet the needs of new residents and employees and the introduction of direct and attractive walking and cycling routes. These are set out in more detail below.

Parking Policy

4.5.3 Parking policy has featured prominently in the transport strategy for the city for many years. The introduction of park and ride at Bar End and the planned introduction of a second facility to the south of the city in 2010 has shown how car users can transfer to bus for short journeys to the city centre. This is fundamental to reducing traffic levels in the city centre where the lack of road space causes problems at peak times. A broader park and ride policy will support a reduction in central area traffic of several thousand car trips every day. However, to achieve this, the supply of spaces in the central areas must reduce as park and ride capacity increases so that the overall supply does not increase disproportionately to the level of planned development.

4.5.4 Parking supply at the proposed Knowledge Park site in Bushfield Camp is likely to prove one of the key determinants in shaping the extent to which the site is car dependent. Constraining the parking supply and ensuring there is no unintended spreading of commuter parking onto unrestricted sections of road, inappropriate residential areas or displacement to Park & Ride will compel employees to find alternative means of travel. Parking supply limitations must be implemented alongside quality alternatives to the car to bring about modal shift.

Bus Services

4.5.5 The outer areas of Winchester all have direct bus links to the centre e.g. Harestock and Stanmore (15 minute daytime frequency), Badger Farm and Winnall (10 minute frequency). A new route could serve Barton Farm via City Road (for rail station) and continue cross-town to Bushfield Camp, maximising public transport accessibility to both developments.

4.5.6 A fundamental feature of both development sites should be priority bus routes so that local people can identify with services and use them as a first choice. To achieve this, bus-only links should feature so that car access is relatively difficult and properties should front the route rather than focusing on garages and parking spaces alongside roads that are difficult for buses to negotiate (as happens in many layouts). Bus stops should be at natural nodes where walking and cycling routes coincide and where they are well sited in relation to local facilities and natural surveillance. A regular 10 minute frequency would provide an attractive alternative to car use.

Walking and Cycling Routes

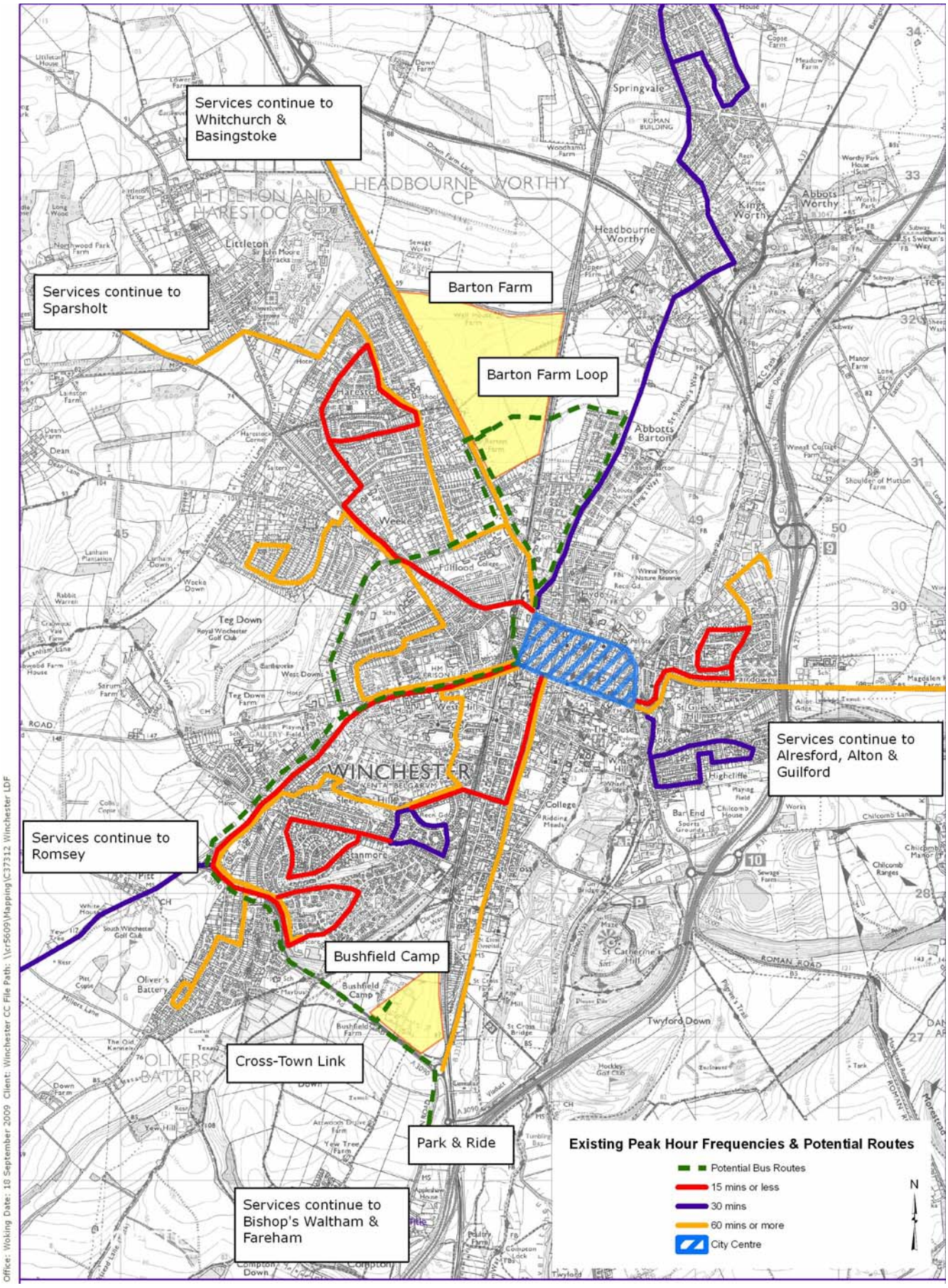
4.5.7 Routes must be designed to be direct and safe with connections through the city centre and to other destinations, particularly for journeys to work. From Barton Farm convenient and direct access to the city centre exists for pedestrians and cyclists which should be enhanced through delivery of this development. Other routes should consider access to the rail station via Andover Road and to the Romsey Road corridor for access to employment and health facilities, to the Winnall employment area and other locations as required.

4.5.8 Bushfield Camp is adjacent to proposed National Cycle Network Route 23 and other signposted routes in the vicinity. Improvements to infrastructure are required to provide a consistent level of service to cyclists, but a core network of routes is present that offers relatively convenient access to Bushfield Camp by cycle from elsewhere in Winchester.

Travel Planning

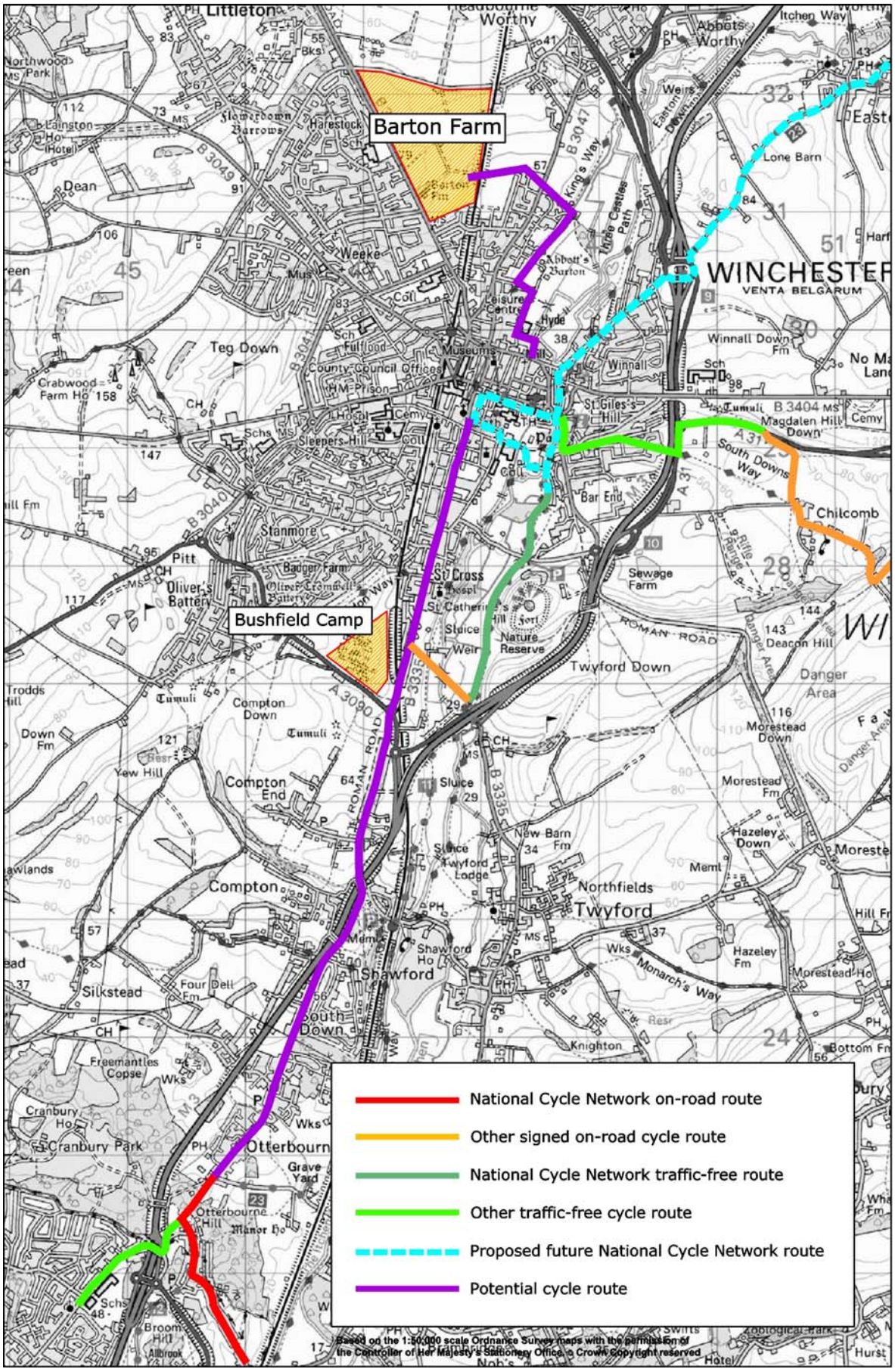
4.5.9 The above approach should be reinforced with comprehensive demand management strategies for the developments as outlined in Chapter 2. A range of travel planning tools are available suitable to different needs and land uses. The demand management strategies should not only put in place physical infrastructure and services to facilitate behavioural changes, they should also raise awareness of the travel options available to proactively encourage sustainable travel habits. This will require ongoing funding and commitment.

Figure 4.1 Existing and Potential Bus Routes



mvaconsultancy

Figure 4.2 Potential Cycle Routes



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4.6 Impact of Smarter Travel Measures

4.6.1 As outlined in Chapter 2 we anticipate a range of impacts associated with Smarter Travel. The impact on car travel demand will respond to the level of intensity with which Smarter Travel measures are applied at new developments, and within the wider population, such as local schools and workplaces.

4.6.2 Our Base assessments described above assume no direct Smarter Travel interventions, and extend existing mode share figures from 2001 Census into existing developments. This is a **Do Minimum** scenario. For assessment purposes we consider two further scenarios:

- **Do Something** – Assume 10% car travel reduction
- **Do Maximum** – Assume 30% car travel reduction

4.6.3 We have also estimated the impacts of a 20% car travel reduction, but have not reported this analysis to avoid over-complicating the assessment and to focus the assessment on the absolute range of travel demand forecasts.

4.6.4 In each scenario, we have made the following assumptions regarding mode shift of car trips. In the absence of a detailed smarter travel strategy for the developments we have assumed that the interventions will reduce car use by corresponding increases in Work at Home (20% of reduced car trips), bus use (40%), walk, cycle and rail use (40% split evenly). Adjustments have been made to the distribution profile to account for distance anomalies, such that transferred walking and cycling trips are limited to 2km and 5km respectively and transferred rail trips are only applicable to zones where rail travel is possible.

4.6.5 Applying the principles described, the number of trips has been recalculated as shown in Tables 4.6 and 4.7 below.

Table 4.6 Combined Assignment by Mode – Do Something

AM peak 10% Shift - Do Something) Winchester Combined Development		Barton Farm			Bushfield Camp			
Car driver		depart	arrive	**total**	depart	arrive	**total**	**Cumulative impact**
Motorway impact	M3 J9	173	62	**235**	5	32	**37**	**272**
	M3 J10	34	12	**46**	0	3	**3**	**49**
	M3 J11	202	72	**274**	39	384	**423**	**697**
Local roads	City/Local	280	100	**380**	10	93	**103**	**483**
	north: Andover Rd/A34	130	46	**177**	4	35	**39**	**215**
	west: Stockbridge Rd	79	28	**107**	3	31	**34**	**141**
Bus	city: local network	75	27	**102**	2	18	**20**	**122**
Cycle	local	25	9	**34**	2	16	**18**	**52**
Walk	local	37	13	**50**	1	11	**12**	**62**

Table 4.7 Combined Assignment by Mode –Do Maximum

AM peak 30% Shift - Do Maximum Winchester Combined Development		Barton Farm			Bushfield Camp			
Car driver		depart	arrive	**total**	depart	arrive	**total**	**Cumulative impact**
Motorway impact	M3 J9	146	52	**198**	5	27	**31**	**229**
	M3 J10	29	10	**39**	0	2	**2**	**41**
	M3 J11	170	61	**231**	35	344	**380**	**610**
Local roads	City/Local	227	81	**308**	8	76	**83**	**391**
	north: Andover Rd/A34	110	39	**149**	0	30	**30**	**178**
	west: Stockbridge Rd	66	24	**90**	3	26	**29**	**119**
Bus	city: local network	102	36	**139**	2	24	**27**	**165**
Cycle	local	34	12	**46**	2	17	**19**	**66**
Walk	local	46	16	**62**	1	13	**14**	**76**

4.6.6 The Do Maximum scenario shows a reduction of 87 trips at M3 Jn 11 and 43 trips at Jn 9 over the Do Something scenario. This reduction increases to 130 trips at Jn 11 and 65 trips to Jn 9 over the Do Nothing scenario.

4.6.7 Local trips are reduced by about 92 vehicles between Do Something and Do Maximum, increasing to approximately 138 over Do Nothing. Many, but not all these trips will travel through City Road junction. The reductions achieved through the behavioural change scenarios are critical to the operation of this already congested junction. The additional trips forecast in the Do Nothing scenario will be difficult to accommodate at the junction without significant mitigation measures.

4.7 Mitigation Measures

4.7.1 The following table identifies a selection of measures that would be required to mitigate the transport impacts of the development options being progressed. A similar approach to that taken by TfSH / PUSH has been adopted with measures being identified under Reduce, Manage and Invest headings. Initial indications are given on possible phasing in relation to development. As timescale for delivery is unclear (and in Barton Farms' case relates to the need for development being proven through monitoring), phasing is described in relation to delivery of development as **Commencement of Development**, **Early Years** (within 2-4 years of development commencing) and **Ongoing** (beyond 4 years of commencement and / or when need is proven). Indicative costs are based on known scheme costs from elsewhere and further design work will be necessary to confirm estimates prior to schemes being submitted for funding approval. An appropriate lead agency for delivery is also indicated, although it is likely partnership working will be necessary for almost all schemes. Potential funding sources are identified in Chapter 2.

Table 4.8 Winchester Combined Mitigation Measures

Measure	Indicative Cost	Lead / Funding Source	Time Scale
Reduce			
Comprehensive Workplace Travel Plan delivered at Bushfield Camp to reduce commuting and business travel. Package to include as a minimum: - Car sharing - Home working - Flexible working to reduce peak period travel demands - Season ticket loans for public transport - Good quality cycle parking and shower facilities for each employer - Appointment of Travel Plan co-ordinator It is expected that this package will need enhancement to achieve the 'Do Maximum' scenario	*Capital* £50,000 - £150,000 depending on package details. *Revenue* Ongoing costs for staff and maintenance c£30-40k per annum[13]	Developer in partnership with WCC Developer	Commencement of Development and ongoing
Comprehensive Residential Travel Plan delivered at Barton Farm to reduce travel demand. Package to include as a minimum: - Personalised travel planning for new residents - Car club - Discounted public transport	*Capital* £250,000 - £500,000 depending on package (Majority of initial cost is PTP related)	Developer in partnership with WCC Developers	Commencement of Development and ongoing

[13] Annual staff costs assume travel plan co-ordinator role at 1FTE. Role could be combined across all Winchester City developments to reduce costs to approximately 1.5 FTE

Measure	Indicative Cost	Lead / Funding Source	Time Scale
- High speed internet access - Consideration of central 'work hub' to facilitate remote working - Space for cycle parking provided in all dwellings - Appointment of travel plan co-ordinator	*Revenue* Ongoing maintenance and staff costs of c£30-40k per annum[6].		
Comprehensive School Travel Plan measures offered at new Barton Farm schools[14]. Package to include as a minimum - Identification of designated walk and cycle to school routes within development and beyond - Engineering measures to facilitate walking / cycling - Delivery of walking bus and / or chain gangs - Secure cycle parking and lockers - Curriculum support initiatives - Parent car share club - Appointment of travel plan co-ordinator(s)	*Capital* £150,000 - £250,000 depending on package *Revenue* Ongoing maintenance and staff costs c£30-40k per annum[6]	Developer in partnership with WCC Developer	Commencement of Development and ongoing

[14] It is assumed that existing Winchester schools have travel plans in place to meet existing Government targets

Measure	Indicative Cost	Lead Funding Source	Time Scale
Incentives offered for Bushfield Camp employees to relocate to Winchester. Incentives offered for existing Winchester residents to relocated jobs to Bushfield Camp	£50,000 - £100,000 per annum depending on take up and type of incentive[15].	Developers & Occupiers Developer	Commencement of development
Barton Farm Personalised Travel Planning package extended to cover wider Winchester	*Capital* £400,000 - £600,000	WCC / HCC Developer & HCC (LTP)	Early Years
Introduction of Winchester wide car club to reduce parking pressure and manage travel demand[16]. Barton Farm to provide the catalyst for this scheme	Potentially free to public purse if scheme can be delivered commercially. Initial subsidy may be required from developer	WCC / HCC with commercial provider Developer (initial subsidy if required)	Early Years and Ongoing
Manage			
Reduce City Centre parking capacity in line with the Parking strategy to counterbalance increases provided by P+R at the periphery.	£-	WCC WCC	Ongoing
Launch new bus services on a city centre to Barton Farm loop utilising bus gate and proposed bus only access into development. Introduction of weekday only service connecting Barton Farm with Bushfield Camp via Badger Farm and Weeke, bypassing the city centre.	*Capital* £200,000 initial subsidy reducing to £0 as service becomes viable	Bus operators, WCC & HCC Developers (initial subsidy)	Initial services provided at Commencement of Development. expanding through Early Years

[15] Estimate assumes between 10 and 20 employees / residents relocate and 'costs of moving' (legal fees etc) are covered by package.

[16] Research undertaken for Streetcar.com suggests that one Car Club vehicle removes up to 6 private vehicles. Research for carplus.org suggests an average reduction in car mileage of 33% by each member

Measure	Indicative Cost	Lead Funding Source	Time Scale
Improve visibility and pedestrian/cyclist access to Railway station from Andover Road access. Introduce footpath and signing. Possible future alternative bus access bypassing City Road junction for northbound services.	*Capital* £20,000	WCC/Network Rail Developer contribution, HCC, Network Rail	Early years
Subject to the designs progressed at Bushfield Camp and the links to Badger Farm, it may be necessary to establish a South Winchester CPZ to regulate commuter parking.	*Capital* £80,000 *Revenue* Ongoing enforcement	WCC Capital – developer Revenue - WCC	Ongoing
Additional small scale Park and Ride to intercept traffic from north. Possible locations include Den Plan stadium or within Barton Farm development. Subject to further assessment, necessitates extension of CPZ.	*Capital* £250,000 *Revenue* Ongoing CPZ enforcement	WCC with developer Funding dependant upon location.	Ongoing
Traffic management and pedestrian improvements at Andover Road/Worthy Road junction and Andover Road bridge	*Capital* £40,000	HCC, WCC & Network Rail Developer & Network Rail	Early Years
Invest			
Introduce bus gate and link from Barton Farm onto Worthy Road via Courtney Road, utilising existing underbridge and enabling new bus loop.	*Capital* £500,000-£700,000	HCC, WCC - HCC, Network Rail and Developer	Early Years
M3 Junction 9 improvements to signalised roundabout subject to further investigation & HA approval - dedicated left slip from Easton Lane to A34 nbd - capacity increases on rab	*Capital* £600,000 - £1.2m	Highways Agency HA Programme, developer contribution	Early Years

Measure	Indicative Cost	Lead Funding Source	Time Scale
M3 Junction 11 - potential signalisation of P&R access / St Cross roundabout. Contribution to improvements at Jn 11	*Capital* £250,000 Works £200,000 Contribution	HCC / HA Developer, HCC, WCC	Ongoing
Improvements to City Road Junction possibly alongside wider town centre road layout changes to reduce number of arms entering junction **OR** expanded junction utilising third party land	*Capital* £150,000 - £500,000 depending on scale of change	HCC / WCC HCC. developer contribution	Ongoing
Develop mostly segregated cycle route from Barton Farm site, via the underbridge, passing through Abbots Barton and across Worthy Road through sports fields and into the City Centre via Middle Brook Street	*Capital* £600,000	WCC HCC, developer contribution	Early Years

4.7.2 The package of measures outlined in the table above should be delivered through a variety of funding streams, some in conjunction with developers, transport operators or infrastructure owners. Central or regional Government investment will also be required to support key infrastructure.

4.7.3 The measures have been determined in response to the problems and opportunities identified at the preferred development sites, with a view to realising their potential for supporting sustainable modes and mitigating their impacts. These measures will require further detailed consideration and refinement in step with the evolution of site layouts as more detailed plans emerge.

4.7.4 The measures identified are in addition to those to be delivered through the Winchester Access and Movement Plan and other LTP initiatives. We would also expect developer-led proposals to identify more specific mitigation measures in the immediate vicinity of Barton Farm and Bushfield Camp that reflect the access and layout strategies adopted by each development.

4.7.5 Policy SS2 of the Core Strategy Preferred Options notes the need for 'provision of a sustainable transport system to maximise its efficiency and investment in new / improved infrastructure to meet the needs of the new development.' The measures outlined in the above table will all be required to fully achieve the policy objectives of SS2. Development is not necessarily contingent upon all schemes being delivered. However, we believe delivery

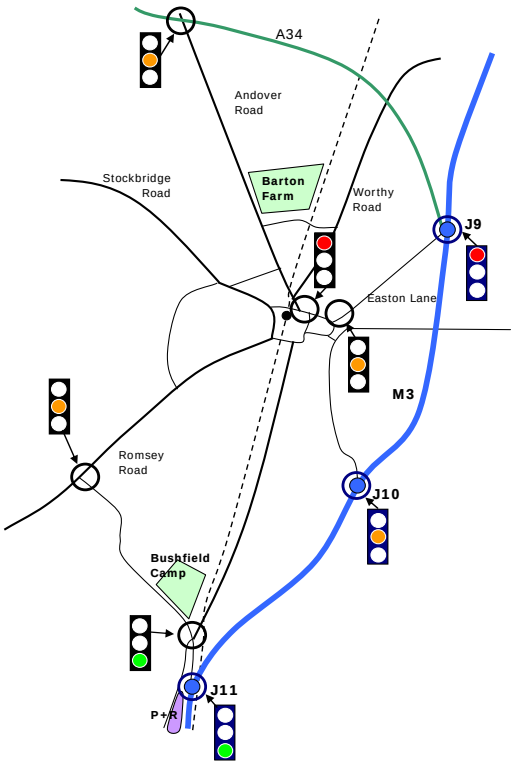
of the above package is the most appropriate strategy to mitigate impacts of development and move towards the mode shift targets assumed in the Do Maximum scenario. The main influence on mode shift is through the Reduce and Manage initiatives.

4.8 Impact at Junctions

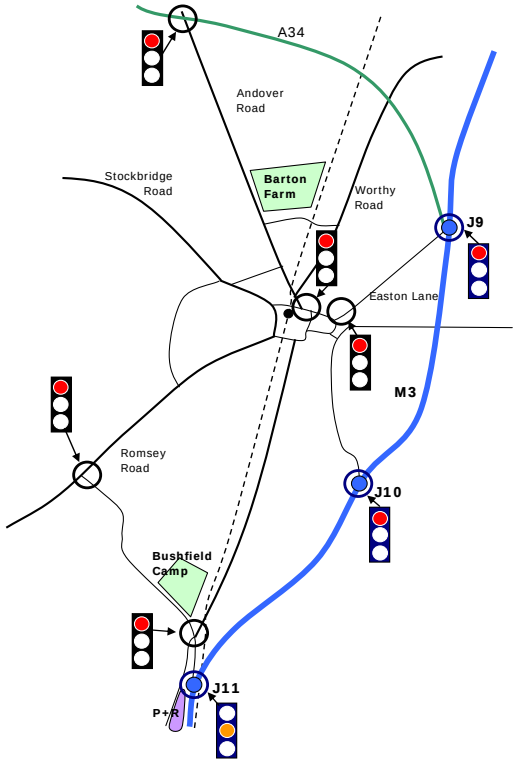
4.8.1 Most development impacts will be experienced at local junctions and on access to the SRN. Detailed junction assessments should be undertaken as part of specific development proposals to assess future performance against current. To support this strategic assessment, an indication of baseline and future performance at key junctions is shown on the diagrams below, where:

- Green = no peak period performance problems;
- Amber = Peak performance at or approaching saturation (queues on some arms); and
- Red = Traffic levels through junction exceed capacity threshold causing extensive queuing.

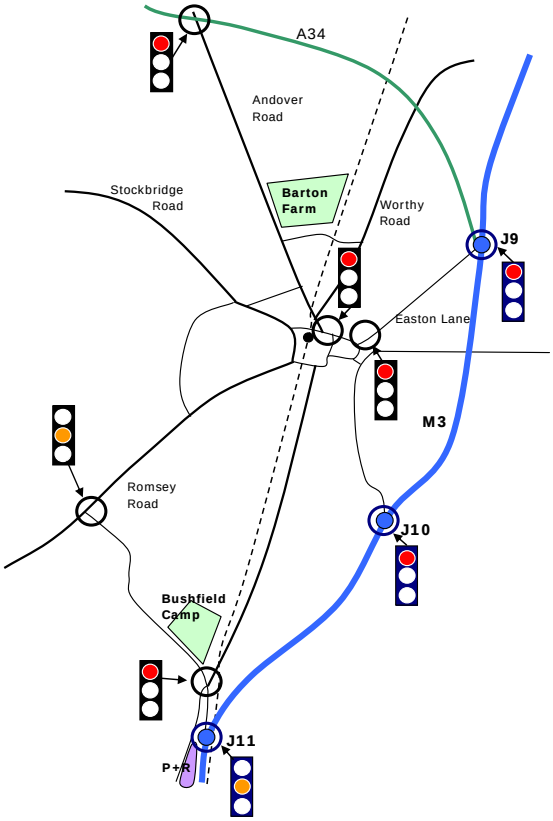
Base - without Development 2026



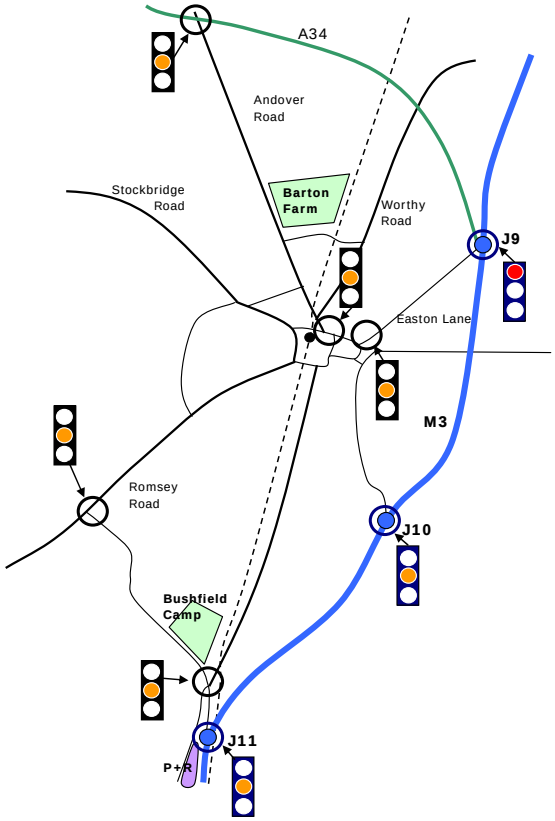
Base - with Development 2026



Do Something - 2026



Do Maximum 2026



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4.8.2 The worst case scenario – 2026 Base with development – shows all junctions except M3 Jn 11 as operating beyond capacity thresholds. The Do Maximum case shows a stabilisation or slight worsening of conditions at most junctions compared to the Base Case, with a slight improvement in conditions at City Road junction. This improvement is associated with changes to the junction layout or city centre one way system.

4.8.3 The Do Something scenario assumes that selected mitigation measures have been implemented from the table above.

4.8.4 M3 Jn 9 is operating above capacity thresholds in all scenarios, as it does in the Base Case. Existing problems at this junction are associated with the merging of two major routes (A34 & M3) – development traffic will add to these problems, and the mitigation measures identified will help to resolve the impacts of development rather than underlying pre-existing problems. Resolution of existing problems has been the subject of previous Highways Agency studies.

4.9 Impact on Local Road Network

4.9.1 Further assessment of the combined impact of the two development sites in Winchester Town was conducted at a localised level, to determine the likely scale of impacts on some principal routes in the local road network.

4.9.2 The base 2026 traffic flows onto which development trips have been applied were derived by growthing 2008 data with the higher growth NRTF rate, so as to consider the worst case scenario in terms of localised impacts and account for development of smaller sites within Winchester City not explicitly considered in this assessment.

4.9.3 Development trip distributions were determined by analysing the strategic level movements to and from each development site, and applying sensible estimates for the likely proportion of each to travel via the four key routes assessed. The key considerations are alternative routing options available, and the relative attractiveness of those routes in terms of their directness, speed / congestion and classification.

4.9.4 Table 4.9 below outlines the number of additional trips generated on each route by the new developments, the resultant Flows in 2026 and the estimated route capacity utilised.

Table 4.9 Winchester local road traffic flows - base (daily)

Location	Barton Farm		Bushfield Camp		Total additional car trips by route	2026 Flow + Devt	% Increase	2026 High Capacity + Devt
B3049 Stockbridge Road	1,149	13.3%	182	22.9%	1,331	9,301	16.7%	55.5%
B3420 Andover Road	2,726	31.5%	115	14.5%	2,842	16,381	21.0%	95.5%
C465 Worthy Road		0.0%		0.0%	0	9,613	0.0%	56.6%
C465 Easton Lane	1,496	17.3%	22	2.7%	1,517	14,582	11.6%	88.0%
B3040 Romsey Road	3,282	37.9%	477	59.9%	3,758	16,563	29.4%	94.5%
	8,652		**795**		**9,448**	**66,440**		

4.9.5 Table 4.10 and 4.11 below demonstrate the impact of the mitigation measures on the local road network, relative to the base forecasts for development without further mitigations. The 'do something' measures bring about 5% reduction in the impact on annual average daily

traffic (AADT). The 'do maximum' approach reduces overall addition of cars on the key local routes by 11%.

Table 4.10 Winchester local road traffic flows – Do Something (daily)

Location	Barton Farm		Bushfield Camp		Total additional car trips by route	2026 Flow + Devt	% Increase	2026 High Capacity + Devt
B3049 Stockbridge Road	1,064	13.3%	169	19.5%	1,233	9,204	15.5%	54.9%
B3420 Andover Road	2,515	31.5%	173	20.1%	2,689	16,228	19.9%	94.6%
C465 Worthy Road		0.0%		0.0%	0	9,613	0.0%	56.6%
C465 Easton Lane	1,386	17.3%	20	2.3%	1,406	14,471	10.8%	87.3%
B3040 Romsey Road	3,030	37.9%	501	58.0%	3,531	16,336	27.6%	93.2%
	7,996		**862**		**8,858**	**65,851**		

Table 4.11 Winchester local road traffic flows –Do Maximum (daily)

Location	Barton Farm		Bushfield Camp		Total additional car trips by route	2026 Flow + Devt	% Increase	2026 High Capacity + Devt
B3049 Stockbridge Road	980	13.4%	155	19.7%	1,135	9,106	14.2%	54.3%
B3420 Andover Road	2,304	31.4%	157	20.0%	2,462	16,001	18.2%	93.3%
C465 Worthy Road		0.0%		0.0%	0	9,613	0.0%	56.6%
C465 Easton Lane	1,276	17.4%	18	2.3%	1,295	14,359	9.9%	86.6%
B3040 Romsey Road	2,778	37.9%	458	58.0%	3,236	16,041	25.3%	91.5%
	7,339		**789**		**8,128**	**65,121**		

4.10 Impact on Strategic Road Network Links

4.10.1 Estimated impacts on the strategic road network have been made based on forecast flows from Winchester developments in combination with forecasts from other PUSH developments.

4.10.2 Background traffic data and growth factors for M3 and M27 were described in the Stage 1 report. NRTF low growth factors have been used in consideration of the fact that the M3 is already capacity constrained in peak periods and the ability for background traffic growth to exceed these forecasts is limited.

4.10.3 Figure 4.2 below shows AM Peak traffic flow forecasts for M3 Junctions 9 to 11 with and without development at 2016 and 2026. Without development, the motorway will be operating beyond design capacity by 2026 based on low-growth background forecasts, except between Junctions 9 & 10. Development flows exacerbate congestion with some links forecast to carry traffic levels one third above design capacity.

4.10.4 Figures 4.3 & 4.4 show AM Peak flow forecasts for the Do Something and Do Maximum scenarios – 10% and 30% car trip reductions respectively. Impact on the links either side of Jn 11 is reduced slightly by the smarter travel mitigation measures from an average of 120% design capacity to 118% design capacity. However, other developments at Hedge End and Whiteley have a greater impact on capacity at Junction 11 than development at Winchester.

4.10.5 It should also be noted that the Department of Transport has announced proposals to implement a Managed Motorway strategy on this section of M3 (Jns 9-14), subject to further investigation. Details of the proposal are unclear at this stage but might include selective hard shoulder running, variable speed limits and improved incident management and, if feasible, would be delivered after 2014. Forecasts for overall capacity increases are not available but experience from elsewhere, principally the M42 Active Traffic Management Pilot scheme, would suggest capacity increases of between 7% & 22%. The impact on individual junctions needs further consideration in the context of Managed Motorways as the concept largely targets link capacity rather than junction capacity. Taken in combination with traffic reductions from smarter travel intervention, M3 volume/capacity levels would return to current levels.

Figure 4.3 Base AM Peak Flows M3 Jn 9 to Jn 11

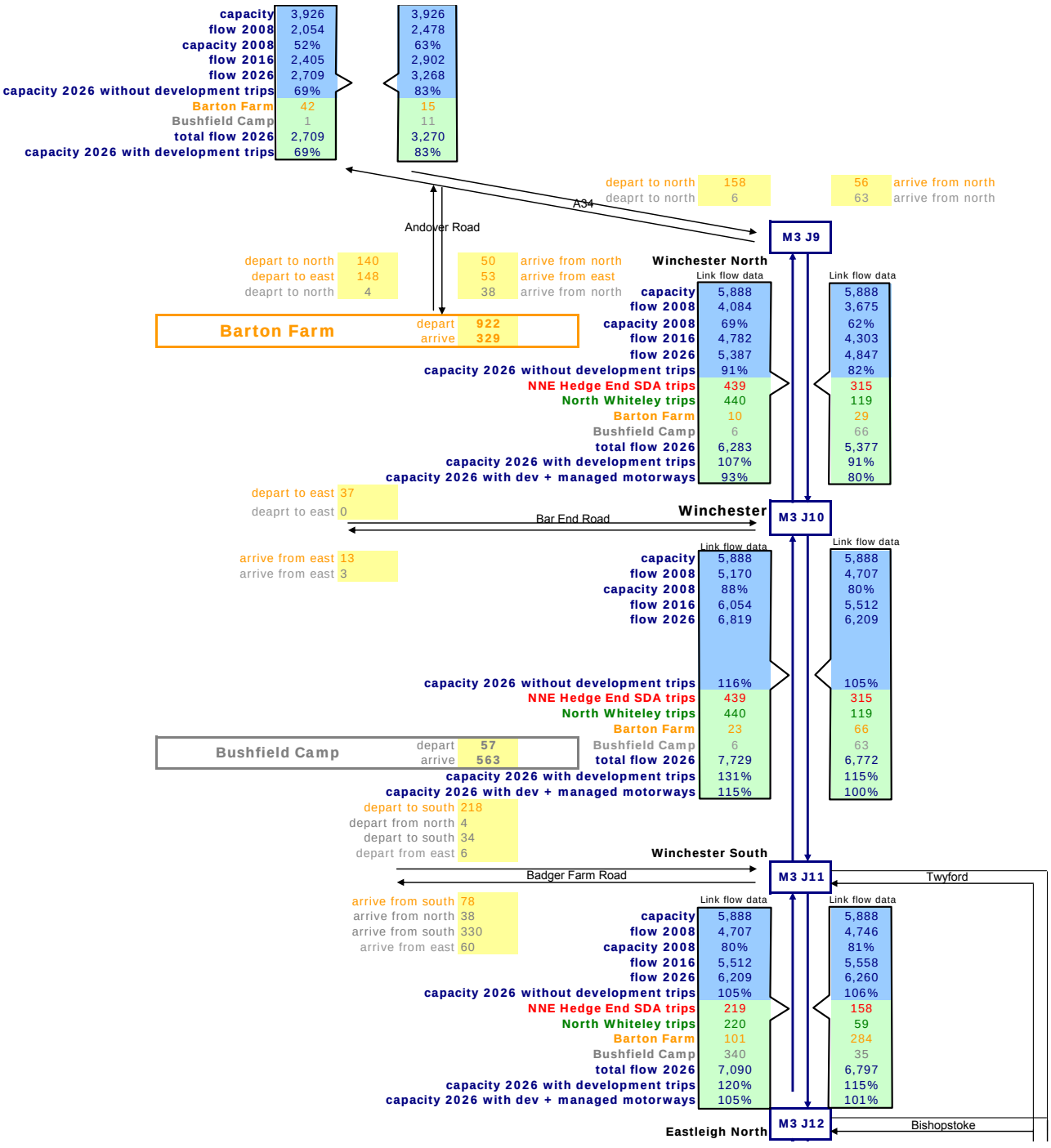


Figure 4.4 Do Something AM Peak Flows M3 Jn 9 to Jn 11

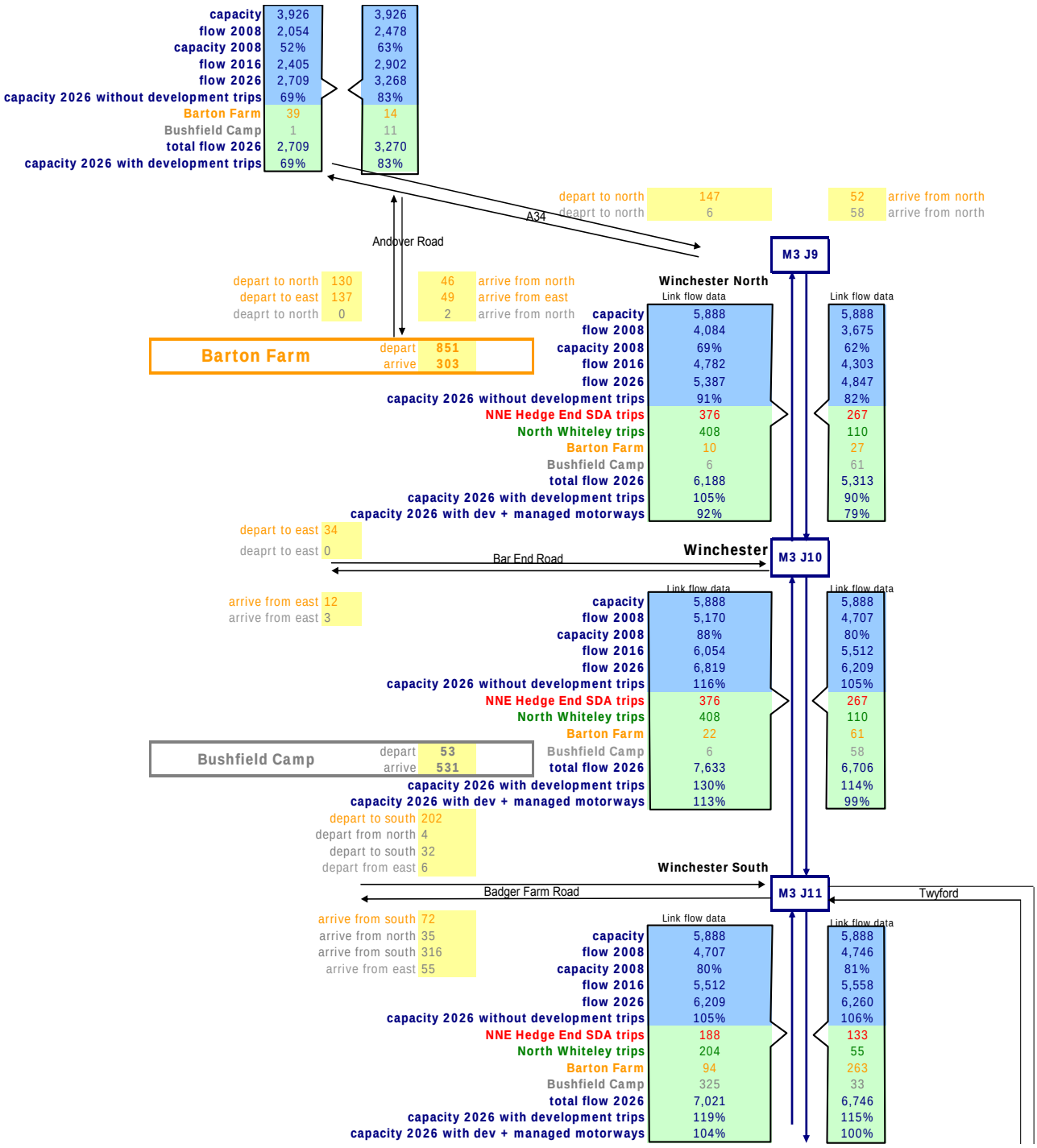
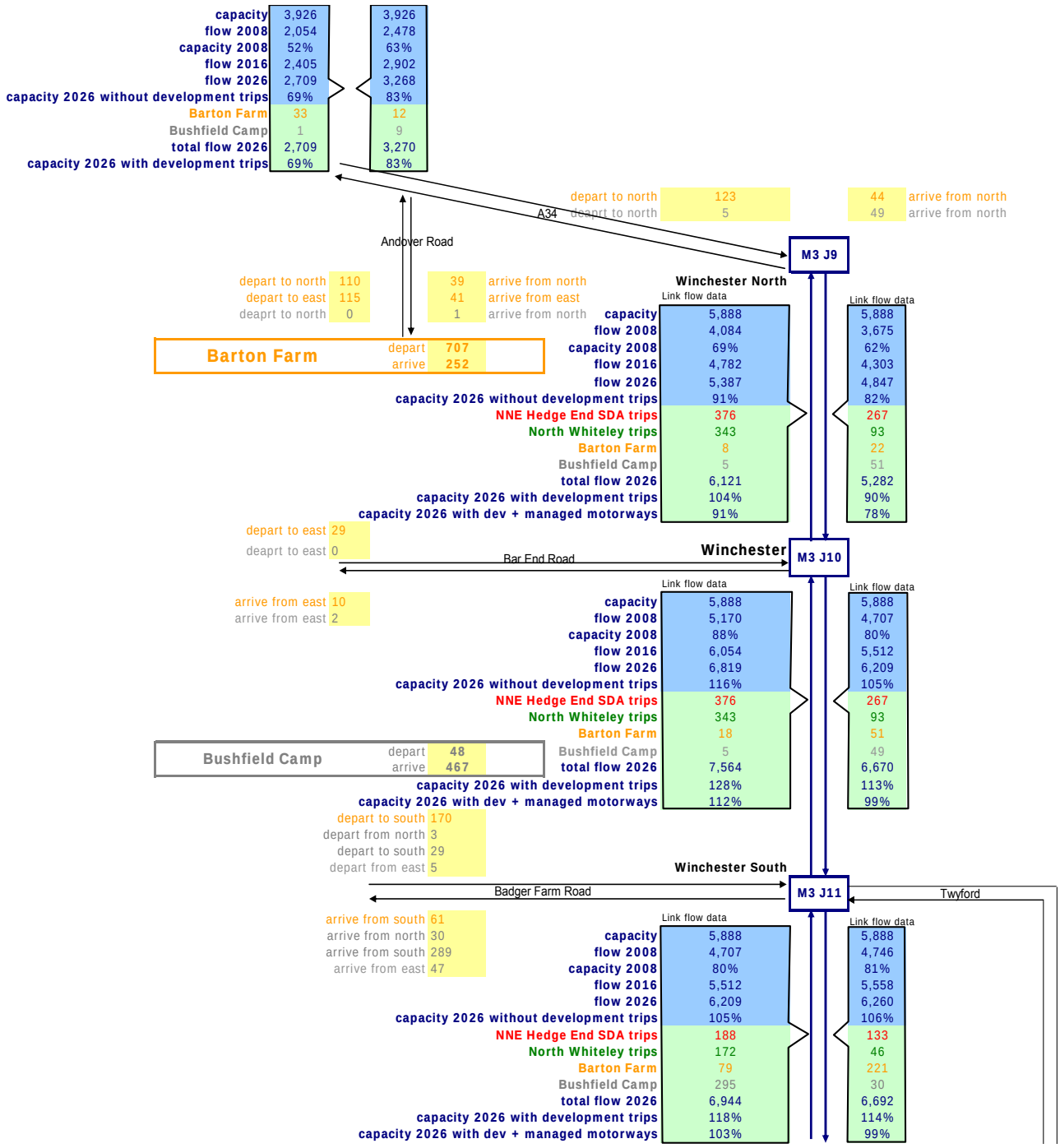


Figure 4.5 Do Maximum AM Peak Flows M3 Jn 9 to Jn 11



5 North Whiteley

5.1 Context of Recent Developments

5.1.1 Large scale development has taken place in Whiteley in recent years and there are extensive housing and employment areas, some of which remain uncompleted. In addition there is a superstore and an outlet retail park and local facilities including a primary school. The area has major in-commuting as the number and type of jobs outweighs the local labour market. Due to its location, Whiteley is almost entirely car-dependent; bus services are lightly used, remote from residential areas and subject to traffic delays and the recent introduction of a bus-only access to Swanwick and Park Gate is currently only used by local bus services, school buses and private buses/mini-buses. The main access is at M27 Junction 9 which experiences regular congestion at peak times.

5.1.2 To the north, the planned extension of Whiteley Way has yet to be completed so all traffic (with the exception of minor flows via Leafy Lane) is forced to use Junction 9. To the south of Junction 9, the Segensworth employment areas attracts large numbers of commuters and the A27 corridor, notably the Segensworth Roundabout, is congested which adds to the problems of accessing Whiteley.

5.2 Emerging Development Masterplan

5.2.1 A development consortium for North Whiteley has been established. Work is progressing on creation of a development masterplan and transport strategy but both are in their infancy. Early discussions on the emerging transport strategy have indicated a strategic aim for 'nil detriment' as a result of the development, i.e. transport conditions are no worse after development is complete than at present.

5.2.2 A primary and secondary school is also included within the draft masterplan, and early assumptions on transport impacts indicate a potential reduction in external trips due to greater internalisation of education trips. These assumptions have been highlighted at a relatively late stage in the preparation of this report, so it has not been possible to include them in our analysis.

5.3 Relationship with North / North East Hedge End SDA

5.3.1 Potential development sites to the north of Whiteley are close to the south eastern boundary of the proposed North/North East Hedge End SDA. The creation of a new road link to Junction 9 via Whiteley Way, supported by the construction of a Botley Bypass which could be facilitated by the N/NE Hedge SDA, means that the two proposals are linked for access purposes.

5.3.2 This study has been prepared without the benefit of an outline masterplan for the development or knowledge of the role / layout of Whiteley Way. The potential delivery of the Botley Bypass is also unknown at this stage. These issues are now being considered in more detail by both the Whiteley developer consortium and the County Council, and it is expected that further clarity will be revealed by the sub-regional / corridor study being commissioned by the County Council. The conclusion of these studies will create a more robust evidence

base on the impacts of the proposed development, particularly on M27 Jn 9. In the meantime, the Stage 2 Study offers assumptions given current knowledge as follows:

- Whiteley Way is complete as a single carriageway two-way distributor route allowing access between Botley and M27 Jn 9;
- Our modelling and assignment processes have not required network speed estimations to be undertaken – our working assumption is that Whiteley Way is built to 40mph standard;
- Access from a potential N/NE Hedge End development is achievable, possibly by a Botley bypass;
- Bus priority measures are included where necessary to avoid congestion – a separate busway/lane is not included on freeflow-sections; and
- Whiteley Way is not artificially constrained through introduction of traffic management / calming measures or similar.

5.3.3 These assumptions create the possibility of traffic using Whiteley Way to access Botley / Hedge End using M27 Jn 9. The scope of the study and available data was not sufficient to forecast potential trips diverted from Jn 7/8 to gain access to Botley / Hedge End. The number of diverted trips will depend, in any case, on the presence of a potential link road between Jn 8 and N/NE Hedge End development. These issues are being given further consideration by the County Council.

5.3.4 In practice, a range of alternative scenarios exist. One scenario could be that both links (Whiteley Way and Botley Bypass) are designed as high capacity connector / distributor routes in combination to facilitate convenient access between employment and residential areas. Existing constraints at M27 Jn 9 and west of Hedge End would create additional congestion at either end of the combined link road. Such a route would also establish an alternative route to M27 generating concerns regarding rat-running, route suitability and congestion on local roads.

5.3.5 Other alternatives could be investigated to limit the undesirable elements of a combined link road that also facilitates greater accessibility, particularly for bus services. Whiteley Way also facilitates a bus rapid transit route which is fundamental to creating an attractive alternative to car use between the SDA, Whiteley and Fareham.

5.3.6 Given the high car dependency at Whiteley, it is vitally important that measures associated with the large development sites also benefit the completed parts of Whiteley. Hence bus links in particular will play a key role in making the additional sites function but must be integrated with established development. Behavioural change measures must also be implemented amongst the established population, resident and workforce, to ensure the viability of new services is maximised.

5.4 Potential Impacts

5.4.1 Estimates for traffic impacts arising from North Whiteley have been developed from first principles, based on comparable trips rates and trip distribution according to 2001 Census Journey to Work profiles. We have sought, but not received traffic data and underlying assumptions for North Whiteley from the developers' traffic consultants. We have therefore

made informed assumptions regarding trip distribution and assignment based Census data and other work for N/NE Hedge End SDA.

5.4.2 Travel estimates are based on an assumed development of 3000 dwellings and a local centre comprising 2000 sqm local retail and 500 sqm of community use. Table 5.1 below shows base trip generation by mode for internal and external trips.

Table 5.1 North Whiteley Base Trip Generation by Mode

Whiteley Areas 1 and 2 REVISED EXTERNAL	AM depart	AM arrive	AM total	PM depart	PM arrive	PM total	DAY depart	DAY arrive	DAY total
Work at home	-	-	0	-	-	0	-	-	0
Train	88	24	111	36	57	92	455	411	866
Bus/minibus	12	3	15	5	8	13	62	56	119
Taxi/minicab	0	0	0	0	0	0	0	0	0
Car driver	1,657	448	2,105	672	1,067	1,740	8,597	7,767	16,364
Car passgr	81	22	102	33	52	85	419	378	797
Cycle	31	8	39	12	20	32	159	144	303
Walk	100	27	127	41	64	105	519	469	989
Total	1,968	532	2,500	799	1,268	2,066	10,211	9,226	**19,438**

Whiteley Areas 1 and 2 REVISED INTERNAL	AM depart	AM arrive	AM total	PM depart	PM arrive	PM total	DAY depart	DAY arrive	DAY total
Work at home	-	-	286	-	-	233	-	-	2,119
Bus/minibus	1	0	2	0	1	1	6	6	12
Car driver	364	107	472	155	238	393	1,969	1,789	3,758
Car passgr	8	2	10	3	5	8	43	39	81
Cycle	12	3	15	5	8	12	63	57	119
Walk	38	11	49	16	25	41	204	185	389
Total	422	125	833	179	276	689	2,285	2,076	**6,479**

Whiteley Areas 1 and 2 EXTERNAL+INTERNAL	AM depart	AM arrive	AM total	PM depart	PM arrive	PM total	DAY depart	DAY arrive	DAY total
Work at home	-	-	286	-	-	233	-	-	2,119
Train	88	24	111	36	57	92	455	411	866
Bus/minibus	13	4	17	5	9	14	69	62	131
Taxi/minicab	0	0	0	0	0	0	0	0	0
Car driver	2,021	555	2,576	827	1,305	2,132	10,566	9,557	20,122
Car passgr	89	24	113	36	57	93	461	417	878
Cycle	42	12	54	17	27	45	222	201	423
Walk	138	38	176	57	89	146	723	655	1,378
Total	2,391	656	3,333	978	1,544	2,755	12,496	11,302	**25,917**

5.4.3 The dominance of car travel is demonstrated, with 77% mode share (80% including passenger). In the base case, minimal bus trips are forecast, reflecting existing travel patterns. Forecasts are based on 2001 Census data. Trip internalisation has been assumed at 25% for all commuting trips, whilst retail trips to the local centre are entirely contained within Whiteley.

5.4.4 Table 5.2 below shows the base assignment with no remedial measures in place continuing the existing dominance of car journeys. Assumptions have been made regarding routing along a completed Whiteley Way.

5.4.5 With additional development, there will clearly be impacts on the M27, as shown in Figure 5.1 – 636 vehicles in AM Peak to the east of Junction 9 and over 488 to the west. In addition, a further 422 will be using the junction to gain access to routes to the south adding to congestion here and at Segensworth Roundabout. Given the congestion already experienced here, this level of additional demand is unsustainable and will require significant mitigation.

5.4.6 Over 500 vehicles are forecast to use an extended Whiteley Way to the north in the AM Peak. In addition to SDA traffic and any other reassignment that may occur with motorists avoiding the M27 and southern part of the M3 where delays may occur.

5.4.7 The level of bus use is particularly inadequate while cycling and rail use make little impression on the overall figures. Unless significant mitigation measures are implemented, and their benefits 'locked-in', Whiteley will continue to be a car dominated development with consequent impacts on local and strategic road networks, continued congestion with inadequate transport choice for residents and commuters.

Table 5.2 Base Assignment North Whiteley

Base Assignment		AM			PM			DAY		
EXTERNAL TRIPS		depart	arrive	total	depart	arrive	total	depart	arrive	total
Work at home		-	-	**0**	-	-	**0**	-	-	**0**
Train										
	to/from North	57	15	72	23	37	60	296	267	563
	to/from East	25	7	32	10	16	27	131	119	250
	to/from South	0	0	0	0	0	0	0	0	0
	to/from West	5	1	7	2	4	6	28	26	54
		88	**24**	**111**	**36**	**57**	**92**	**455**	**411**	**866**
Bus/minibus										
	to/from North	5	1	6	2	3	5	25	23	48
	to/from East	2	1	3	1	1	2	11	10	20
	to/from South	3	1	4	1	2	3	15	14	29
	to/from West	2	1	3	1	1	2	11	10	22
		12	**3**	**15**	**5**	**8**	**13**	**62**	**56**	**119**
Taxi/minicab										
	local	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Car driver										
	to/from North	440	119	559	179	284	462	2,285	2,064	4,349
	to/from East	501	135	636	203	323	526	2,598	2,348	4,946
	to/from South	332	90	421	135	214	348	1,720	1,554	3,275
	to/from West	384	104	488	156	247	403	1,993	1,801	3,794
		1,657	**448**	**2,105**	**672**	**1,067**	**1,740**	**8,597**	**7,767**	**16,364**
Car passgr										
	to/from North	21	6	27	9	14	23	111	101	212
	to/from East	24	7	31	10	16	26	127	114	241
	to/from South	16	4	21	7	10	17	84	76	159
	to/from West	19	5	24	8	12	20	97	88	185
		81	**22**	**102**	**33**	**52**	**85**	**419**	**378**	**797**
Cycle		**31**	**8**	**39**	**12**	**20**	**32**	**159**	**144**	**303**
Walk		**100**	**27**	**127**	**41**	**64**	**105**	**519**	**469**	**989**
Total		**1,968**	**532**	**2,500**	**799**	**1,268**	**2,066**	**10,211**	**9,226**	**19,438**

5.4.8 A Bus Rapid Transit (BRT) network is being developed for south Hampshire. The first phase, along the former rail line in Gosport, has recently received funding from DCLG (through CIF) and is due for completion by spring 2011. The Vision is for a network of high quality, highly prioritised or segregated bus routes linking key origins and destinations. Innovative fares and ticketing systems are anticipated.

5.4.9 PUSH expect a high quality bus network to take several forms across the sub-region. The BRT model offers the highest degree of priority and journey time reliability, but is also the most difficult to deliver due to infrastructure requirements and cost. A Premium Bus Network, offering a highly differentiated service but with a lower level of priority is also being considered. The existing ZIP services along the A3 corridor fall into this category. Other bus service improvements, such as Quality Bus Partnerships, selected priority measures and bespoke initiatives may also be necessary to achieve the modal shift necessary to manage travel demand by car.

5.4.10 New bus services using one of the models described above should be provided linking the area with Swanwick station and Southampton and also with Fareham and Portsmouth. This may require priority measures on the M27 motorway. For viable, high quality bus services to

be provided, the relationship between Whiteley and other possible development sites needs to be considered, for example the opportunities provided for through services to the North/North East Hedge End SDA.

5.4.11 There may be opportunities for an additional rail station at Segensworth (provided that some services from the Southampton to Fareham line can be diverted to the Botley line to access Southampton Airport Parkway with the construction of Eastleigh Chord).

5.5 Smarter Travel Measures

5.5.1 A similar approach to the adoption of smarter travel interventions has been taken to that proposed for Winchester for assessment purposes. We have assumed 10% - Do Something and 30% - Do Maximum scenarios to compare against base case forecasts.

5.5.2 The mix of smarter travel measures applied in Whiteley will differ from those appropriate to Winchester. Due to the larger residential community both existing and proposed, a **Personalised Travel Planning** (PTP) approach would be particularly effective based on current experience in the UK and overseas. Experience from Darlington Sustainable Travel Town Pilot shows an 11.5% reduction in car journeys in targeted communities and significant increases in walking and cycling trips. This experience is also borne out by similar projects in Brighton and Sutton where PTP schemes have been piloted.

5.5.3 The existing Whiteley development experiences acute congestion at peak periods due to lack of choice (of routes or modes), and development at North Whiteley offers a strong potential for travel behaviour change in the right circumstances.

5.5.4 It is expected the North Whiteley development will enable delivery of a completed Whiteley Way, and with it the opportunity to create new routes through to Botley, Hedge End and beyond. All new residents within North Whiteley will be subject to the 'Change Opportunity' and might therefore be receptive to provision of new bus services despite the very high car reliance that is present in the existing Whiteley community. The extent to which new residents take up alternative modes will, to a large degree, depend on how new services are packaged and promoted. If done successfully, some existing residents may also be persuaded to switch modes.

5.5.5 Considerable investment in Smarter Travel interventions will be necessary to alleviate existing and future traffic impacts, and we would anticipate that Personalised Travel Planning would feature strongly in the package due to its effectiveness amongst residential communities. Depending on the intensity of Smarter Travel measures, we anticipate a range of behavioural responses in Whiteley:

Table 5.3 Behavioural Responses at Whiteley

TDM Intervention Level	Likely Behavioural Response
Low Intensity – New PT services promoted only to new residents. Some delivery of Personalised Travel Planning	Some new residents choose new PT services. Minimal mode shift amongst existing residents
Medium Intensity – New PT services promoted to new residents and existing residents and businesses in immediate catchment. Wider use of PTP techniques	Greater proportion of new and existing residents switch mode to PT. Some inbound commuters switch mode.
High Intensity – New PT services promoted strongly to all new and existing residents and businesses across Whiteley. New residents moving into the existing Whiteley development will be especially targeted. Strong use of PTP techniques with residential groups and strengthening of existing area based travel planning techniques with businesses.	High proportion of new and existing residents and inbound commuters switch to PT or change commuting patterns (i.e. work at home)

5.5.6 These interventions could also be used successfully in other major development areas. The actual number of car journeys reduced by the above interventions is difficult to predict. Clearly, greater investment in TDM leads to more change in travel behaviour. The relationship between the level of intervention and behavioural response is complex and certainly not linear. However, investment at the High Intensity end of the scale results in a proportionally greater number of people influenced than at the Low & Medium investment levels.

5.5.7 To be effective genuine alternatives must already be in place, and the construction of Whiteley Way offers the opportunity for **new public transport routes** to Botley, Hedge End and Eastleigh. In conjunction with PTP initiatives, commitments from bus operators are required to provide new frequent and reliable services from the outset. Current bus services are very limited in number. This deficiency must be overcome and improved by a very significant margin if Whiteley is to function sustainably.

5.5.8 The new development must also be set out in a manner that facilitates convenient bus access. Positively planning for effective bus services should include consideration of the following:

- Dwellings fronting onto bus routes;
- Higher density clusters around bus nodes;
- Penetrable road network rather than the current cul-de-sac layout
- Priority measures within the development and at key congestion points
- Attractive and well-designed bus stops

5.5.9 To support these more conventional responses, an innovative approach is required to further mitigate the potential impacts of additional development. Particular focus is required on **employment and in-bound commuting patterns** in consideration of the fact that Whiteley currently has only 14% internalisation of trips. Innovative measures might include:

- Offering incentives to existing Whiteley employees to move to North Whiteley through a combination of financial and travel incentive measures;
- Making use of the proposed Park & Ride facility at Windhover (M27 Junction 8) to provide services to Solent Business Park in addition to Southampton City Centre. This would relieve some pressure from Jn 9 and also improve viability of the Park & Ride facilities;
- Inclusion of High Occupancy vehicle (HOV) lanes on Jn 9 slip roads (and possibly extended to M27 links) to encourage car sharing
- Re-arrangement of the east-facing sliproads at Jn 9 to draw Business Park traffic away from the roundabout junction.

5.5.10 Indicative costs and phasing of these initiatives is described in Section 4.6 below. It is clear, however, that **an innovative approach is necessary** in Whiteley to mitigate impacts, and that the full costs of these measures need to be understood at an early stage to avoid repeats of past issues that have affected Whiteley.

5.6 Impact of Smarter Travel Measures

5.6.1 A similar approach to that taken for Winchester has been adopted to forecast changes in the car driver mode shares and resultant trips. We have assumed that the interventions described above will reduce car use by corresponding increases in Work at Home (20% of reduced car trips), bus use (40%), walk, cycle and rail use (40% split evenly). Adjustments have been made to the distribution profile to account for distance anomalies, such that transferred walking and cycling trips and limited to 2km and 5km respectively and transferred rail trips are only applicable to zones where rail travel is possible. Tables 5.4 and 5.5 below show the recalculated trip assignments for Do Something and Do Maximum Scenarios.

Table 5.4 Whiteley Revised Assignment – Do Something

Revised Assignment (10%)		AM			PM			DAY		
EXTERNAL TRIPS		depart	arrive	total	depart	arrive	total	depart	arrive	total
Work at home		-	-	**0**	-	-	**0**	-	-	**0**
Train										
	to/from North	61	16	77	25	39	64	316	285	601
	to/from East	33	9	42	14	21	35	173	156	329
	to/from South	0	0	0	0	0	0	0	0	0
	to/from West	13	3	16	5	8	13	66	59	125
		107	**29**	**136**	**43**	**69**	**112**	**554**	**501**	**1,055**
Bus/minibus										
	to/from North	22	6	29	9	14	24	116	105	222
	to/from East	22	6	28	9	14	23	115	104	219
	to/from South	16	4	21	7	10	17	84	76	160
	to/from West	18	5	22	7	11	19	91	83	174
		79	**21**	**100**	**32**	**51**	**82**	**407**	**368**	**776**
Taxi/minicab										
	local	0	0	0	0	0	0	0	0	0
Car driver										
	to/from North	408	110	518	166	263	428	2,117	1,913	4,030
	to/from East	464	125	590	188	299	487	2,408	2,176	4,583
	to/from South	307	83	390	125	198	323	1,594	1,440	3,034
	to/from West	356	96	452	144	229	374	1,847	1,669	3,516
		1,536	**415**	**1,950**	**623**	**989**	**1,612**	**7,966**	**7,198**	**15,164**
Car passgr										
	to/from North	20	5	25	8	13	21	103	93	196
	to/from East	23	6	29	9	15	24	117	106	223
	to/from South	15	4	19	6	10	16	78	70	148
	to/from West	17	5	22	7	11	18	90	81	171
		75	**20**	**95**	**30**	**48**	**78**	**388**	**350**	**738**
Cycle		36	10	45	14	23	37	184	166	351
Walk		102	28	130	42	66	107	531	480	1,011
Total		**1,934**	**522**	**2,456**	**785**	**1,245**	**2,030**	**10,031**	**9,063**	**19,094**

Table 5.5 Whiteley Revised Assignment – Do Maximum

Revised Assignment (30%)		AM			PM			DAY		
EXTERNAL TRIPS		depart	arrive	total	depart	arrive	total	depart	arrive	total
Work at home		-	-	**0**	-	-	**0**	-	-	**0**
Train										
	to/from North	70	19	89	29	45	74	365	330	695
	to/from East	50	13	63	20	32	52	258	233	490
	to/from South	0	0	0	0	0	0	0	0	0
	to/from West	27	7	34	11	17	28	138	125	263
		147	**40**	**186**	**59**	**94**	**154**	**761**	**687**	**1,448**
Bus/minibus										
	to/from North	56	15	71	23	36	59	291	263	555
	to/from East	61	16	77	25	39	64	315	284	599
	to/from South	42	11	53	17	27	44	216	195	411
	to/from West	47	13	60	19	30	49	244	221	465
		206	**56**	**261**	**83**	**132**	**216**	**1,067**	**964**	**2,030**
Taxi/minicab										
	local	0	0	0	0	0	0	0	0	0
Car driver										
	to/from North	343	93	436	139	221	361	1,782	1,610	3,392
	to/from East	391	106	496	159	252	410	2,027	1,831	3,858
	to/from South	259	70	329	105	167	272	1,342	1,212	2,554
	to/from West	300	81	381	122	193	315	1,555	1,405	2,959
		1,292	**349**	**1,642**	**525**	**832**	**1,357**	**6,705**	**6,058**	**12,764**
Car passgr										
	to/from North	17	5	21	7	11	18	87	78	165
	to/from East	19	5	24	8	12	20	99	89	188
	to/from South	13	3	16	5	8	13	65	59	124
	to/from West	15	4	19	6	9	15	76	68	144
		63	**17**	**80**	**26**	**41**	**66**	**326**	**295**	**621**
Cycle		46	12	58	19	30	48	238	215	453
Walk		111	30	140	45	71	116	574	518	1,092
Total		**1,864**	**504**	**2,368**	**756**	**1,200**	**1,957**	**9,671**	**8,737**	**18,408**

5.6.2 Bus use increases significantly between scenarios, from 15 AM peak users in Do Nothing to 261 AM peak users in Do Maximum. At this higher level, it is conceivable that a viable service could operate to Whiteley, provided the service was afforded significant priority to ensure journey times faster or comparable with car travel and strong reliability.

5.6.3 To support the Do Maximum scenario, it is assumed that BRT from the Hedge End SDA using Whiteley Way is given priority across Junction 9 before serving the Segensworth East employment area and accessing the A27 to avoid Segensworth Roundabout; the route would then continue towards Fareham using a series of extensive priority measures in both directions to offer a reliable service and comparatively good journey times compared with car use. Previous analysis has indicated that a BRT service from the SDA to Fareham via Whiteley could be operated commercially with a 20 minute daytime Monday to Saturday frequency (30 minutes on Sundays) provided that there were strong measures in place to support it in both the SDA and North Whiteley and that good journey times were achievable. To achieve a major mode share for BRT would require considerable efforts to discourage car use both through restrictions on parking at destinations and within the site and by providing BRT to a standard that would appeal to car users.

5.7 Mitigation Measures

5.7.1 The following table identifies a selection of measures that would are required to mitigate the transport impacts of the development options being progressed. A similar approach to that taken by TfSH / PUSH has been adopted with measures being identified under Reduce, Manage and Invest headings. Initial indications are given on possible phasing in relation to development. As timescale for delivery is unclear, phasing is described in relation to delivery of development as Commencement of Development, Early Years (within 2-4 years of development commencing) and Ongoing (beyond 4 years of commencement and / or when need is proven). Indicative costs are based on known scheme costs from elsewhere and further design work will be necessary to confirm estimates prior to schemes being submitted for funding approval. An appropriate lead agency for delivery is also indicated, although it is likely partnership working will be necessary for almost all schemes. Potential funding sources are identified in Chapter 2.

Table 5.6 Whiteley Mitigation Measures

Measure	Estimated Cost	Lead / Funding Source	Time Scale
Reduce			
Continued delivery of comprehensive Workplace Travel Plan at Solent Business Park to reduce commuting and business travel. Package to include as a minimum: - Car sharing - Home working - Flexible working to reduce peak period travel demands - Season ticket loans for public transport - Good quality cycle parking and shower facilities for each employer - Appointment / retainment of Travel Plan co-ordinator It is expected that this package will need enhancement to achieve the 'Do Maximum' scenario	*Capital* £50,000 - £150,000 depending on package details *Revenue* Ongoing costs for staff and maintenance c£30-40k per annum	Developer in partnership with WCC & HA Developer	Commencement of Development and ongoing
Comprehensive Residential Travel Plan delivered at North Whiteley to reduce travel demand. Package to include as a minimum: - Personalised travel planning for new residents - Car club - Discounted public transport - High speed internet access - Consideration of central 'work hub' to facilitate remote working - Space for cycle parking provided in all dwellings - Appointment of travel plan co-ordinator	*Capital* £250,000 - £500,000 depending on package *Revenue* Ongoing costs for staff and maintenance c£30-40k per annum	Developer in partnership with WCC Developer	Commencement of Development and ongoing

Measure	Estimated Cost	Lead / Funding Source	Time Scale
Comprehensive School Travel Plan measures offered at all Whiteley schools. Package to include as a minimum - Identification of designated walk and cycle to school routes within development and beyond - Engineering measures to facilitate walking / cycling - Delivery of walking bus and / or chain gangs - Secure cycle parking and lockers - Curriculum support initiatives - Parent car share club - Appointment of travel plan co-ordinator(s)	*Capital* £150,000 - £250,000 depending on package *Revenue* Ongoing costs for staff and maintenance c£30-40k per annum	Developer in partnership with WCC Developer	Commencement of Development and ongoing
Incentives offered for Solent Business Park employees to relocate to (North) Whiteley. Incentives offered for existing Whiteley residents to relocate jobs to Solent Business Park	*Revenue* £50,000 - £100,000 depending on take up and type of incentive[17].	Developers & Occupiers Developer	Commencement of development
North Whiteley Personalised Travel Planning package extended to cover wider rest of Whiteley as per High Intensity model outlined in Table 2.2	*Capital* £500,000 - £750,000	WCC / HCC Developer & HCC (LTP)	Early Years
Introduction of Whiteley wide car club to reduce parking pressure and manage travel demand.	Potentially free to public purse if scheme can be delivered commercially.	WCC / HCC with commercial provider Developer (initial subsidy if required)	Early Years and Ongoing

[17] Estimate assumes between 10 and 20 employees / residents relocate and 'costs of moving' are covered by package

Measure	Estimated Cost	Lead / Funding Source	Time Scale
Manage			
Delivery of new BRT (or similar) service serving Whiteley, Hedge End SDA and Segensworth, potentially linking with Southampton and Fareham	*Capital* £500,000 per annum *Revenue* Modest subsidy (or zero) as service becomes viable	HCC with bus operator & Developer. HCC (potential funding through RFA or similar), Developers	Early years and ongoing
Introduce a new bus route connecting Whiteley and the North Whitely to Swanwick railway station which utilises Yew Tree Drive bus link.	*Revenue* £200,000 per annum reducing to modest subsidy (or zero) as service becomes viable	HCC, WCC, Fareham BC and bus operator Developer	Commencement of Development
Extension of Windhover (Jn 8) Park & Ride service to Solent Business Park	*Revenue* £200,000 per annum reducing to modest subsidy (or zero) *Capital* Assumed P&R infrastructure costs accounted for through Access to Southampton package	HCC with PUSH, Southampton CC & HA HCC (through RFA & LTP), Developer	Early Years (subject to delivery of Windhover P&R)

Measure	Estimated Cost	Lead / Funding Source	Time Scale
Investigate conversion to signals of roundabout access to Solent Business Park. Facilitates pedestrian / cycle access, allows bus priority and regulates traffic flow	*Capital* £500,000 - £800,000	HCC with HA / Developer	Ongoing
Commission a report to undertake a feasibility study for new station at Segensworth. Reliant on use of the Eastleigh Chord, positive demand forecasts and re-scheduling opportunities.	*Capital* £50,000	WCC with HCC & Network Rail / Developer	Ongoing
Invest			
Complete Whiteley Way		Developer / Developer	Commencement of Development
Introduce Bus priority measures on M27 Junction 9 roundabout and Segensworth Roundabout to facilitate new BRT service	*Capital* £1.0m - £1.5m	HCC & HA / Developer, HCC & HA	Early Years
Introduce High Occupancy Vehicle Lanes (HOV) on Jn 9 slip roads	*Capital* £500,000 - £1.5m depending on land take requirements	Highways Agency / Developer & HA	Early Years
Investigate potential for separate on/off slips on Jn 9 east-facing to provide direct access to Solent Business Park	*Capital* Study - £100,000 Works £5.0m+	Highways Agency / Study – Developer Works – HA	Ongoing

5.7.2 As before, the package of measures outlined in the table above could be delivered through a variety of funding streams, some in conjunction with private sector developers, transport operators or infrastructure owners.

5.7.3 The measures have been determined in response to the unique problems and opportunities presented by Whiteley. The measures proposed will require further detailed consideration and refinement in step with the evolution of site layouts as more detailed plans emerge. The measures identified are in addition to those to be delivered through the PUSH / TfSH Towards Delivery document and other initiatives promoted by Highways Agency and Network Rail.

5.7.4 Policy SS2 of the Core Strategy Preferred Options notes the need for 'provision of a sustainable transport system to maximise its efficiency and investment in new / improved infrastructure to meet the needs of the new development.' The measures outlined in the above table will all be required to fully achieve the policy objectives of SS2. Development is not necessarily contingent upon all schemes being delivered. However, we believe delivery of the above package is the most appropriate strategy to mitigate impacts of development and move towards the mode shift targets assumed in the Do Maximum scenario. The main influence on mode shift is through the Reduce and Manage initiatives. Impact on Strategic Road Network.

5.7.5 The main constraint on access to Whiteley is, and will continue to be, the ability of M27 Jn 9 to accommodate the high traffic flows generated by Whiteley and Segensworth. Development at North Whiteley offers an opportunity for some relief at Junction 9 but this may be discounted by trips diverted from M27 through a Whiteley Way particularly if Botley Bypass is completed. Although this is undesirable, it is difficult to conceive how these movements may be managed effectively (by for example restricting access along Whiteley Way to certain vehicles) without also compromising legitimate movements between residential and employment zones and increasing impacts at Jn 9. Our analysis has not sought to predict the number of diverted trips created through Whiteley Way completion.

5.7.6 The Base scenario shows an additional 1657 trips departing Whiteley in the AM Peak, 1530 of which are seeking access to the M27 or to Segensworth through junction 9. This reduces to 1315 and 1137 in the Do Something and Do Maximum scenarios respectively.

5.7.7 The base scenario adds 636 car trips to/from the east of Junction 9 via the M27, and 488 car trips to/from the west of Junction 9. Although the impact on motorway links merits consideration, the ability of Jn 9 to accommodate 1200 additional AM trips (best case) is of more serious concern. As identified in the mitigation strategy, significant measures are required to provide and lock-in additional highway capacity and provide priority for high quality bus services.

Figure 5.1 Base AM Peak Flows M27 Jn 8 & Jn 9

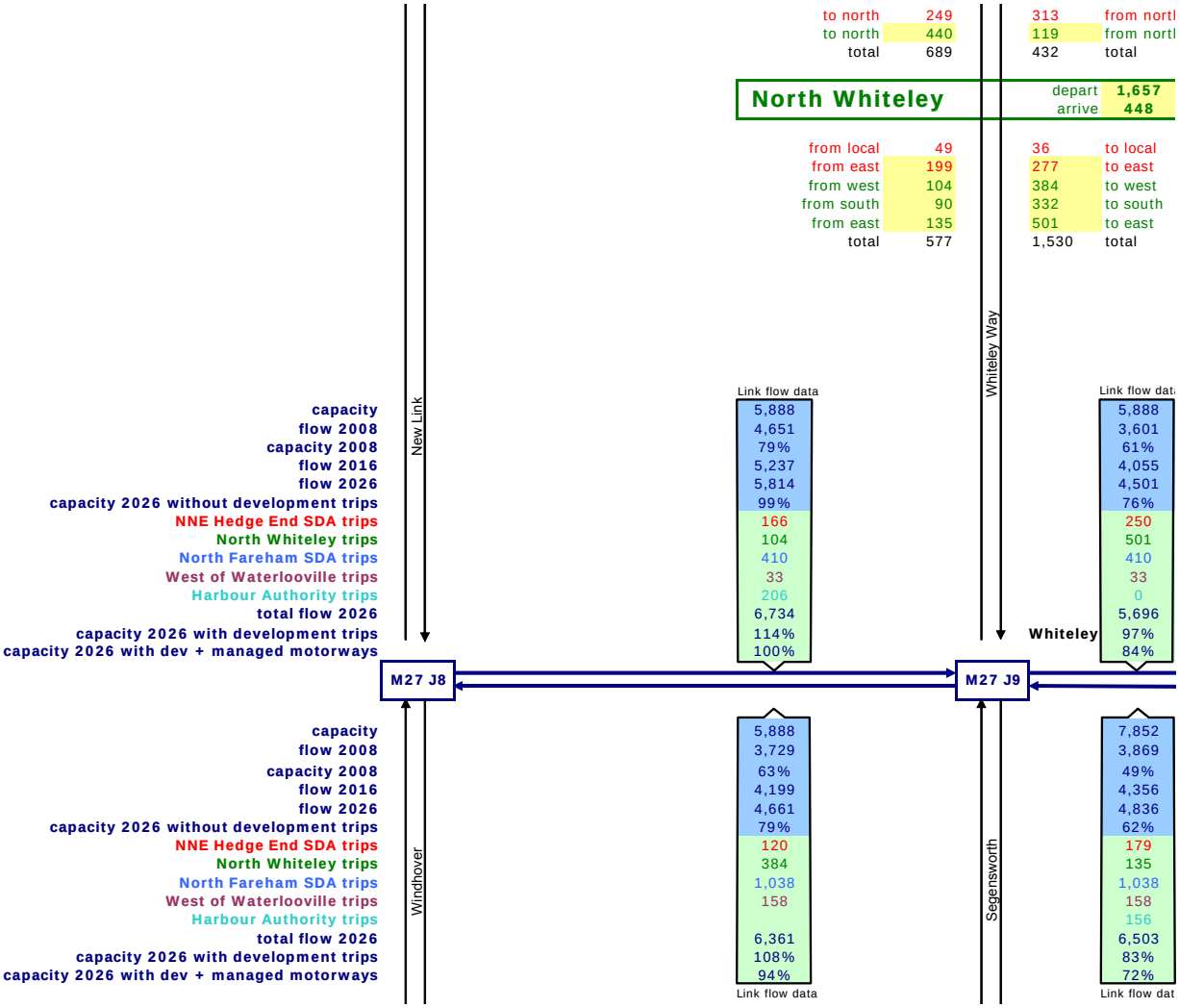


Figure 5.2 Do Something AM Peak Flows M27 Jn 8 & 9

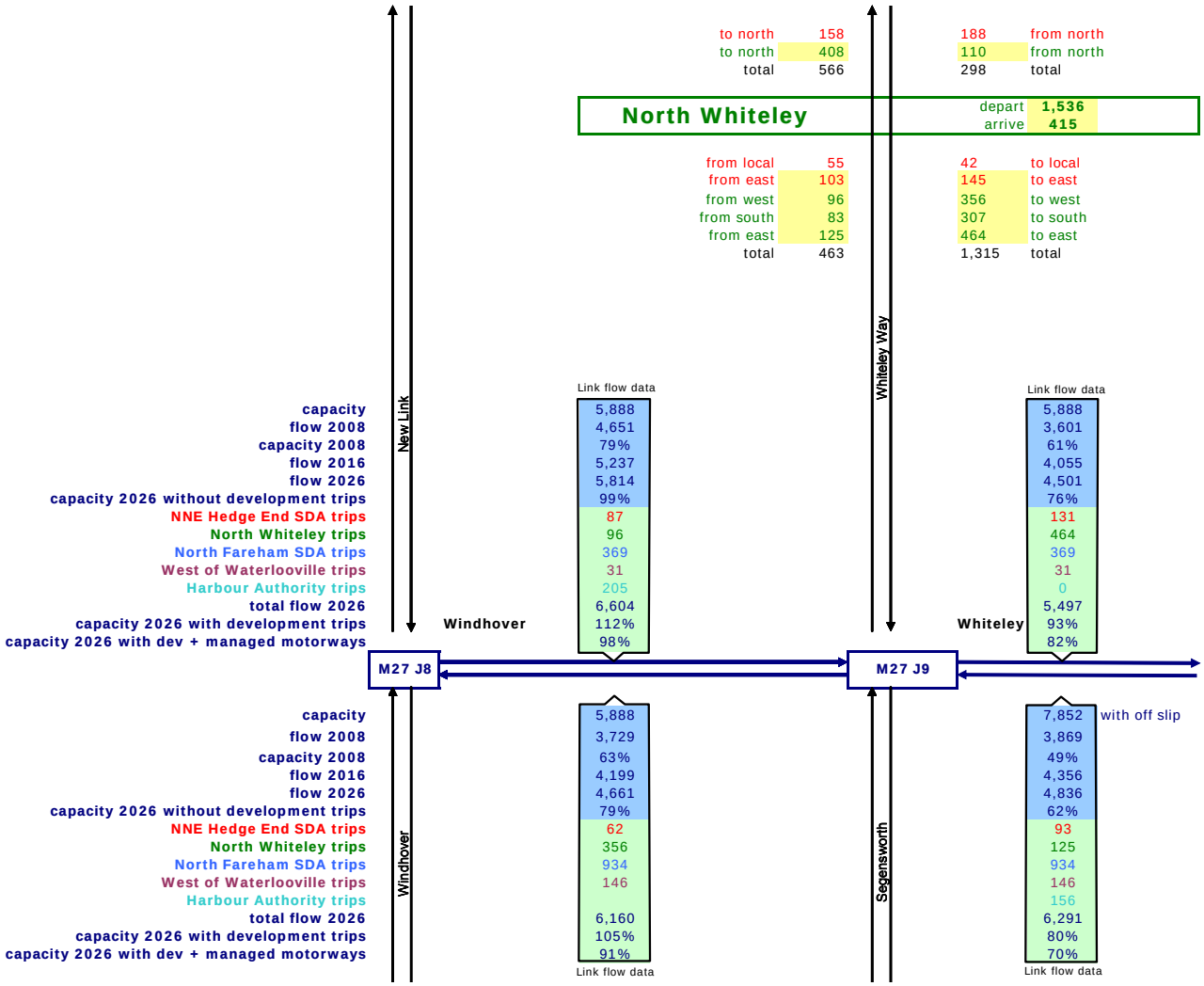
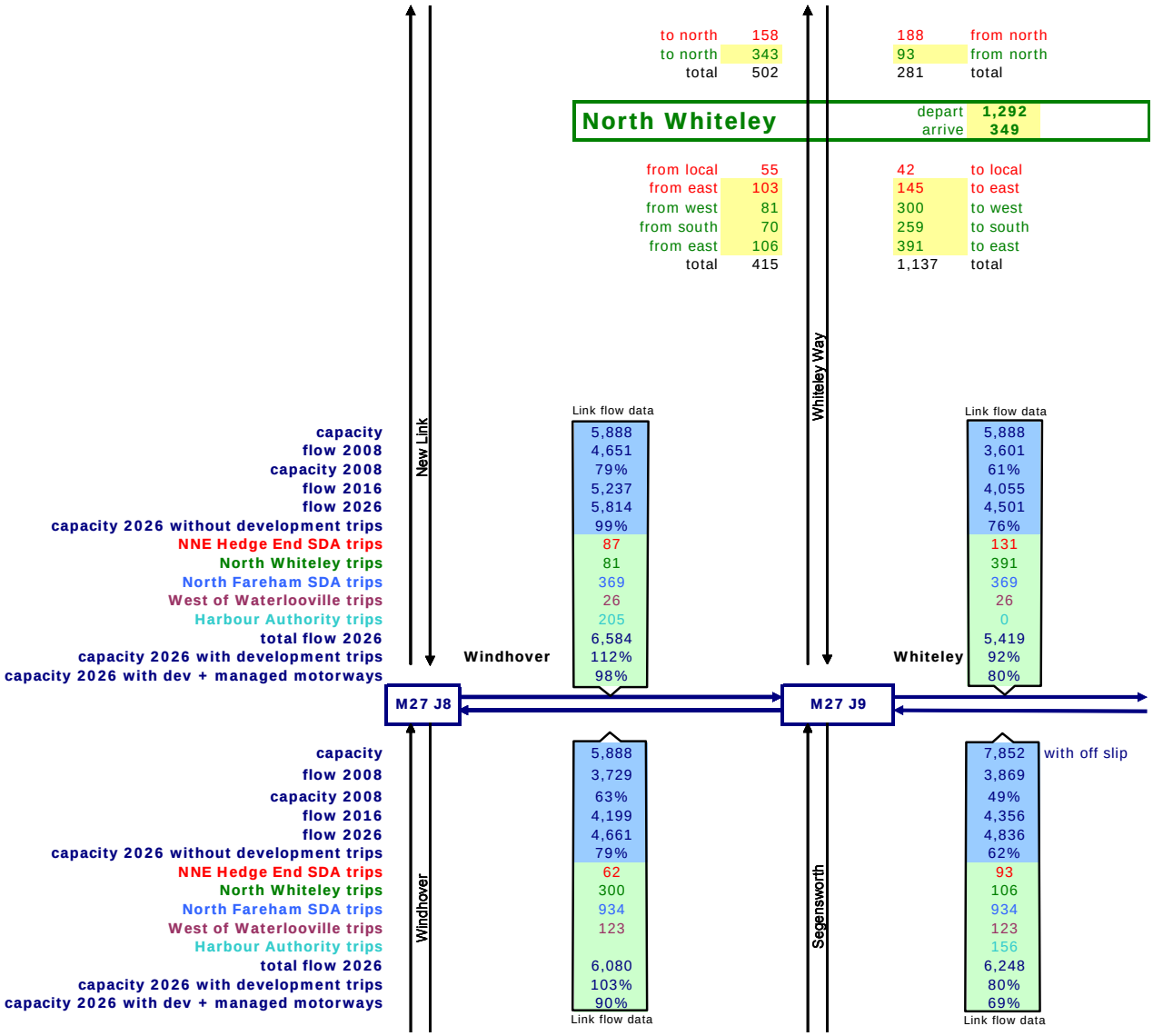


Figure 5.3 Do Maximum AM Peak Flows M27 Jn 8 & 9



6 West of Waterlooville

6.1 Context of the Major Development Area

6.1.1 West of Waterlooville is one of four locations selected through the Winchester LDF process and was previously identified in the County Structure Plan on the basis that is was well related to a major centre with a strong public transport connection between. West of Waterlooville MDA is closely related to Waterlooville with its range of local facilities and also to Portsmouth as a sub-regional centre. The A3 corridor connecting the two developed over a number of years for the same reason and it is appropriate to add to the MDA to take advantage of the employment, retail, education, health and leisure opportunities available. The majority of the 3,000 dwellings in the overall West of Waterlooville MDA fall outside of the Winchester District, with only 1,000 dwellings comprising the extension to the development with the LDF process directly.

6.1.2 Making the development successful in transport terms requires maximising the potential for sustainable modes. Much of the planned development is within walking and cycling distance of Waterlooville and surrounding communities although an extended site may have fewer opportunities due to its size and relative distance. The core bus service in the A3/A2047 corridor between Horndean, Waterlooville, Cosham and Portsmouth is marketed as 'Zip' and has been upgraded with a major investment in priority measures in the Hampshire part of the route. The 'Zip' corridor bus service is not due to run through the extended development areas in order to preserve its role as a direct and rapid service towards Portsmouth, but does run adjacent to a section of the eastern edge of the development. There is clearly a trade off between providing more immediate access to the service for residents within the development, against the need to maintain the routes' appeal amongst existing users. A more detailed assessment of the site layout and routing options would need to be undertaken to form a more definitive view over this issue, but there is a risk of locking out an opportunity to provide a more comprehensive access to quality bus provision by not committing the necessary infrastructure during the detailed planning phase.

6.1.3 The absence of a rail link to principal employment sites beyond Waterlooville itself, namely Portsmouth, Fareham and Southampton increases the likelihood that the development will be largely car dependent. The provision of substantive local employment within the extended MDA must be accompanied by comprehensive bus connections to combat this outcome and provide viable alternatives to the car, where there are fewer opportunities to walk and cycle and where new housing will be within easy reach of the A3/A3(M) and M27 corridors.

6.2 Potential Impacts

6.2.1 As only a portion of the overall West of Waterlooville development quantum lies within the Winchester District explicitly, and the remainder straddles the Winchester and Havant Districts, we have shown separate tables to quantify the impact of the Winchester District development specifically, followed by an assessment of the overall development site.

6.2.2 Table 6.1 shows the expected impacts of the 1,000 dwelling extension to the already consented MDA. Major employment is located within the neighbouring MDA, as well as the QA Hospital in Cosham (expected to reach 7,000 jobs) with IBM and other prospective employers at North Harbour being another major commuter attractor in the area.

Portsmouth city centre and other centres including Havant and Waterlooville provide further employment opportunities and planned expansion of Port Solent will create further jobs. Hence it is important that public transport services connect the site with employment and other centres to avoid traffic congestion and unsustainable travel behaviour.

6.2.3 For connections to rail, a bus link is currently in place between Waterlooville and Petersfield on the London Waterloo to Portsmouth main line. To the south, Cosham station provides access to services to Havant and beyond, Portsmouth, Fareham, Southampton and beyond and Eastleigh and beyond. Public transport links from Cosham to the site could help to reduce car use and congestion.

6.2.4 Car traffic will be generated in all directions. To the north, the reliability of journeys using A3 corridor will be improved with the completed Hindhead Tunnel scheme. To the south, the A3 via Cosham, and the A3(M) via the B2150, provide direct access to the M27 and A27 and into Portsmouth city centre; parking constraints in the city and at major employment centres in Cosham would help deter car use. To the west, the main route is the M27 from Junction 12 although there are likely to be some journeys on the secondary routes such as the B2177 through Wickham and the B2150 through Denmead to avoid using the motorway.

Table 6.1 West of Waterlooville (1000 dwellings) Base Trip Generation by Mode

West of Waterlooville REVISED EXTERNAL	AM			PM			DAY		
	depart	arrive	total	depart	arrive	total	depart	arrive	total
Work at home	-	-	0	-	-	0	-	-	0
Train	18	4	22	7	11	18	86	76	162
Bus/minibus	26	6	32	9	16	26	121	108	229
Taxi/minicab	2	0	2	1	1	2	9	8	16
Car driver	430	91	521	155	267	421	1,998	1,777	3,774
Car passgr	40	8	48	14	25	39	185	164	349
Cycle	12	3	14	4	7	12	56	49	105
Walk	82	17	100	30	51	81	383	341	724
Total	611	129	740	220	379	599	2,837	2,523	**5,360**

West of Waterlooville REVISED INTERNAL	AM			PM			DAY		
	depart	arrive	total	depart	arrive	total	depart	arrive	total
Work at home	-	-	101	-	-	82	-	-	732
Bus/minibus	2	0	3	1	1	2	10	9	20
Car driver	83	18	101	30	52	82	387	344	730
Car passgr	3	1	4	1	2	3	16	14	30
Cycle	4	1	5	1	2	4	18	16	35
Walk	27	6	33	10	17	27	127	113	240
Total	120	25	247	43	75	200	558	497	**1,787**

West of Waterlooville EXTERNAL+INTERNAL	AM			PM			DAY		
	depart	arrive	total	depart	arrive	total	depart	arrive	total
Work at home	-	-	101	-	-	82	-	-	732
Train	18	4	22	7	11	18	86	76	162
Bus/minibus	28	6	34	10	18	28	132	117	249
Taxi/minicab	2	0	2	1	1	2	9	8	16
Car driver	513	108	621	185	318	503	2,384	2,120	4,505
Car passgr	43	9	52	16	27	42	201	178	379
Cycle	16	3	19	6	10	16	74	66	140
Walk	110	23	133	40	68	108	510	454	964
Total	731	154	986	263	453	798	3,396	3,020	**7,147**

Table 6.2 West of Waterlooville (1000 dwellings) Base Assignment

Base Assignment		AM			PM			DAY	
EXTERNAL TRIPS	depart	arrive	total	depart	arrive	total	depart	arrive	total
Work at home	-	-	**0**	-	-	**0**	-	-	**0**
Train									
to/from North	1	0	1	0	0	1	3	3	5
to/from East	2	0	2	1	1	2	9	8	16
to/from South	16	3	19	6	10	16	74	66	140
to/from West	0	0	0	0	0	0	0	0	0
	18	**4**	**22**	**7**	**11**	**18**	**86**	**76**	**162**
Bus/minibus									
to/from North	5	1	6	2	3	5	23	20	43
to/from East	6	1	8	2	4	6	30	26	56
to/from South	5	1	6	2	3	5	25	22	47
to/from West	9	2	11	3	6	9	44	39	83
	26	**6**	**32**	**9**	**16**	**26**	**121**	**108**	**230**
Taxi/minicab									
local	**2**	**0**	**2**	**1**	**1**	**2**	**9**	**8**	**16**
Car driver									
to/from North	69	14	83	25	43	67	319	283	602
to/from East	80	17	96	29	49	78	370	329	698
to/from South	107	23	129	38	66	105	496	441	937
to/from West	175	37	212	63	109	172	814	724	1,537
	430	**91**	**521**	**155**	**267**	**422**	**1,998**	**1,777**	**3,775**
Car passgr									
to/from North	6	1	8	2	4	6	29	26	56
to/from East	7	2	9	3	5	7	34	30	65
to/from South	10	2	12	4	6	10	46	41	87
to/from West	16	3	20	6	10	16	75	67	142
	40	**8**	**48**	**14**	**25**	**39**	**185**	**164**	**349**
Cycle	**12**	**3**	**14**	**4**	**7**	**12**	**56**	**49**	**105**
Walk	**83**	**17**	**100**	**30**	**51**	**81**	**383**	**341**	**724**
Total	**611**	**129**	**740**	**220**	**379**	**599**	**2,838**	**2,524**	**5,362**

6.2.5 Based on Census data we have estimated that internal trips account for up to 25% of all peak trips generated by the development. Internalisation in this case means containment within the wider West of Waterlooville MDA where a significant employment mix is already present.

6.2.6 Up to 3,775 new car trips are forecast onto the external road network (daily) as a result of development, and a very low proportion (4%) of bus trips forecast. Greater accessibility of 'Zip' services is required to reprioritise travel patterns. This can be achieved through creation of good quality walking links and re-routing some 'Zip' services through the development extension.

6.2.7 Table 6.3 on the following page shows the expected impacts that the overall development site, including the consented 2,000 houses as well as the proposed 1,000 houses within the Winchester District, will generate in terms of trips by mode.

6.2.8 As in Table 6.1, we have assumed an internalisation of 25% of all peak trips, on the basis that significant employment is located within the neighbouring MDA. We have also assumed the same distribution profiles across the various local centres as detailed above, with the only difference being the greater number of trips given the overall development includes 3,000 dwellings as opposed to the 1,000 proposed in the Winchester Core Strategy.

Table 6.3 West of Waterlooville (3000 dwellings) Base Trip Generation by Mode

West of Waterlooville		AM			PM			DAY	
REVISED EXTERNAL	depart	arrive	total	depart	arrive	total	depart	arrive	total
Work at home	-	-	0	-	-	0	-	-	0
Train	55	12	67	20	34	54	257	229	486
Bus/minibus	78	17	95	28	49	77	364	324	688
Taxi/minicab	6	1	7	2	3	5	26	23	49
Car driver	1,290	272	1,562	464	800	1,264	5,993	5,330	11,323
Car passgr	119	25	145	43	74	117	554	493	1,047
Cycle	36	8	43	13	22	35	167	148	315
Walk	247	52	300	89	154	243	1,150	1,023	2,173
Total	1,832	387	2,219	659	1,136	1,796	8,512	7,569	**16,081**

West of Waterlooville		AM			PM			DAY	
REVISED INTERNAL	depart	arrive	total	depart	arrive	total	depart	arrive	total
Work at home	-	-	303	-	-	245	-	-	2,196
Bus/minibus	7	1	8	2	4	7	31	28	59
Car driver	249	53	302	90	155	245	1,160	1,031	2,191
Car passgr	10	2	12	4	6	10	48	42	90
Cycle	12	3	14	4	7	12	55	49	104
Walk	82	17	99	30	51	80	381	339	721
Total	360	76	740	130	224	599	1,675	1,490	**5,360**

West of Waterlooville		AM			PM			DAY	
EXTERNAL+INTERNAL	depart	arrive	total	depart	arrive	total	depart	arrive	total
Work at home	-	-	303	-	-	245	-	-	2,196
Train	55	12	67	20	34	54	257	229	486
Bus/minibus	85	18	103	31	53	83	396	352	748
Taxi/minicab	6	1	7	2	3	5	26	23	49
Car driver	1,539	325	1,864	554	955	1,509	7,153	6,361	13,514
Car passgr	130	27	157	47	80	127	602	535	1,137
Cycle	48	10	58	17	30	47	222	197	419
Walk	330	70	399	119	204	323	1,531	1,362	2,893
Total	2,192	463	2,958	789	1,360	2,394	10,187	9,059	**21,441**

Table 6.4 West of Waterlooville Base Assignment – 3000 dwellings

Base Assignment		AM			PM			DAY	
EXTERNAL TRIPS	depart	arrive	total	depart	arrive	total	depart	arrive	total
Work at home	-	-	**0**	-	-	**0**	-	-	**0**
Train									
to/from North	2	0	2	1	1	2	9	8	16
to/from East	6	1	7	2	3	6	26	23	49
to/from South	48	10	58	17	30	47	222	198	420
to/from West	0	0	0	0	0	0	0	0	0
	55	**12**	**67**	**20**	**34**	**54**	**257**	**229**	**486**
Bus/minibus									
to/from North	15	3	18	5	9	15	69	61	130
to/from East	19	4	23	7	12	19	89	79	169
to/from South	16	3	19	6	10	16	75	66	141
to/from West	28	6	34	10	18	28	132	117	249
	78	**17**	**95**	**28**	**49**	**77**	**364**	**324**	**689**
Taxi/minicab									
local	**6**	**1**	**7**	**2**	**3**	**5**	**26**	**23**	**49**
Car driver									
to/from North	206	43	249	74	128	202	956	850	1,806
to/from East	239	50	289	86	148	234	1,109	986	2,095
to/from South	320	68	388	115	199	314	1,488	1,324	2,812
to/from West	525	111	636	189	326	515	2,441	2,171	4,612
	1,290	**273**	**1,562**	**464**	**800**	**1,265**	**5,995**	**5,331**	**11,326**
Car passgr									
to/from North	19	4	23	7	12	19	88	79	167
to/from East	22	5	27	8	14	22	103	91	194
to/from South	30	6	36	11	18	29	138	122	260
to/from West	49	10	59	17	30	48	226	201	427
	119	**25**	**145**	**43**	**74**	**117**	**555**	**493**	**1,048**
Cycle	**36**	**8**	**43**	**13**	**22**	**35**	**167**	**148**	**315**
Walk	**248**	**52**	**300**	**89**	**154**	**243**	**1,150**	**1,023**	**2,173**
Total	**1,832**	**387**	**2,219**	**659**	**1,137**	**1,796**	**8,514**	**7,571**	**16,085**

6.2.9 Table 6.4 on the previous page reports our estimates for the distribution of trips generated by the overall West of Waterlooville development. As with Table 6.2 these were determined based on Census data.

6.2.10 Up to 1562 additional car trips are forecast onto the external road network in the AM Peak as a consequence of the development as a result of 3000 dwellings. The mitigation strategy has already been established and agreed for 2000 consented dwellings.

6.3 Impacts of Smarter Travel

6.3.1 This section takes forwards the impacts determined for the overall West of Waterlooville development (3000 dwellings) and considers the application of a package of Smarter Travel measures.

6.3.2 The Zip services provide an ideal opportunity to have a positive impact on travel impacts and it is important to the success of this development that every opportunity is taken to embed and augment existing services into the new housing areas.

6.3.3 Being a residential based extension to an existing (albeit new) development area, it bears some similarity to Whiteley and will therefore respond most positively to Personalised Travel Planning measures to promote change. However, unlike Whiteley, current congestion problems are not acute and the development does not unlock significant new infrastructure in its own right. The opportunity for change, particularly amongst existing residents, is more limited. To invoke maximum change, Zip services should ideally be routed to include the new development area, recognising the trade off between providing convenient access and fast journey times through direct routes.

6.3.4 We have assumed that the interventions described above will reduce car use by corresponding increases in Work at Home (20% of reduced car trips), bus use (40%), walk, cycle and rail use (40% split evenly). Adjustments have been made to the distribution profile to account for distance anomalies, such that transferred walking and cycling trips and limited to 2km and 5km respectively and transferred rail trips are only applicable to zones where rail travel is possible. The relative proximity of employment areas and retail facilities adjacent to development and in Waterlooville Town Centre provide some comfort that increases in walking and cycling trips will be realised provided that adequate infrastructure is put in place. Rail trips have been assumed to be centred at Havant station.

6.3.5 Tables 6.5 and 6.6 show revised assignment based on Do Something and Do Maximum scenarios.

6.3.6 To support the Do Maximum scenario, high quality infrastructure for pedestrians and cyclists will be needed, linked with networks beyond the site. It is assumed that bus services will permeate the site to provide the basic links to retail and other facilities and that the 'Zip' service will provide the focus for trips in the Waterlooville to Portsmouth corridor, particularly for journeys to work.

Table 6.5 West of Waterlooville Assignment – Do Something

Revised Assignment (10%)	AM			PM			DAY		
EXTERNAL TRIPS	depart	arrive	total	depart	arrive	total	depart	arrive	total
Work at home	-	-	**0**	-	-	**0**	-	-	**0**
Train									
to/from North	5	1	6	2	3	5	23	20	43
to/from East	9	2	11	3	6	9	42	38	80
to/from South	53	11	64	19	33	52	245	217	462
to/from West	0	0	0	0	0	0	0	0	0
	67	**14**	**81**	**24**	**41**	**65**	**309**	**275**	**585**
Bus/minibus									
to/from North	24	5	29	9	15	23	111	99	210
to/from East	30	6	36	11	18	29	138	123	261
to/from South	30	6	36	11	19	30	140	124	264
to/from West	51	11	62	18	32	50	239	212	451
	135	**29**	**164**	**49**	**84**	**132**	**627**	**558**	**1,185**
Taxi/minicab									
local	6	1	7	2	3	5	26	23	49
Car driver									
to/from North	191	40	231	69	118	187	886	788	1,673
to/from East	221	47	268	80	137	217	1,028	914	1,942
to/from South	297	63	359	107	184	291	1,379	1,226	2,606
to/from West	487	103	590	175	302	477	2,262	2,012	4,274
	1,195	**253**	**1,448**	**430**	**742**	**1,172**	**5,555**	**4,940**	**10,495**
Car passgr									
to/from North	18	4	21	6	11	17	82	73	155
to/from East	20	4	25	7	13	20	95	85	180
to/from South	27	6	33	10	17	27	128	113	241
to/from West	45	10	55	16	28	44	209	186	395
	111	**23**	**134**	**40**	**69**	**108**	**514**	**457**	**971**
Cycle	39	8	48	14	24	39	183	163	346
Walk	251	53	304	90	156	246	1,168	1,039	2,207
Total	**1,804**	**381**	**2,185**	**649**	**1,119**	**1,768**	**8,383**	**7,454**	**15,837**

Table 6.6 West of Waterlooville Assignment – Do Maximum

Revised Assignment (30%)	AM			PM			DAY		
EXTERNAL TRIPS	depart	arrive	total	depart	arrive	total	depart	arrive	total
Work at home	-	-	**0**	-	-	**0**	-	-	**0**
Train									
to/from North	11	2	13	4	7	10	49	43	92
to/from East	16	3	19	6	10	15	72	64	137
to/from South	60	13	73	22	37	59	279	248	526
to/from West	22	5	27	8	14	22	103	92	195
	108	**23**	**131**	**39**	**67**	**106**	**503**	**447**	**950**
Bus/minibus									
to/from North	41	9	49	15	25	40	188	167	356
to/from East	49	10	59	18	30	48	227	202	429
to/from South	56	12	68	20	35	55	261	232	494
to/from West	94	20	114	34	58	92	438	389	827
	240	**51**	**290**	**86**	**149**	**235**	**1,115**	**991**	**2,106**
Taxi/minicab									
local	5	1	7	2	3	5	25	22	47
Car driver									
to/from North	160	34	194	58	100	157	746	663	1,409
to/from East	186	39	225	67	115	182	865	769	1,634
to/from South	250	53	303	90	155	245	1,161	1,032	2,193
to/from West	410	87	496	147	254	402	1,904	1,693	3,598
	1,006	**213**	**1,219**	**362**	**624**	**986**	**4,676**	**4,158**	**8,834**
Car passgr									
to/from North	15	3	18	5	9	15	69	61	130
to/from East	17	4	21	6	11	17	80	71	151
to/from South	23	5	28	8	14	23	107	96	203
to/from West	38	8	46	14	24	37	176	157	333
	93	**20**	**113**	**34**	**58**	**91**	**433**	**385**	**817**
Cycle	45	9	54	16	28	44	208	185	394
Walk	250	53	303	90	155	245	1,161	1,033	2,194
Total	**1,747**	**369**	**2,117**	**629**	**1,084**	**1,713**	**8,121**	**7,221**	**15,342**

6.4 Mitigation Measures

6.4.1 Planning consent has been granted for 2000 dwellings and associated employment at West of Waterlooville. Legal agreements are already in place to secure a range of transport mitigation measures, including:

- Bus service subsidy - £1.5m staged payments
- Highways Contribution - £1.7m staged payments
- Junction Improvements - £1.15m staged payments
- School Travel Plan - £15,000 prior to occupation

6.4.2 In addition, the developers are obliged to deliver a range of off-site transport works, including construction of new accesses, pedestrian and cycle routes to schools including 3 new Toucan crossings, bus only links and bus priority measures within and adjoining the development area, highway improvements to A3(M) junction 3 and other strategic junctions as well as delivery of Residential and Workplace Travel Plans.

6.4.3 Given this context, mitigating the impact of an additional 1,000 dwellings would best be achieved through augmentation of the schemes planned under the current legal agreements. These have not yet been delivered, and will take several years to be implemented and a further period for their effectiveness to be assessed.

6.4.4 The mitigation strategy outlined here therefore seeks to build on current proposals and strengthen their effectiveness. It will be important for Winchester and Havant District Councils to work cooperatively and effectively to ensure that cross boundary mitigating measures are delivered.

6.4.5 A similar approach to that taken by TfSH / PUSH has been adopted with measures being identified under Reduce, Manage and Invest headings. Initial indications are given on possible phasing in relation to development. As timescale for delivery is unclear, phasing is described in relation to delivery of development as Commencement of Development (of the 1000 dwelling extension), Early Years (within 2-4 years of development commencing) and Ongoing (beyond 4 years of commencement and / or when need is proven). Indicative costs are based on known scheme costs from elsewhere and further design work will be necessary to confirm estimates prior to schemes being submitted for funding approval. An appropriate lead agency for delivery is also indicated, although it is likely partnership working will be necessary for almost all schemes. Potential funding sources are identified in Chapter 2.

Table 6.7 West of Waterlooville Mitigation Measures

Measure	Indicative Cost	Lead / Funding Source	Time Scale
Reduce			
Personalised Travel Planning for West of Waterlooville	*Capital* £250,000 - £300,000	WCC / Havant BC & HCC	Commencement of Development

community		Developer & HCC (LTP)	
PTP for wider Waterlooville community	*Capital* £500,000	WCC, HBC, HCC Developer & HCC (LTP)	Ongoing
Further contributions to Workplace, Residential and School Travel Plans as appropriate	*Revenue* £100,000	HCC, WCC, HBC Developer	Early Years
Manage			
Revise BRT route to serve the extended MDA	*Capital* £100,000 - £400,000 depending on routing and service viability	HCC in partnership with WCC and operator Developer	Early Years
Invest			
None identified – to be reviewed once effectiveness of current proposals is assessed			Ongoing

6.4.6 As before, the package of measures outlined in the table above could be delivered through a variety of funding streams, some in conjunction with private sector developers, transport operators or infrastructure owners.

6.4.7 Policy SS2 of the Core Strategy Preferred Options notes the need for 'provision of a sustainable transport system to maximise its efficiency and investment in new / improved infrastructure to meet the needs of the new development.' The measures outlined in the above table will all be required to fully achieve the policy objectives of SS2. Development is not necessarily contingent upon all schemes being delivered. However, we believe delivery of the above package is the most appropriate strategy to mitigate impacts of development and move towards the mode shift targets assumed in the Do Maximum scenario. The main influence on mode shift is through the Reduce and Manage initiatives.

6.5 Impact on Strategic Road Network

6.5.1 The additional proposed development at West of Waterlooville results in additional demand on the A3(M) corridor, with a dispersion of some southbound trips onto the A3 via Cosham as a more direct route into Portsmouth.

6.5.2 Portsmouth is the primary destination for many of these trips, but the proposed employment at Fareham SDA may divert some trips, leading to longer trips on the SRN. Compared to western sections of the M27 and M3 south, this part of the A3(M) is relatively uncongested although the A27 corridor through Portsmouth experiences some peak period congestion. Accommodating the impacts of development on the SRN is therefore less problematic than elsewhere, but it should be noted that links are forecast to be operating above their theoretical capacity by 2026 taking account of all development trips and background growth. Improvements to the A3(M) Waterlooville junction are programmed under the existing planning consent.

6.5.3 The diagrams below show SRN impacts for Base case, Do Something and Do Maximum scenarios.

Figure 6.1 West of Waterlooville Base AM Flows A3(M) / A27 / M27

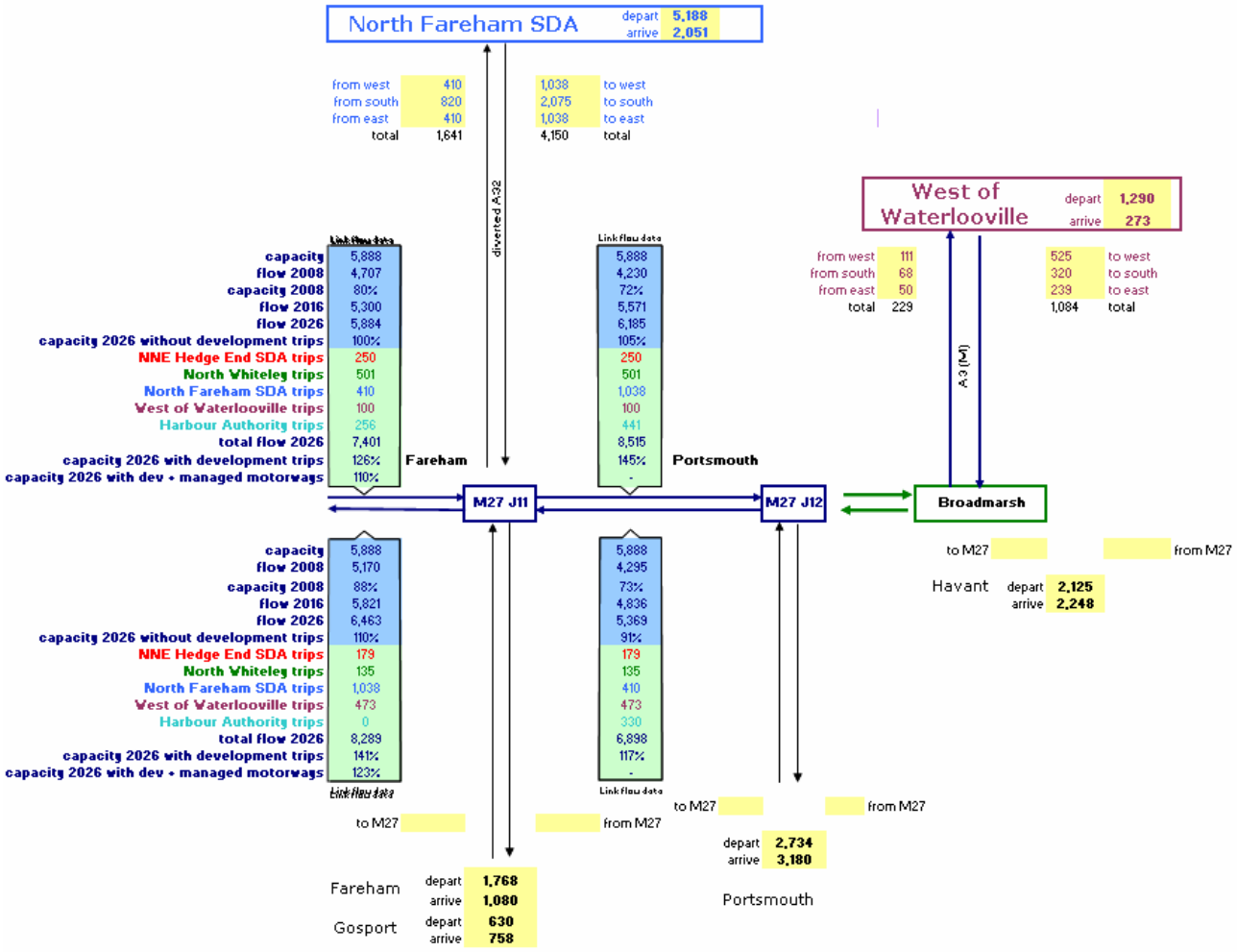


Figure 6.2 West of Waterlooville Do Something AM Flows A3(M) / A27 / M27

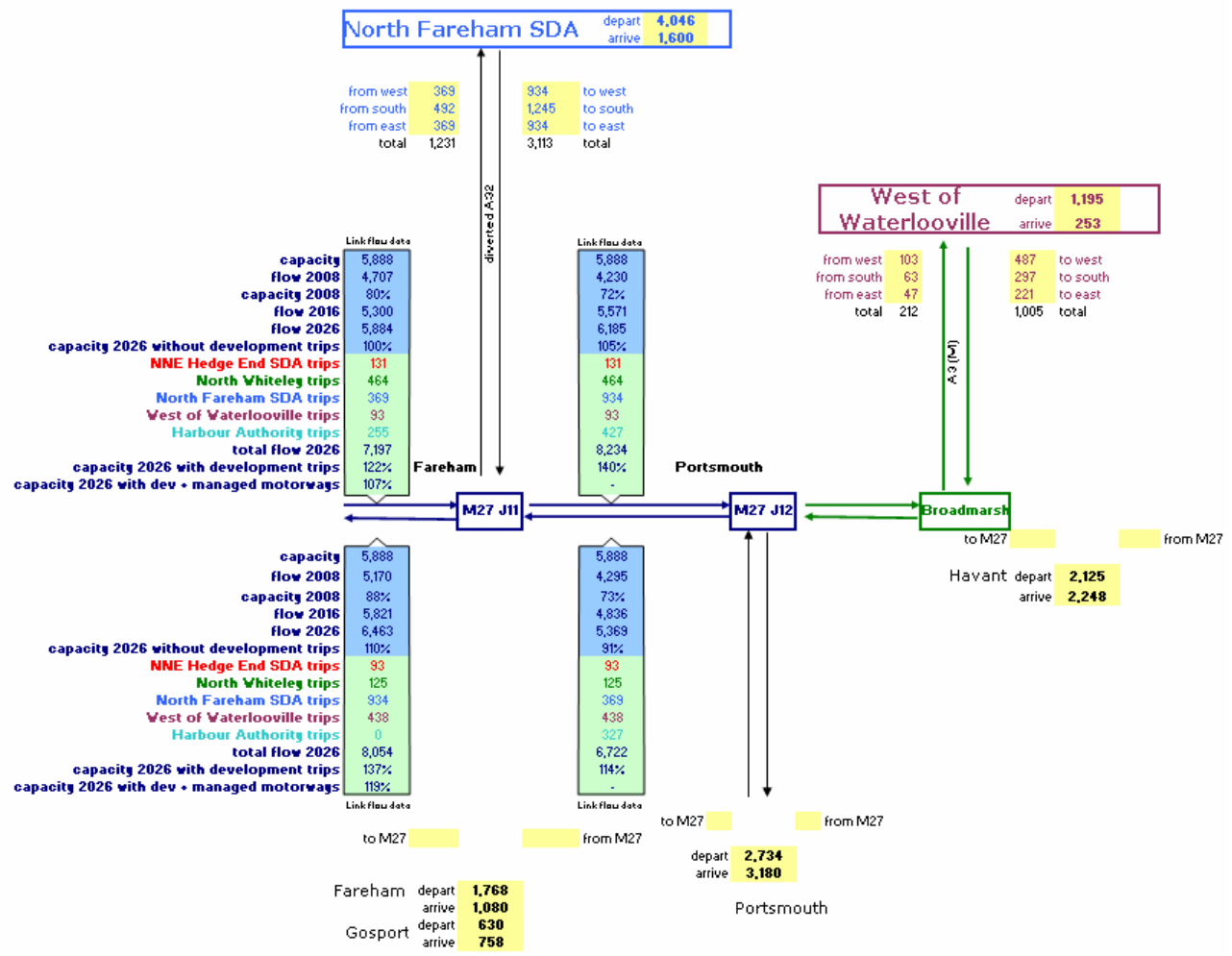
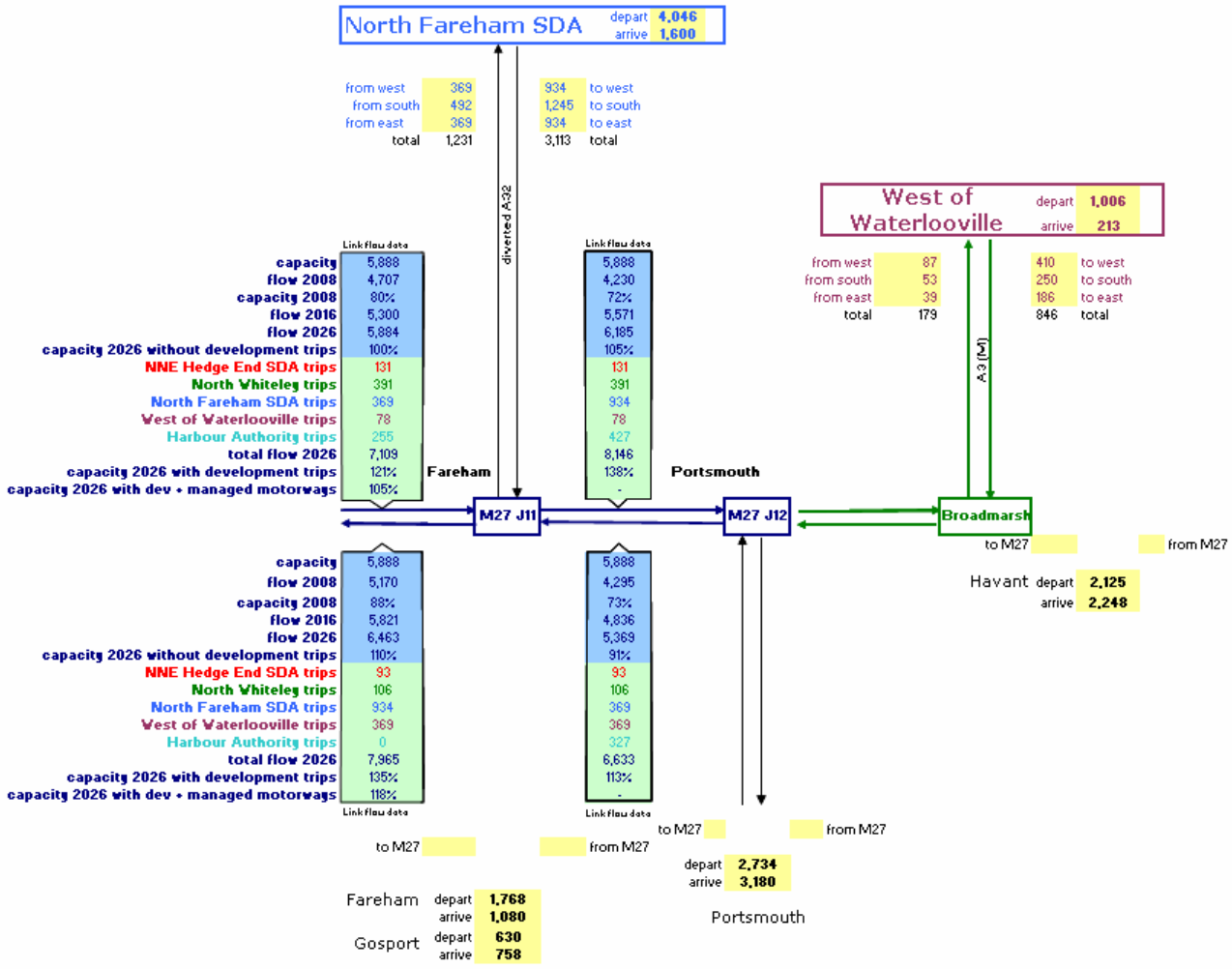


Figure 6.3 West of Waterlooville Do Maximum AM Flows A3(M) / A27 / M27



7 Combined Impacts of Proposed Development Sites

7.1 Implications and Phasing of Combined Sites

7.1.1 To achieve the scale of development required, a number of sites will need to be promoted at the same time. The larger sites will take many years to plan and build out and the programme for this will need to be determined so that the transport implications at various stages can be determined. The remedial measures required will need to be in place from the initial occupancies so that travel patterns can be promoted with alternatives to car use being available from the outset. This may require some creativity in terms of funding and delivery but is important to achieve the reductions in car traffic that are essential to make the sites and the surrounding road networks operate efficiently.

7.1.2 For the sites in and around Winchester, the main impacts will be on the city's road network and measures such as further parking constraints can be introduced at an appropriate time. For the bus network, procuring vehicles and providing suitable infrastructure at stops will require around two to three years' lead time. Walking and cycling routes need to be identifiable off-site to be integrated with the on-site networks as development takes place. The trunk road network will also be affected but it is unlikely that major infrastructure changes will be approved and programmed unless significant funding sources are secured in addition to those generated by the development sites.

7.1.3 In the PUSH part of the District, several sites are expected to be taken forward simultaneously although the larger sites will take several years to complete. The combined impacts of sites at North Whiteley, North/North East Hedge End SDA and North Fareham SDA will need to be determined. For the larger schemes associated with these sites – an extended Whiteley Way, Botley Bypass and a diverted A32 together with extensive bus priority measures on the A27 and elsewhere – suitable lead times need to be determined and the commitment of relevant operators and agencies secured.

7.2 Combinations Considered

7.2.1 To take an overall view of the traffic impacts of several sites in combination, we have considered the M3 to the south of Winchester and the M27 corridor to include the following:

- Winchester Combination – Barton Farm & Bushfield Camp;
- North Whiteley Sites 1 and 2; and
- West of Waterlooville

7.2.2 From another recent study, we have taken trip generation figures for the North/North east Hedge End SDA (determined on a similar basis to those used here). Although we have not undertaken a detailed analysis of the impacts of the North Fareham SDA, we were involved in an initial assessment of the transport impacts and have undertaken a basic analysis for completeness here (with relevant mode share data for North Fareham ward) but without detailed assignment; this assumes that much of the SDA traffic will use a relocated A32 access to M27 Junction 11 for east, west and south directions. This has been used alongside data received from the Harbour Authorities LDF draft transport report.

7.2.3 We have not included any traffic generated from the SHSEZ site in the absence at this stage of any details of the site, the trips attributable to it any diversionary effects that may arise with relocated employment etc.

7.2.4 The main impacts of the West of Waterlooville site will be on the A3 corridor and with some effects experienced on the M27 corridor. Modest numbers of westbound trip towards Winchester are expected to use other routes. However, we have extended our analysis to include the southern part of the A3 corridor and A27 between Portsmouth and Broadmarsh.

7.3 Neighbouring Districts

7.3.1 The impact of development in neighbouring districts may bring additional transport impacts on the strategic network. However, the overall approach of neighbouring LDFs is one of containment to reduce the number and length of overall journeys. The urban centres within Winchester district, particularly Winchester itself, will however continue to be attractive for commuting and leisure journeys from elsewhere in south Hampshire and beyond. Our analysis has included data made available by the Harbour Authorities, which comprises of Portsmouth, Havant, Gosport and Fareham. Due to the format in which the data was received, the information has undergone considerable treatment and interpretation[18] in order to be comparable with the analysis undertaken for Winchester District. Information from Southampton and Eastleigh is yet to be supplied. Development in other, more rural districts, such as Test Valley and East Hampshire will not a have a significant impact on the core Strategic Motorway sections considered within this analysis, and so are seen to be incorporated within the wider NRTF growth estimates applied to the base year flows.

7.4 Market Towns and Rural Area

7.4.1 The development strategy outlined for the rural market towns of the Winchester District is based on a settlement hierarchy, with the aim of apportioning development quantum's on the basis of their existing scale and service provision, amongst other considerations. The most significant developments taking place at this level are in Bishops Waltham and New Alresford. Table 7.1 below summarises the more significant development levels and the number of dwellings apportioned to each town/parish. Levels 3 and 4 equate to limited or very small scale additions.

[18] The draft report and accompanying appendices provided were from a July 2008 draft report, and amongst the data reported was total AM and PM average trips by area plus a matrix of origins and destinations. Data was not assigned to specific routes, so we were unable to attribute the impacts of specific developments to particular junctions. We instead applied where available junction modelling outputs which demonstrated the increased flows into junctions by development area. But these limited us to demonstrating development trips on given links where we knew they were going to exit or enter from an upcoming junction - and so do not account for all trips from Harbour Authority sites.

Table 7.1 Market Towns and Rural Area Settlement Hierarchy

Scale	Locations	Dwellings per Settlement
Level 1	Bishops Waltham, New Alresford	About 500 and corresponding economic growth
Level 2	Colden Common, Denmead, Kings Worthy, Swanmore, Waltham Chase, Wickham	About 300 and corresponding economic growth

Source: Winchester Development Framework - Core Strategy

7.4.2 As the number of new dwellings and non-residential land uses to be developed and their specific development sites are yet to be determined, we have limited our investigation of the market town development assignments to a broader level written assessments of their possible impacts, and gone on to identify opportunities for mitigating their impacts. Given the scale of the developments their likely impacts on the strategic road network would be captured within the normal growth level assumptions of the NRTF factors applied in the background growth assumptions.

7.4.3 Bishops Waltham, Swanmore, Waltham Chase and Wickham form something of a cluster of small scale development sites that significantly lie to the north of Whiteley and the future North Fareham SDA. Consequently there may be greatly improved conditions for enabling a high frequency and quality bus service as a sufficient level of critical mass, in terms of passenger demand, is fostered. But the comparatively isolated nature of the area, the lack of immediate access to rail services and the likelihood of continued out commuting to Southampton, Eastleigh, Fareham and Whiteley will still engender high levels of car usage. The A32 links the cluster to the North Fareham site to the south, which will bring added pressures to the junction the A334 that may require some remodelling. The Botley bypass to the West will alleviate the current difficulties evidenced on that route, and so should benefit east-west trips to and from the cluster onto Eastleigh and the SHSEZ in particular.

7.4.4 Colden Common is situated on the B3354, a key route linking Botley, Fair Oak, Horton Heath Twyford and onto Junction 11 of the M3. The scale of development proposed at Colden Common is not substantial, and is unlikely to bring about any significant enhancements to bus connections into Eastleigh and Winchester, nor have any major problems on the local road network. Although in combination with the developments taking place at North Hedge End, North Whiteley, Bushfield Camp and Eastleigh Riverside, and critically the completion of the Whiteley Way link and Botley Bypass to the South, a new route is created. Considering the major new sources of employment and homes at either end, there is potential for substantial rat running along this route in future years, and as such it is likely measures will be needed to discourage this. Particular pinch points are likely to be at the junction with Hazeley Road in Twyford and Eastleigh Road in Fair Oak, and perhaps at the junction with Highbridge Road north of Colden Common.

7.4.5 New Alresford is an isolated village to the NorthWest of Winchester and SouthEast of Alton. Bus connections to these urban centres are unappealing to both operators and passengers, due to the lengthy journey times relative to car trips, and the lack of passenger demand on route. Although the rail link between New Alresford and Alton has been preserved as the

Watercress Line, previous efforts to develop it into a commuter service have been unsuccessful for a number of reasons, which look unlikely to change at present. A development quantum of the scale proposed would most likely be highly car dependent as are the existing residents. But the nearby A31 provides good connections both north and south and is known to have capacity available. A possible pinch point to the north may be as the route passes through the village of Four Marks prior to widening into dual carriage way. To the south, the trips would be likely to load onto the M3 via junction 10. Or into Winchester via the comparatively underused Alresford Road link.

7.4.6 Kings Worthy lies immediately to the North of Winchester, served by the A34 and A33 which provide links to the M3 at Junction 9. Worthy Road connects the village to Winchester via the busy City Road junction, or through Hyde Road and onto North Walls. Bus services into Winchester currently operate at 30 minute frequencies, but given the relative proximity of the Barton Farm site there may be opportunities to extend newly proposed routes up to Kings Worthy at given time intervals, with a view to delivering 20 minute frequencies. The potential for extending the proposed cycle route into Barton Farm further north along Nuns Walk and onto Kings Worthy should also be considered.

7.4.7 Denmead lies to the North West of Waterlooville, not far from the MDA site. The location is constrained by its lack of rail access and limited, bus services, although there is a bus link to Petersfield Station, and as such is car dependent. But the substantial development taking place at the West of Waterlooville MDA will provide greater localised employment opportunities, which may provide the demand for improved bus links, possibly based on the A3 corridor services. The spatial relationship between Denmead and the MDA will be highly conducive to a cycle link, particularly if a segregated route is established and promoted in sync with the developments to utilise the 'change opportunity'.

7.5 Combined Mitigation Measures

7.5.1 The following table summarises mitigation measures from each development by phase.

Table 7.2 Combined Mitigation Summary

Measure	Estimated Cost (£000)	Time Scale
Reduce		
Winchester Combined	*Capital* - 500– 1,000	Commencement of Development
	Capital - 400- 600	Early Years
	Revenue - 90 - 120	Ongoing
North Whiteley	*Capital* - 500 – 1,000	Commencement of Development
	Capital – 500-700	Early Years
	Revenue - 90 - 120	Ongoing

West of Waterlooville	*Capital* - 250 – 300	Commencement of Development
	Revenue - 100	Early Years
	Capital - 500	Ongoing
Manage		
Winchester Combined	*Capital* - 200	Commencement of Development
	Capital -60	Early Years
	Capital – 320	Ongoing
	Revenue – Enforcement costs	
North Whiteley	*Revenue* - 200	Commencement of Development
	Capital – 500	Early Years
	Revenue - 200	
	Capital - 550 – 850	Ongoing
West of Waterlooville	-	Commencement of Development
	Capital – 100 - 400	Early Years
	Capital - 500	Ongoing
Invest		
Winchester Combined	-	Commencement of Development
	Capital – 1,700 – 2,500	Early Years
	Capital – 600 - 950	Ongoing
North Whiteley	*Whiteley Way Developer Funding*	Commencement of Development
	Capital - 1,500 – 3,000	Early Years
	Capital - 5,100 +	Ongoing
West of Waterlooville	-	Commencement of Development
	-	Early Years
	To be reviewed against effectiveness of planned schemes	Ongoing

7.6 Overall Strategic Road Network Impacts

7.6.1 Figures 7.1 to 7.6 include the effects of remedial measures as set out in the relevant Chapters for AM peak and All Day flows. This shows that the impact on the motorways can be reduced but there will still be high levels of additional demand.

7.6.2 The figures suggest assumed traffic growth will be a major factor in worsening congestion, compounded by development site traffic. It some respects it is not clear how theoretical traffic growth can be accommodated as it is predicated on the assumptions that growth will continue to occur, even if traffic conditions will prompt some motorists to use other forms of travel or not travel at all. In view of climate change targets and reducing emissions, it may not be desirable or possible for traffic growth to occur on the scale predicted.

7.6.3 The impact of generated trips is less than that of traffic growth. However, the effect of remedial measures on journeys outside the development sites is relatively minor, even when applied strongly for the larger sites, given the high base flows. This emphasizes the fact that a wider strategy needs to be implemented to ensure that area-wide measures are in place, not simply measures associated with the development sites. The creation of a premium bus network and BRT services is fundamental to the future success of the PUSH area alongside improved rail infrastructure. It is also clear that containment within sites is important as there will be fewer external trips and that there is considerable scope for internal trips to make use of sustainable modes.

Figure 7.1 Motorway Capacities Base Assignment AM Peak

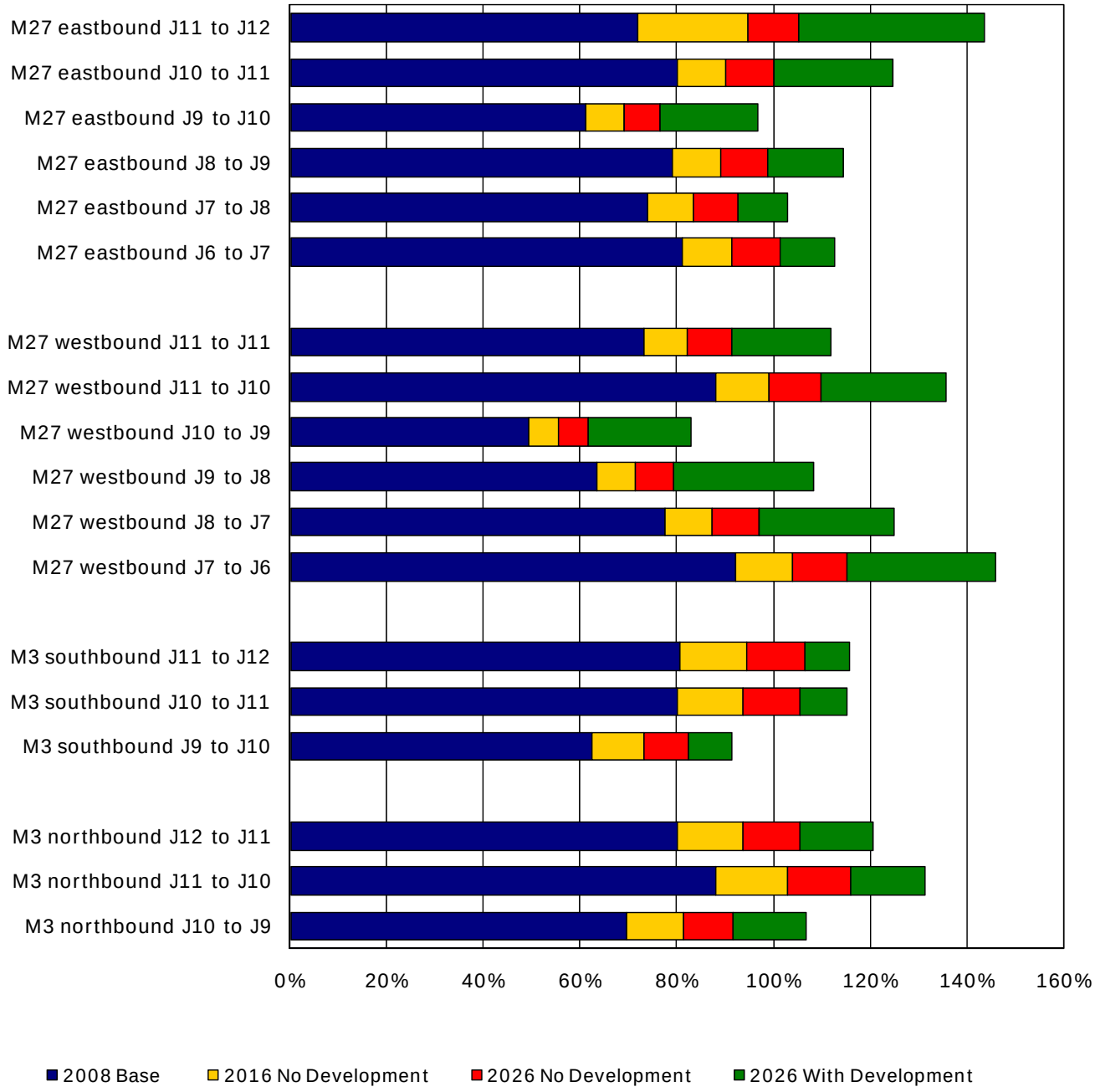


Figure 7.2 Motorway Capacities Base Assignment Daily Traffic

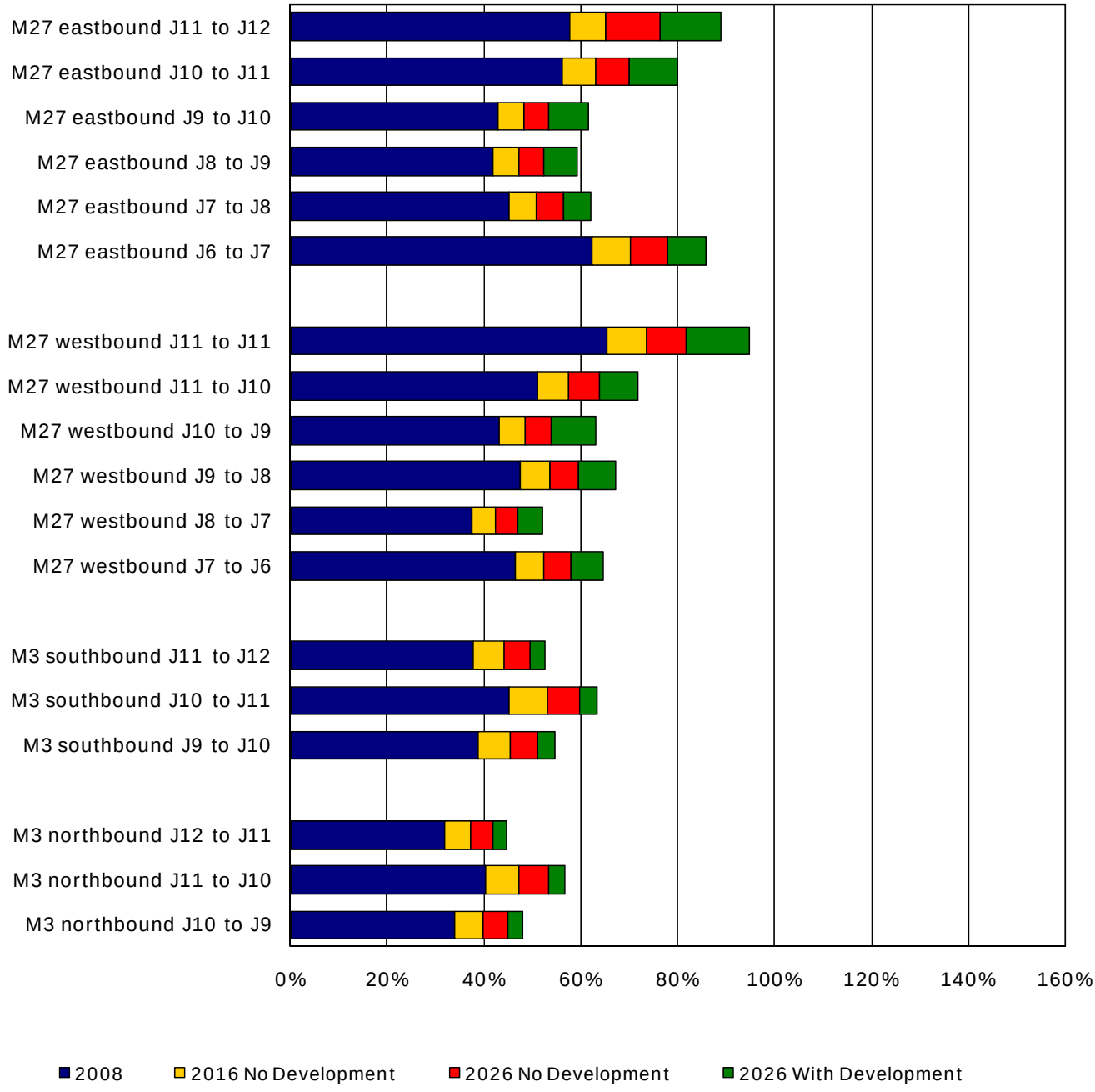


Figure 7.3 Motorway Capacities Do Something Assignment AM Peak

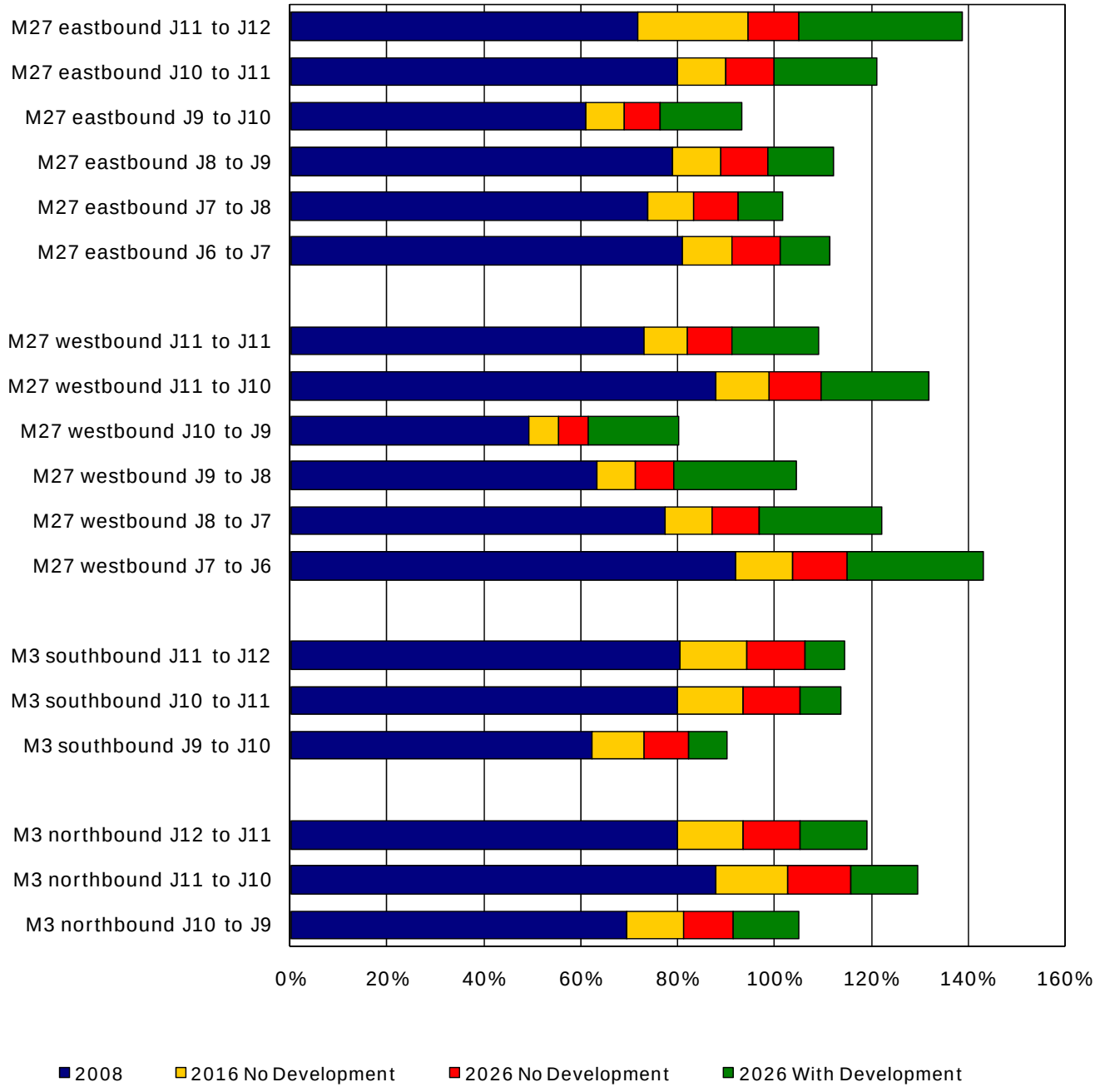


Figure 7.4 Motorway Capacities Do Something Assignment Daily Traffic

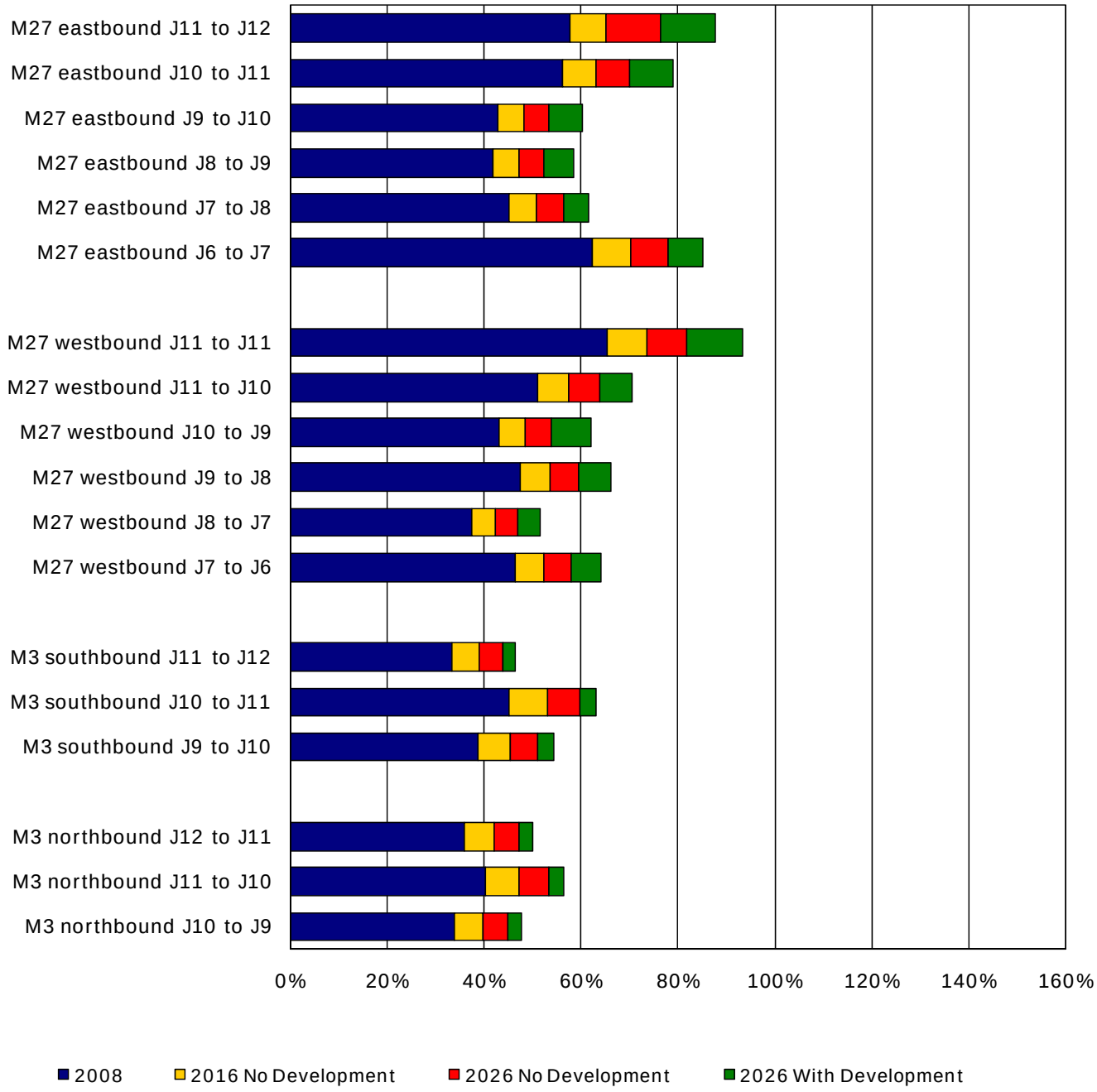


Figure 7.5 Motorway Capacities Do Maximum Assignment AM Peak

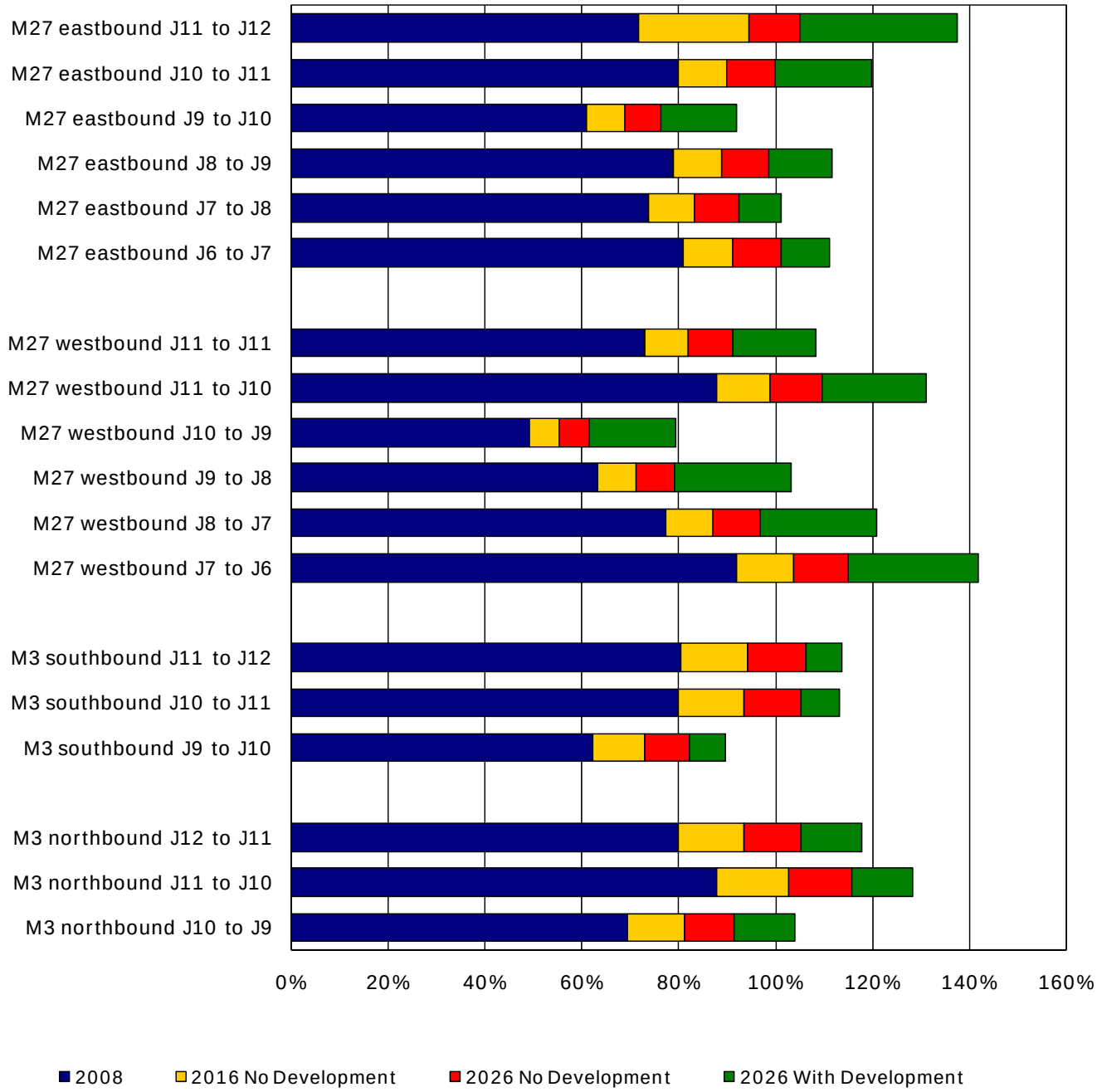
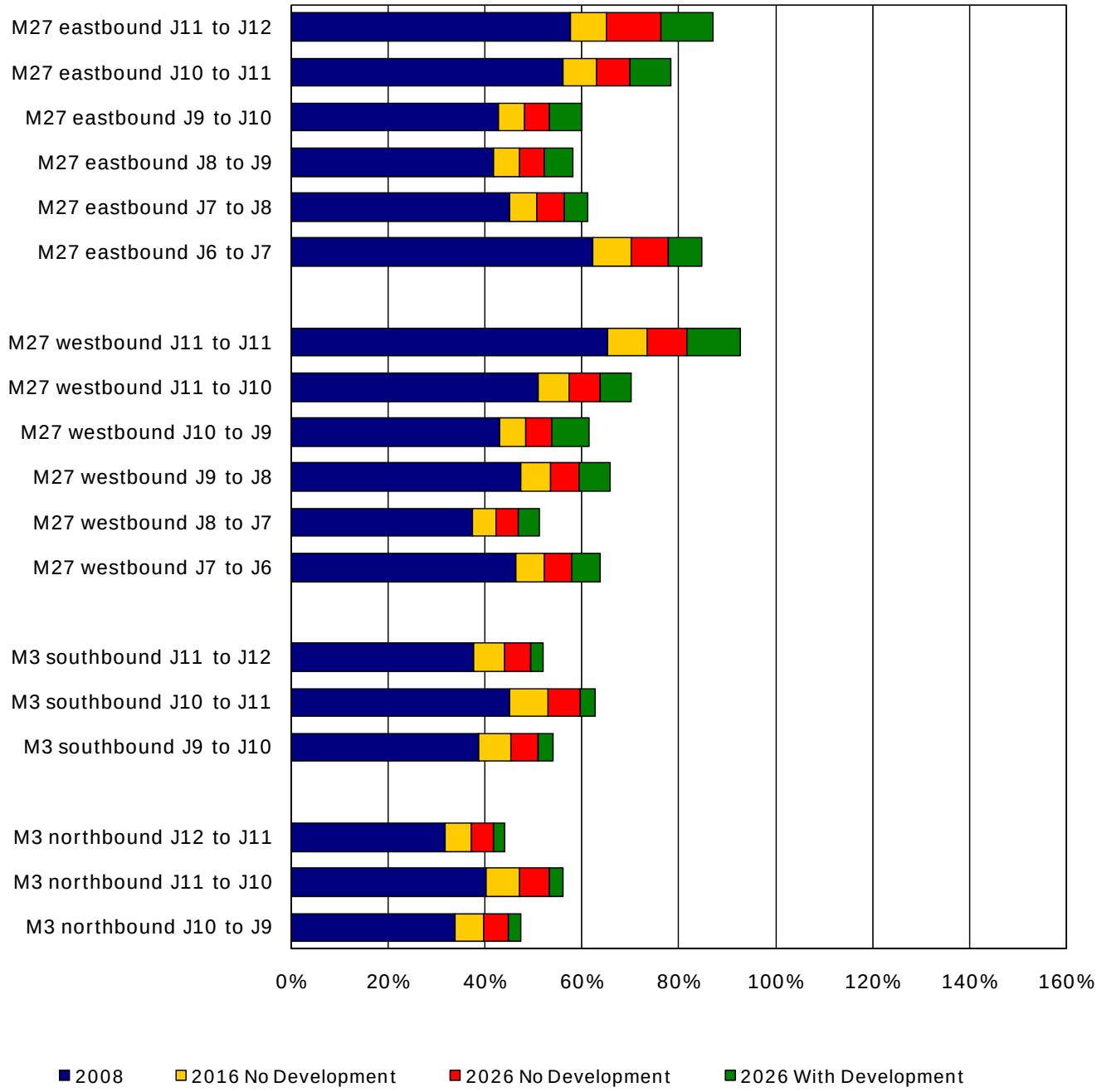


Figure 7.6 Motorway Capacities Do Maximum Assignment Daily Flows



7.6.4 Figures 7.7 and 7.8 show the detailed assignment of trips for AM Peak and daily total for the base assumption scenario with no mitigation measures in place; Figures 7.9 to 7.12 show the revised assignment for AM Peak and daily total for Do Something and Do Maximum scenarios.

Figure 7.7 Motorway Flows With Development Sites Base Assumption - AM Peak

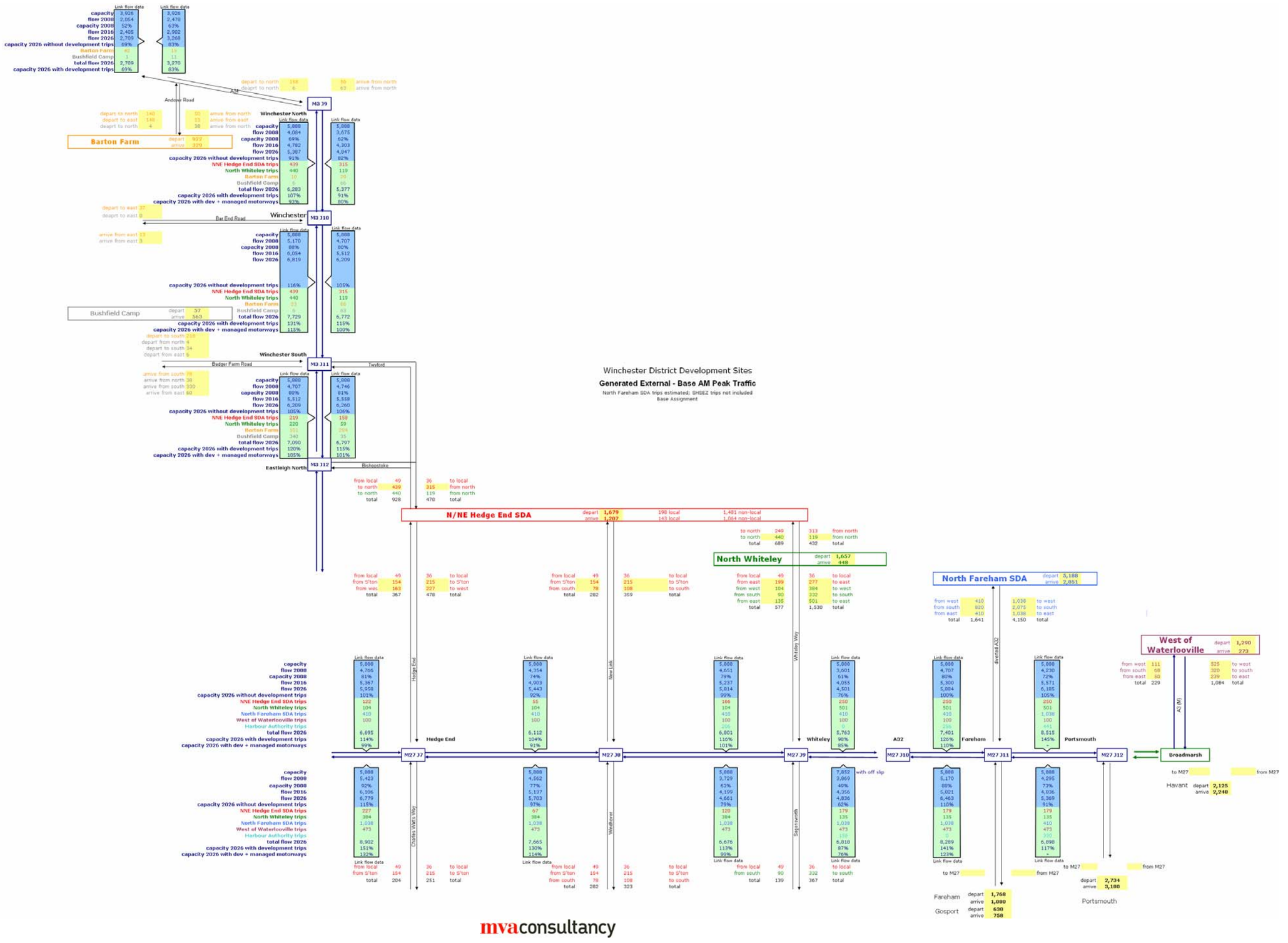


Figure 7.8 Motorway Flows With Development Sites Base Assumption - Daily

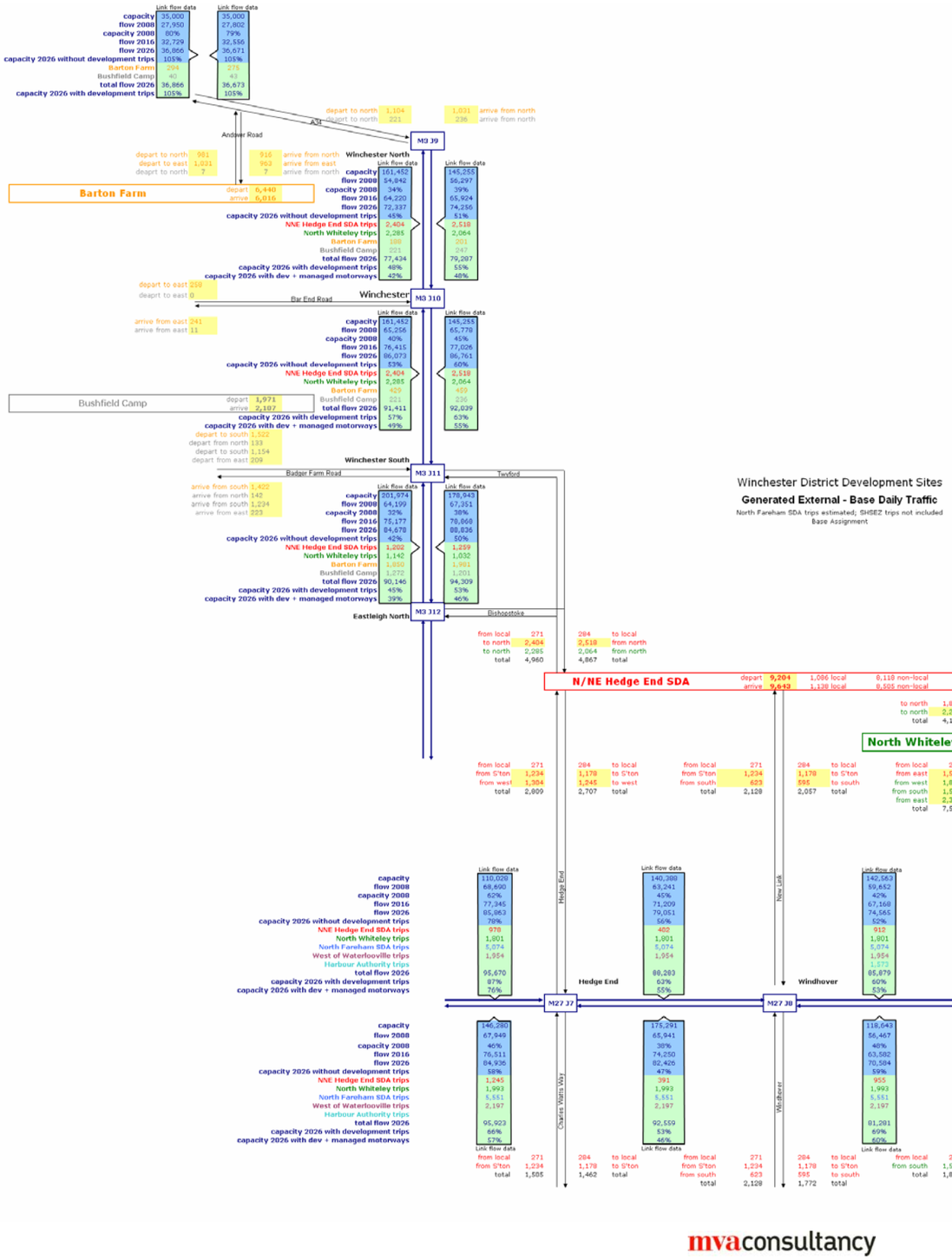


Figure 7.9 Motorway Flows With Development Sites Do Something AM Peak

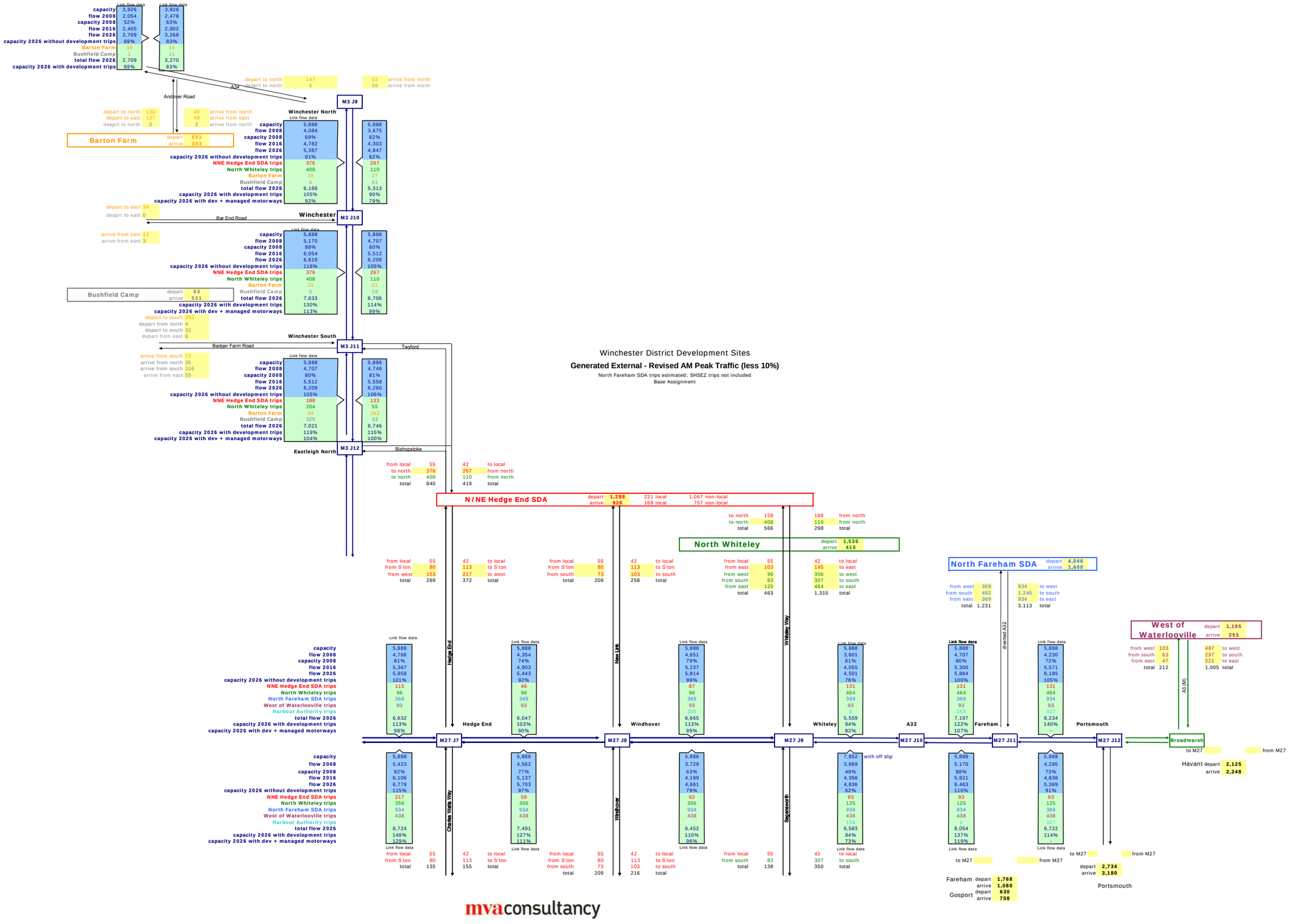


Figure 7.10 Motorway Flows With Development Sites Revised Do Something Daily Traffic

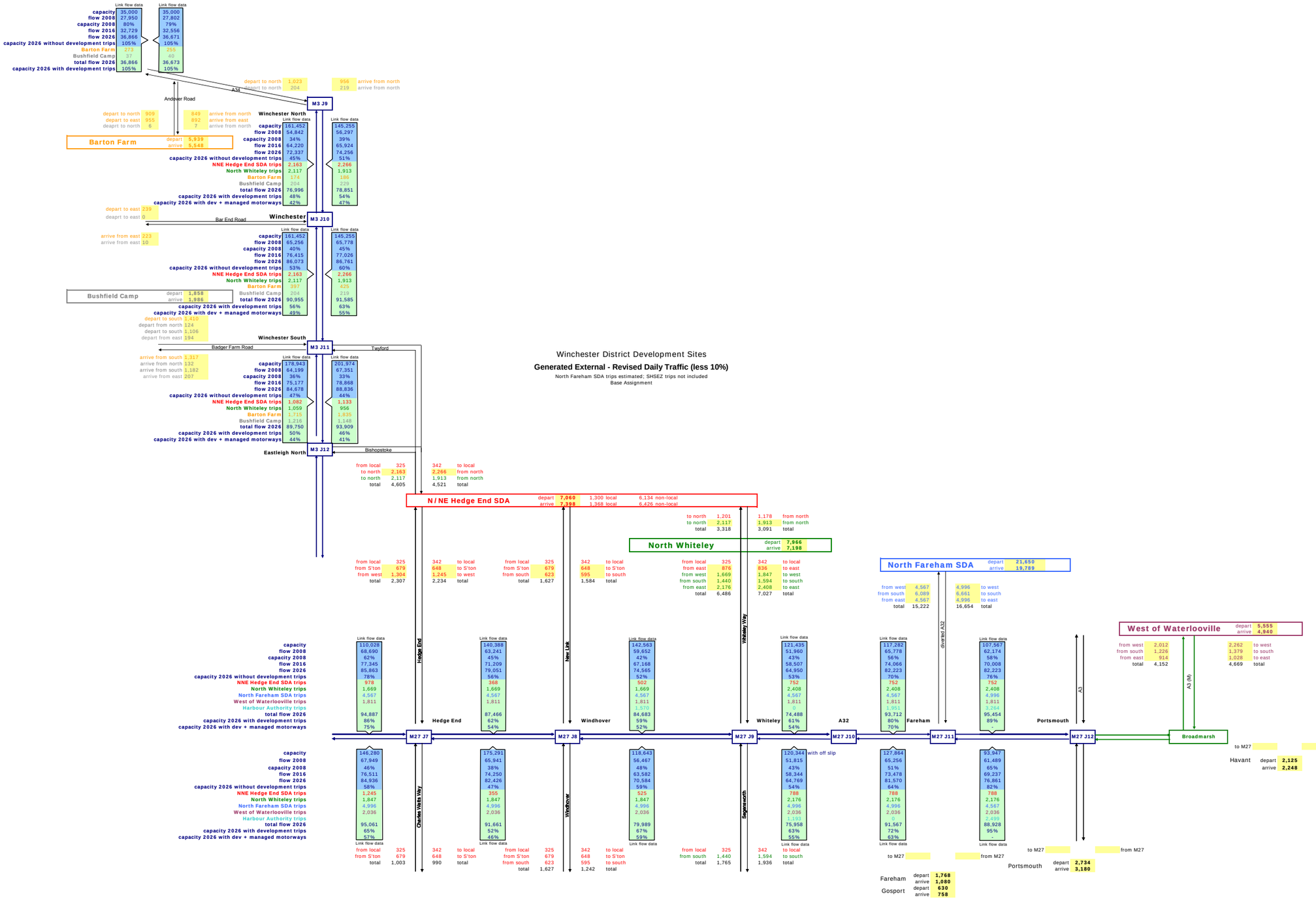


Figure 7.11 Motorway Flows With Development Sites Revised Do Maximum AM Peak

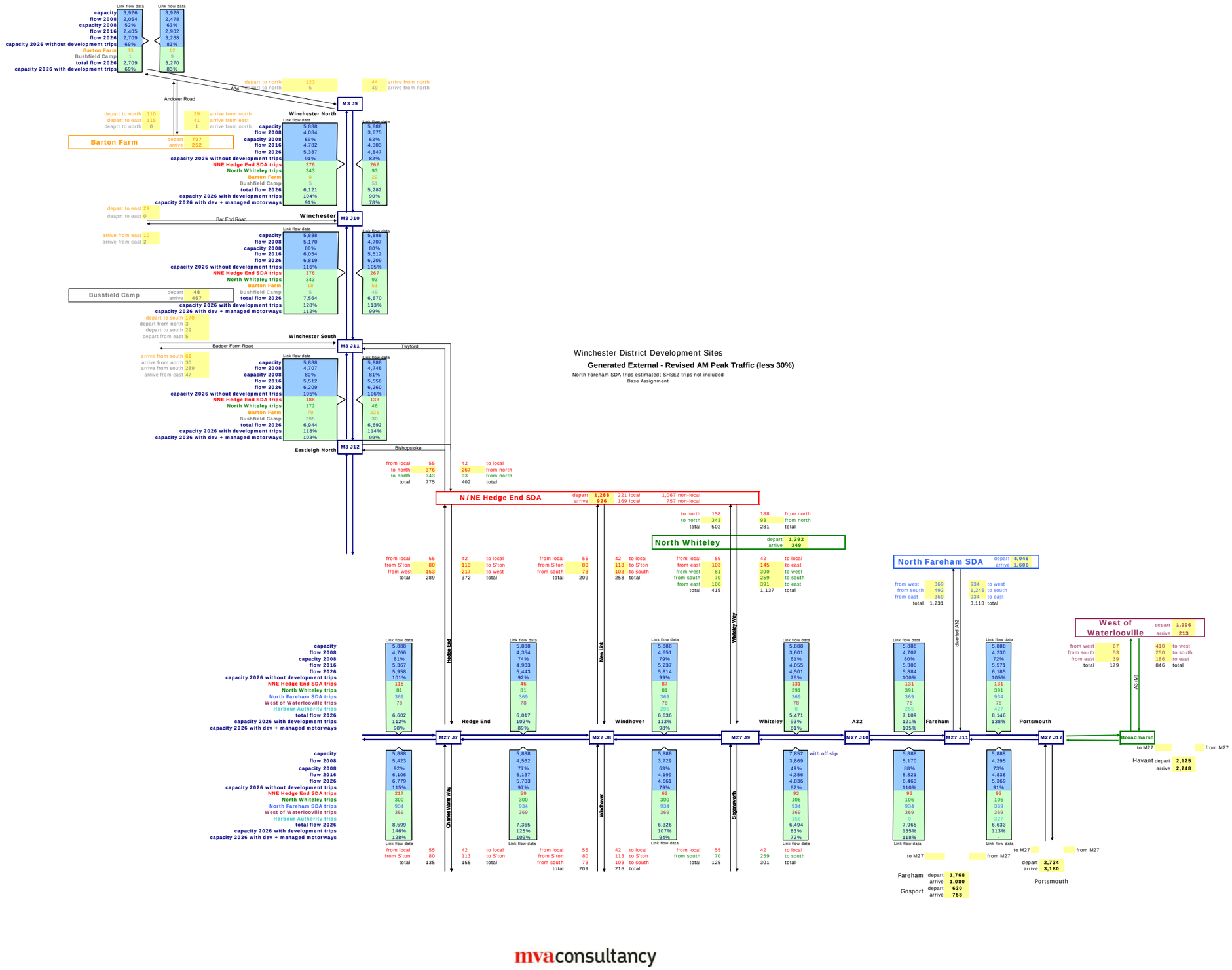
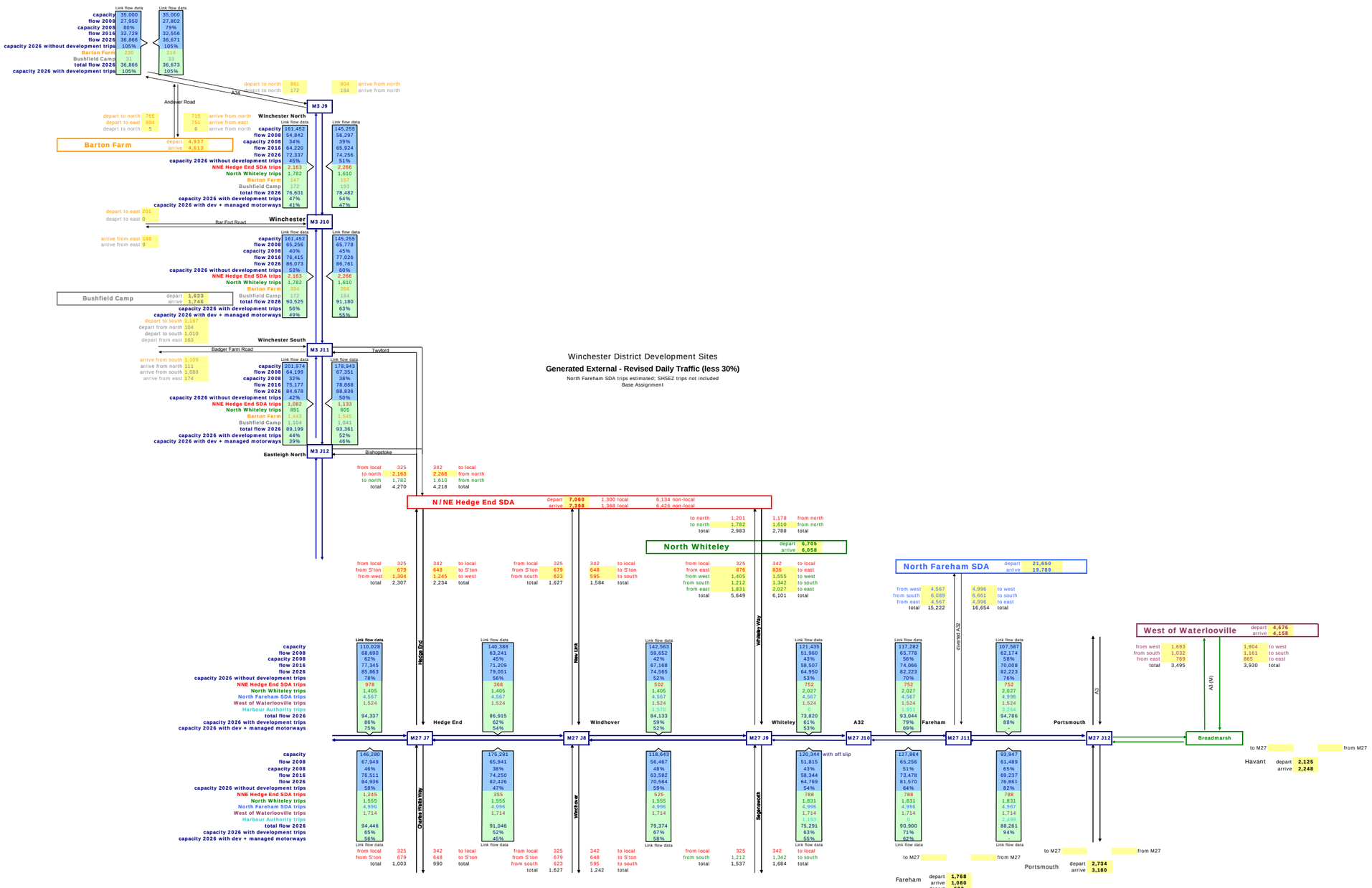


Figure 7.12 Motorway Flows With Development Sites Revised Do Maximum Daily Traffic



8 Conclusions and Recommendations

8.1 This Study in Context

8.1.1 The Winchester Core Strategy is one of several LDF's in Hampshire delivering targets set by DCLG and captured in the South East Plan for provision of housing and job requirements in the South East. The level of development within South Hampshire is significant and, cumulatively will have an impact on the local and strategic road networks.

8.1.2 The scale of development expected in Winchester District and neighbouring planning authorities will require improvements funded through the development process, but not all problems can be dealt with by the development market. It is therefore apparent that the Government has a key role in helping to fill gaps in infrastructure provision through a mixture of funding sources at local, regional and national level.

8.1.3 The proposed sites with the District, at Barton Farm, Bushfield Camp, North Whiteley and West of Waterlooville, together with smaller allocations in market towns and rural communities will generate significant volumes of traffic and travel demand. Much of the increase will focus on the M3 and M27 motorways and will add to projected increases in background traffic levels.

8.1.4 This study forms part of a dynamic and complex evidence base that is emerging as plans for development areas and area-wide transport strategies become crystallised. This report has used information that is available within its timeframe, but the overall transport evidence base will evolve as other studies are completed. We would anticipate that further information on transport issues may be available in advance of the Core Strategy Examination.

8.2 Synopsis of Evidence Available

8.2.1 The Stage 1 study investigated a wide range of alternative land use distribution options in terms of their impacts on transport infrastructure and sustainability. It was prepared on the basis of a fixed amount of housing and employment land being required across the District and sought to understand the most appropriate means of distributing those requirements to minimise transport impacts, reduce pressure on existing transport infrastructure and exploit the potential of smarter travel measures. The Core Strategy and the preferred distribution of land uses contained within it were informed by the evidence contained with the Stage 1 report alongside parallel evidence streams.

8.2.2 The assessment of potential transport impacts of the proposed allocations within the Core Strategy are grounded in a robust but dynamic evidence base. Core data regarding traffic flow, public transport availability and network performance forms the foundation of the assessment.

8.2.3 This has been complemented by up to date evidence of the effectiveness of behavioural change interventions to reduce travel impacts. Based on current experience, there is evidence that high-intensity travel plans that are well considered and implemented effectively, can deliver the site-based modal shifts that are forecast. The LDF is looking forward to 2026, by which time we can realistically expect a much greater understanding of

the most effective travel planning measures. It is also a realistic expectation that take up of travel planning measures at a population level will be greater than at present, due to the effects of increased congestion, higher awareness and acceptance of climate change issues and increases in fuel / oil costs.

8.2.4 Historic evidence shows that travel planning has become increasingly effective over time, as the above issues gain a stronger foothold within individuals, organisations and society. Evidence suggests the best travel plans today can achieve modal shift of up to 35% away from solo car use. We have no reason to believe that this trend will alter going forward. We therefore consider that, whilst in today's terms a target for 30% mode shift may appear ambitious, viewed in the light of current evidence, it is a realistic assumption for forecasting purposes.

8.2.5 Additional information on emerging development parameters has been made available through the course of undertaking this study; these parameters are evolving in response to market conditions and public consultation and we have used the latest and best information available to inform our analysis.

8.2.6 South Hampshire is undergoing significant change and development pressures in the period to 2026. Work to understand the impacts of change and interventions necessary to facilitate growth is ongoing. At the time of writing, we are aware of the following workstreams being undertaken in parallel with this Study:

- **Commissioned / managed by HCC**
  - Sub-regional corridor study for Hedge End / Whiteley area – brief being prepared
  - Highway modelling for Whiteley area, recently completed
  - South Hampshire Multi-modal model – currently out to commission
  - South Hants DaSTS study underway, commissioned by SE Partnership Board
  - Separate strategies in various stage of preparation for Reduce, Manage & Invest components of PUSH strategy
- **Commissioned by other LA's**
  - Harbours LDF Impacts study (Portsmouth, Fareham & Gosport Councils)
  - Bushfield Camp – viability study (Winchester CC)
- **Commissioned by Developer groups**
  - Barton Farm – consultation on revised masterplan recently completed
  - Bushfield Camp – masterplanning
  - North Whiteley masterplanning and strategy preparation.
  - Whiteley 'Local centre' planning application – to be determined

8.2.7 Our assessment is aimed specifically at considering the transport impacts of proposed development within Winchester District, within the context of PPS12. On the basis of the evidence currently available, areas of potential problems have been identified and a mitigation strategy developed, including contributions to improvements on the SRN. The study forms part of a wider evidence base that in combination, seeks to assess longer term

transport impacts and mitigation across South Hampshire in a more detailed manner. It has sought to use reasonably available information on major developments beyond the District boundary to assess potential impacts within the District.

8.3 Justification for Transport Proposals

8.3.1 Not surprisingly, the scale of development anticipated with the District has potentially adverse impacts on the transport network. Our forecasts show additional pressures will be experienced on the M3 south of Winchester as a result of Barton Farm and Bushfield Camp developments, and on M27 at Junction 9 as a result of the expansion of Whiteley. These pressures will be experienced even with the implementation of a range of smarter travel interventions aimed at reducing travel demand at source.

8.3.2 Our forecasts are based on estimations of travel demand from the proposed developments, and reductions in demand achieved through smarter travel interventions relate to reductions in travel demand arising from the development site in question, rather than background traffic levels.

8.3.3 The transport mitigation package necessary to unlock development of this scale is extensive over the plan period, and will need to be delivered through partnership between the development industry, public sector local transport funding and Government intervention. Our analysis suggests that full delivery of the mitigation measures identified will unlock potentially significant changes to sustainable travel habits.

8.3.4 The mitigation package proposed is built upon analysis of the evidence base presented through the study timeline and is, in our assessment, the most appropriate response to the development challenges posed. There must be an emphasis on:

- Reducing the need to travel by providing local facilities within the site or close by, particular for regular journeys such as commuting;
- Integrating the new communities with established communities in terms of local travel patterns;
- Promoting sustainable travel behaviour not only within the development sites but across established communities;
- Ensuring that walking and cycling will play a much greater role than at present rather than assuming that a shift from local journey journeys will happen;
- Reviewing the implementation of parking policies in terms of further constraints on supply at destinations (public and private non-residential) and making best use of park and ride facilities;
- Placing a major emphasis on bus and bus rapid transit as a means of avoiding car use which will require significant capital expenditure;
- Working with the relevant highway authorities to identify any necessary and appropriate highway improvement schemes and to agree contributions towards implementation of those schemes that are in keeping with specifically identified traffic impacts.

8.3.5 This approach is entirely consistent with the national and regional transport policy agenda as outlined in PPG13, DaSTS, the South East Plan and other documents. It overlaps with policy themes emerging through the social inclusion, health and environmental agendas and represents a sustainable approach to major development over the longer term.

8.4 Effectiveness of Proposed Strategy

8.4.1 The proposed transport strategy will require the involvement of a range of partners to deliver the full extent of benefits. The development industry will be crucial in this regard and, despite current economic frailties, it can be reasonably expected that development partners would be responsible for delivering the lions' share of mitigation measures through the plan period.

8.4.2 Major investment is also required in strategic infrastructure, such as the SRN and rail networks, in order to unlock capacity constraints for longer distance travel and economic growth. South Hampshire is undergoing significant change in Winchester District and neighbouring areas and it is reasonable to anticipate funding interventions from public sector and Government sources to reduce any shortfalls in transport infrastructure supply.

8.4.3 As identified above, various studies are currently underway to identify and prioritise the most effective interventions. Decisions on future transport priorities for the region beyond 2014 are not yet crystallised and these will only become clear during 2011/12 as the current round of DaSTS studies publish their conclusions. Publication of the third Local Transport Plans in 2011 will also set out transport priorities at a local level.

8.4.4 There is an expectation that the current transport studies will use the proposed land use strategy to 2026 as described in the Core Strategy to inform and influence transport proposals, priorities, funding and delivery schedules.

8.4.5 At the same time, the studies offer the opportunity to examine alternative interventions and measures, bringing flexibility into the strategy.

8.5 Closing Remarks

8.5.1 This assessment is founded on a robust evidence base and offers a clear, deliverable transport strategy in response to the consequences of development proposals set out in the Core Strategy.

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